Kiggavik Project
Final Environmental Impact Statement

Tier 2 Volume 9:
Socio-Economic Environment and Community

Part 1 - Socio-Economic Environment

September 2014

History of Revisions

Revision Number	Date	Details of Revisions
01	December 2011	Initial release Draft Environmental Impact Statement (DEIS)
02	September 2014	FINAL Environmental Impact Statement

Foreword

The enclosed document forms part of the Kiggavik Project Final Environmental Impact Statement (FEIS) submission, presenting potential environmental and social impacts to determine if the Project should proceed and if so, under what terms and conditions. The submission has been prepared for the Nunavut Impact Review Board by AREVA Resources Canada Inc. 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)", to include new material or clarity provided during the review of the Draft Environmental Impact Statement, and to address company commitments and direction from the Nunavut Impact Review Board as outlined in the "Preliminary Hearing Conference Decision Concerning the Kiggavik Project (NIRB File No. 09MN003)".

The FEIS submission consists of a number of documents, as shown in the attached road map. These documents have been categorized into tiers, as follows:

Tier 1 document (Volume 1) provides a plain language summary of the Final Environmental Impact Statement.

Tier 2 documents (Volumes 2 to 10) contain technical information and provide the details of the assessments of potential Project environmental effects for each environmental compartment. Tier 2 Volume 11 contains executive, popular, and volume summaries in Inuktitut.

The Tier 2 documents each have a number of technical appendices, which comprise the **Tier 3** supporting documents. These include the environmental baseline reports, design reports, modelling reports and details of other studies undertaken to support the assessments of environmental effects. Management plans are provided as Tier 3 documents.

Volume 1
Main Document

Volume 2 Project Description and Assessment Basis

- Governance and Regulatory Oversight
- Project Description
- Assessment Basis

- **2A** Alternatives Assessment
- **2B** Drilling and Blasting Design
- **2C** Explosives Management Plan
- **2D** Design of Ore and Mine Rock Pads and Ponds
- **2E** Water Diversion and Collection Design
- **2F** Design of Andrew Lake Dewatering Structure
- **2G** Kiggavik-Sissons Road Report
- **2H** Ore Storage Management Plan
- **2I** Water Management Plan
- **2J** Marine Transportation
- **2K** Winter Road Report
- **2L** All-Season Road Report
- **2M** Roads Management Plan
- **2N** Borrow Pits and Quarry Management Plan
- **2O** Mine Site Airstrip Report
- **2P** Occupational Health and Safety Plan
- