

**KIGGAVIK
PROJECT**

Hockey Pucks and Radiation



Keeping the stats on radiation:

- Radiation doses in humans are measured in "Sieverts" (Sv).
- Most doses we experience are very, very small – and are measured in "millisieverts" (mSv), $1,000 \text{ mSv} = 1 \text{ Sv}$
- The average Canadian is exposed to a dose of 2.4 mSv per year, from a variety of natural and artificial sources in everyday life.
- Most workers at uranium mines receive less than 1 mSv per year through their work with ionizing radiation.



Playing safe:

- The Canadian Nuclear Safety Commission assumes that any dose, no matter how small, can carry risk. Playing hockey carries risk. As with most things in life we have to balance risk with the benefits. Working with radioactive materials brings many benefits to our society:
- * medical diagnosis and treatment;
 - * commercial and industrial products;
 - * scientific and technical advances in research and development;
 - * food safety; and
 - * production of electricity.
- The use of ionizing radiation is regulated to protect workers and the public. Agencies regulate and inspect AREVA's operations to help reduce the risk from radiation hazards.
- Radiation also comes from natural sources (such as from minerals or the sun) in the everyday life of all Canadians, and is not monitored or regulated.


$${}^{\circ}\mathbf{b} \triangleright \lambda \Delta^a \mathbf{a} {}^{\circ}\sigma {}^{\circ}\mathbf{b} : \triangleright \mathbf{C} \Delta^c \mathbf{C} {}^{\circ}\sigma {}^{\circ}\mathbf{C} \mathbf{b}.$$

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Figure B.2-3 Hockey Pucks and Radiation Display

Wildlife Monitoring and Protection Activities

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- Implements a Wildlife Mitigation and Monitoring Plan that is updated and provided to regulators annually
- Provides monthly reports during the field season to the Baker Lake Hunters and Trappers Organization and Government of Nunavut – Dept. of Environment
- Is committed to continual improvement with IQ and other feedback that helps to identify and implement best practices

[illegible]

- Are hired from Baker Lake
- Provide protection to both humans and wildlife
- Are encouraged to independently report to the Baker Lake community
- Have access to all areas of camp including drill rigs
- Provide consistent monitoring throughout field season
- Advise and assist the environmental group

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Figure B.3-1 Wildlife Monitoring and Protection Activities Display

Wildlife Monitoring and Protection Activities

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- Modified baseline data collection methods in 2009
- Prevention of potential aerial disturbance through identification and early warning of approaching caribou by:
 - GN and GNWT satellite collar updates
 - Local wildlife monitors employed to conduct ground-based surveys
- All caribou observations reported to the Environment Supervisor on site who modifies helicopter flights as required to avoid caribou and minimize disturbance
- Use of Skytracker to monitor and enforce helicopter altitude restrictions
- Exceptions to desired altitudes allowed for flight safety, low ceilings and slinging activity; exempted flights are recorded and reported



To find out more information on the proposed Kiggavik project or on-going exploration activities please visit the Kiggavik Blog at www.kiggavik.ca or the AREVA website at www.avearesources.ca.

- Ask A Question!
- Download the Project Proposal or Annual Reports
- Learn about Upcoming Events
- View AREVA's Kiggavik videos
- Read AREVA's Environment and Safety policies
- Read a Community Update
- Learn about other AREVA Projects

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- [illegible]

Figure B.3-2 Wildlife Monitoring and Protection Activities Display

AREVA Resources Canada A Partner in Your Community

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→ **Community Engagement**

- Opened in 2006 – open year round
- Staff available to answer questions on proposed Kiggavik Project and exploration activities



- Formed in 2006 to share information between AREVA and the community of Baker Lake
- Approximately 10 meetings per year
- Meetings are open to the public and translation is provided
- Meetings dates/times announced on local radio and minutes are kept in the Baker Lake office
- Members of the CLC are appointed by their associated organization and the Chair is elected by the group
- Baker Lake groups represented in the CLC include:
 - The Hamlet Council
 - Hunters and Trappers Organization (HTO)
 - The District Education Authority (DEA)
 - The Aberdeen Lake People
 - The Business community
 - The Youth Group
 - The Elders Society
 - The Health Committee
 - The Justice Committee



→ **მაცნე** **საქართველოს**

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Figure B.4-1 AREVA Resources Canada, A Partner in Your Community Display



AREVA Resources Canada A Partner in Your Community

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- Whale Cove Food Bank



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Kivalliq Community Information Sessions Report
Appendix B – Information Material

AREVA Resources Canada A Partner in Your Community

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AREVA sites visits

Since 2005 133 community people have visited the Kiggavik camp. Visitors have included elders and their families, liaison committees, people who have asked questions on the blog, and the Baker Lake HTO.

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Homeland visits

	Date	Location	Community Participants
2006	Jul 27	Aberdeen Lake and Beverly Lake	12
	Jul 28	Aberdeen Lake and Beverly Lake	3
	Aug 24	Aberdeen Lake	3
2007	Aug 17	Schultz Lake and Aberdeen Lake	4
	Aug 21	Schultz Lake	4
	Aug 21	Judge Sissons Lake	5
2008	Sep 5	Malloy Lake	4
	Sep 6	Schultz Lake	4
	Sep 7	Hurmet River	4
	Aug 11	Garry Lake	4
	Aug 12	Aberdeen Lake and Beverly Lake	4
2009	Aug 13	Aberdeen Lake	4
	Sep 9	Schultz Lake and Aberdeen Lake	4
	Sep 10	Sand Lake	4
	Aug 28	Schultz Lake	4
2010	Aug 28	Ferguson Lake	4
	Aug 29	Schultz Lake	4
	Total	16 Homeland visits	71 Participants



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Figure B.4-4 AREVA Resources Canada, A Partner in Your Community Display

KIGGAVIK
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AREVA Resources Canada A Partner in Your Community

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Community Partner



Locally hired workforce

- 35 Inuit Workers in 2007
- 31 Inuit Workers in 2008
- 35 Inuit Workers in 2009
- 30 Inuit Workers in 2010

Some locally hired positions include:

- Camp construction
- Camp maintenance and operations
- Wildlife Monitors
- Wildlife Consultant Assistant
- Archaeological Assistant
- Geological Assistant
- Kitchen Assistant

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Northern benefits from 2007-2010

Northern Contracts	2007	2008	2009	2010	Total
Inuit Owned companies	\$1.3M	\$2.0M	\$1.8M	\$2.4	\$7.5M
Other Northern companies	\$1.1M	\$1.5M	\$1.0M	\$0.5	\$4.1M
Total	\$2.4M	\$3.5M	\$2.8M	\$2.9	\$11.6M



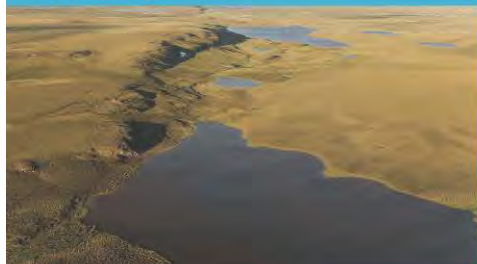
▷▷▷⁶C⁶▷▷▷ Δb⁷C▷▷▷σ⁸Γ^c
2007-Γ^c 2010-Ј^c

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ᐃᓄᓴᓂ ᐱᓴᓂᓴᓂᐅᓴᓂ	\$1.3ᓴᓂᑦ	\$2.0ᓴᓂᑦ	\$1.8ᓴᓂᑦ	\$2.4	\$7.5ᓴᓂᑦ
ᐃᓴᓂᑦ ᐃᑭᓴᓂᑦ ᐅᓄᓴᓂᑦ ᐱᓴᓂᓴᓂᐅᓴᓂ	\$1.1ᓴᓂᑦ	\$1.5ᓴᓂᑦ	\$1.0ᓴᓂᑦ	\$0.5	\$4.1ᓴᓂᑦ
ᐅᓄᓴᓂᑦ	\$2.4ᓴᓂᑦ	\$3.5ᓴᓂᑦ	\$2.8ᓴᓂᑦ	\$2.9	\$11.6ᓴᓂᑦ

Figure B.4-5 AREVA Resources Canada, A Partner in Your Community Display

KIGGAVIK
PROJECT

Valued Components



Valued ecosystem and socio-economic components and indicators

Valued components (VCs) are broad ecological and socio-economic elements that are used during an environmental assessment to ensure a complete view is considered when describing the potential effects of a project.

Groups of indicators within each VC are carefully selected by the proponent, with input from regulators and stakeholders. This helps ensure that the environmental assessment is focused on key indicators that are most important to the people and that represent the ecological and socio-economic health of the region.

Within the Kiggavik Project, a VC category can include animals, plants or even measures of community well-being like household income, and time spent engaging in traditional activities. It is important that VCs and their associated indicators have scientific, ecological and social, cultural, economic, historical, archaeological or aesthetic importance.



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Figure B.5-1 Valued Components (VC) Display

Valued Components

[illegible]

Kivalliq Community Information Sessions Report
Appendix B – Information Material

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An environmental assessment (EA) looks at the interactions of a project with the environment. Some of these interactions may result in various effects. The significance of these effects is considered in the EA.

The Kiggavik Project is being designed to minimize the magnitude, geographic extent, duration, frequency, and probability of potential adverse effects on the natural and socioeconomic environments.

Kiggavik Project progressive reclamation and comprehensive decommissioning plans will be used to return the environment to a condition suitable for traditional uses.



- the magnitude and complexity of adverse effects;
- the geographical extent and the size of the human and the animal populations likely to be affected;
- the frequency and duration of adverse effects;
- the reversibility or irreversibility of adverse effects;
- the probability of adverse effects occurring.

In addition to individual effects, the EA also considers potential for cumulative adverse effects given past, present and future relevant events. Regulators ultimately decide if a project is likely to have significant adverse environmental effects.

An effect is a change in the natural or socio-economic environments caused by or related to project activities.

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Figure B.6-1 Environmental Assessment Display

[illegible]

Figure B.7-1 VC Flip Chart: SocioEconomic Elements Display

What Do You Think? ‘ᑭᓄᑦ ᐃᎊᐱ?

AREVA has prepared a list of elements within the ecological and socio-economic category by focusing on:

- Indicator species such as wildlife that are most likely to interact with the Kiggavik project and/or have a designated conservation status;
- Specific habitats and broad species groups to ensure fair representation of the environment and important characteristics;
- Aspects important to human health, well being and socio-economic interests.

It is important for residents of the Kivalliq region to have input on the selection of VCs and indicators to ensure that the things that are important to them are captured in the environmental assessment.

Please share with us why some these elements hold a particular value to you so that we can further refine the VC list for the Kiggavik environmental assessment.

CATEGORY ᐱᐅᐸ ᐱᐳᐸᐸᐸ	ECOLOGICAL ELEMENTS ᐳᐸᐸᐸᐸᐸᐸᐸᐸ ᐃᐸᐸᐸᐸᐸᐸᐸ	DOES THIS HAVE VALUE TO YOU? WHY? ᐸᐸ ᐱᐸᐸᐸᐸ ᐃᐸᐸᐸᐸ ᐼᐸᐸ?
Atmospheric Environment ᐸᐸᐸᐸ ᐳᐸᐸᐸᐸ	Air quality ᐸᐸᐸᐸ ᐸᐸᐸᐸᐸ	
	Weather ᐸᐸᐸᐸ ᐳᐸᐸᐸᐸᐸ	
	Noise ᐸᐸᐸᐸᐸᐸ	
Terrestrial Environment ᐃᐸᐸᐸᐸᐸᐸ	Landforms ᐃᐸᐸᐸ ᐳᐸᐸᐸᐸᐸᐸᐸ	
	Soil ᐸᐸᐸᐸᐸ	
	Deer ᐸᐸᐸᐸᐸᐸᐸ	
	Lichen ᐸᐸᐸᐸᐸᐸᐸ	
	Caribou ᐸᐸᐸᐸᐸ	
	Grizzly bear ᐸᐸᐸᐸᐸᐸ	
	Moose ᐸᐸᐸᐸᐸᐸᐸ	
	Arctic wolf ᐸᐸᐸᐸᐸᐸ	
	Wolverine ᐸᐸᐸᐸᐸᐸ	
	Arctic fox ᐸᐸᐸᐸᐸᐸᐸ	
	Lemming ᐸᐸᐸᐸᐸᐸᐸ	
	Sika deer ᐸᐸᐸᐸᐸ	
	Tundra swan ᐸᐸᐸᐸᐸᐸ	
	Falcon ᐸᐸᐸᐸᐸᐸ	
	Merganser ᐸᐸᐸᐸᐸᐸᐸ	
	Pintail duck ᐸᐸᐸᐸᐸᐸᐸᐸ	
	Sandpiper ᐸᐸᐸᐸᐸᐸᐸ	
Freshwater Environment ᐸᐸᐸᐸᐸᐸᐸ	Water quality ᐸᐸᐸᐸ ᐸᐸᐸᐸᐸᐸ	
	Water flow ᐸᐸᐸᐸ ᐸᐸᐸᐸᐸᐸ	
	Aquatic plants ᐸᐸᐸᐸ ᐸᐸᐸᐸᐸᐸ	
	Algae ᐸᐸᐸᐸᐸᐸᐸ	
	Sediment ᐸᐸᐸᐸ ᐸᐸᐸᐸᐸᐸᐸ	
	Bottom feeding fish (e.g. whitefish, sucker) ᐸᐸᐸᐸ ᐸᐸᐸᐸᐸᐸᐸ ᐸᐸᐸᐸᐸᐸ (ᐸᐸᐸᐸᐸ)	
Marine Mammals ᐸᐸᐸᐸᐸᐸᐸᐸ	Predatory fish (e.g. trout, charr; Arctic grayling) ᐸᐸᐸᐸ ᐸᐸᐸᐸᐸᐸᐸ (ᐸᐸᐸᐸᐸᐸ, ᐸᐸᐸᐸᐸᐸᐸ, ᐸᐸᐸᐸᐸᐸᐸ)	
	Seal, whale, polar bear ᐸᐸᐸᐸ, ᐸᐸᐸᐸᐸᐸᐸ, ᐸᐸᐸᐸᐸᐸᐸ	

Please use the stickers provided to tell us what you think. ᐸᐸᐸᐸᐸᐸᐸ ᐸᐸᐸᐸᐸᐸ ᐸᐸᐸᐸᐸᐸᐸᐸ ᐳᐸᐸᐸᐸᐸᐸᐸᐸᐸ.

AREVA

Figure B.7-2 VC Flip Chart: Ecological Elements Display

Attachment C COMMENT SURVEY

Attachment D PRESENTATION MATERIAL


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2010



AREVA Resources Canada Inc.
Kiggavik Project EIS
December 2011

Objectives



- ▶ **Project Update**
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- ▶ **Meet the Kiggavik Team**
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- ▶ **Follow up from previous community meetings with more information on radiation protection**
 ከጥራት ምርጫ ምዕራፍ ከጥራት ምርጫ ምዕራፍ ጋር በተያያዘ የሚከተለውን ጥያቄ ማሳሰቢያ
- ▶ **Bring Back Information On VCs**
 ጥራት ምርጫ ምዕራፍ ማሳሰቢያ
- ▶ **Meetings/ Workshops with Groups**
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Kivalliq Community Tour Nov., 2010 - p.3

AREVA ጥራት

- ▶ **AREVA's business is producing clean energy**
- ▶ **Electricity without greenhouse gases**
- ▶ ጥራት ምርጫ ምዕራፍ ማሳሰቢያ
- ▶ ጥራት ምርጫ ምዕራፍ ማሳሰቢያ



Kivalliq Community Tour Nov., 2010 - p.4

Figure D.1-2 Kiggavik Project Open House PowerPoint

The AREVA Way – Our Commitments



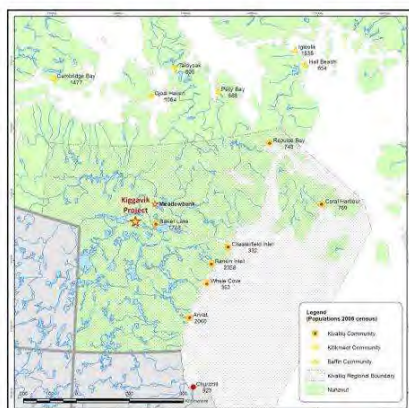
- ▶ **Respect for the environment**
- ▶ **Social/societal expectations**
- ▶ **Economic development**

Kivalliq Community Tour Nov. 2010 - p.5



Project Location

- ▶ Located 80 km west of Baker Lake
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- ▶ Owned by AREVA Resources Inc. and joint venture partners JCU and Daewoo.
- ▶ ᐱᓯᓂᓴᓂᓗᑦᓴᓐ ᑕᓚᓂᓴᓴᓂᓐ ᑦᓴᓂᓴᓂᓐ
ᑕᓴᓂᓴᓂᓐᑕᐁᓂᓐ ᓇᓯᓂᓐᑕ ᑦᓴᓂᓐ
ᑕᓇᓂᓴᓂᓐᑕ ᑦᓴᓂᓐᑕᐁᓂᓐᑕᓴᓂᓐ.



Kivalliq Community Tour Nov, 2010 - p.6



Figure D.1-3 Kiggavik Project Open House PowerPoint

$\mu < \frac{1}{2} \leq \mu \leq 1$

-
- A wide-angle photograph of a massive open-pit mine. The mine is characterized by numerous horizontal terraced levels, or benches, which are light-colored, likely limestone or a similar mineral. A prominent, winding road or conveyor system curves through the lower levels of the mine. In the center-right, a large, dark, circular area contains several yellow excavators and other heavy machinery, indicating active mining operations. The background shows a clear blue sky and a line of trees on the horizon.



$\Delta^c \Gamma \subset \delta^c$ $\Delta^c \Gamma \subset \delta^c$

-



- ▶ $\Delta^{\text{P}}\Gamma^{\text{S}}\text{CD}\sigma\text{-d}^{\text{C}}$ $\triangleright$ $\text{C}\Delta^{\text{C}}$ $\text{CL}\text{D}\Gamma^{\text{S}}\text{L}$ $\text{D}\text{J}\Gamma\Delta\text{D}\Gamma^{\text{S}}$ $\text{b}\Gamma^{\text{S}}\text{P}^{\text{S}}\text{CD}\Gamma\text{L}\text{L}^{\text{C}}$ $\text{P}\Gamma^{\text{S}}\text{D}^{\text{S}}$



Facilities

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AREVA Resources Canada Inc.
Kiggavik Project EIS
December 2011

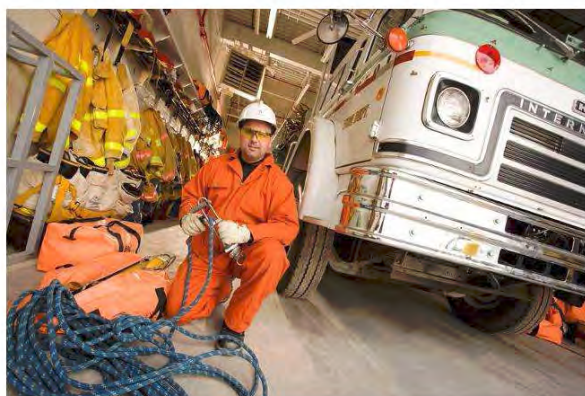
AREVA Performance
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Radiation Protection
 ᐅᓕᓐᓂᓐᓂᓐᓂᓐ ᓂᓐᓂᓐᓂᓐ



Kivalliq Community Tour Nov, 2010 - p.15



AREVA Performance
 ᐱᓕᓕᓐ ᐱᓕᓕᓐᓂᓐᓂᓐ
Occupational Health and Safety
 ᐱᓕᓕᓐᓂᓐ ᐱᓕᓕᓐᓂᓐᓂᓐ
 ᐱᓕᓕᓐᓂᓐ ᐱᓕᓕᓐᓂᓐᓂᓐ



Kivalliq Community Tour Nov, 2010 - p.16



Figure D.1-8 Kiggavik Project Open House PowerPoint

$${}^{\epsilon}d\zeta_a {}^{\epsilon}b {}^{\epsilon}d\zeta' L^{C'} \dot{a}$$

Check us out on and

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facebook

◀LC▶^{9b} **You Tube**



Figure D.1-12 Kiggavik Project Open House PowerPoint

Attachment E SIGN-IN SHEETS

Over 18 yrs.

Sign In Sheet



Date: Nov. 15/2010
Location: Arviat

Print Name

1. Doris ukulokuk
2. Cecilia Kinniksie
3. Elisapee Kautah
4. Eva Alikut
5. Billy Falavik
6. Pess Peterson
7. Janine Kablutsiak
8. Ryan St. John
9. Dorothy St. John
10. Tracy Link
11. Annie Ollie
12. William Ollie
13. Linda Sheetaga
14. Babette Sheetaga
15. Joe Jr. Ishahook
16. Celina Iootna
17. Kwon Aiyarani
18. Sally Arviut
19. Angeline Kinniksie
20. ERNIE EETAK
21. Greg Ryan Sewee
22. Linda Nuturatsunuk
23. Anita Nutarsonuk
24. Bobby Iootna
25. Margaret Kanayok
John Kanayok
Sebastian Kanayok
Tracy Kanayok
Tony

Figure E.1-1 Arviat

Over ~~20~~ 18 yrs.

Sign In Sheet



Date: Nov. 15/2010

Location: Arviat

Print Name

1. HELEN BAKER.
2. Petra Kalverboer
3. Keegan O'Toole
4. Nancy Uluadluak
5. Hannah Suluk
6. Charlene Akammak
7. R. Arcand
8. Chi-chi Arinze
9. Agnes Sham ee
10. Robert Young
11. Mary Mazurek
12. Elizabeth Komak
13. Gordon Billard
14. Peter Komak
15. Keith Alukut
16. Maryanne Komak
17. Cecilia Akammak
18. EMILIA OKATSIK
19. Agnes KOMAKJUK
20. Theresa A. Nibgoarsi
21. Sadie Komakjuk
22. Mary Akammakjuk
23. Mike Alukut
24. Pete Two Anukut
25. Lucy AKAMM at

Figure E.1-2 Arviat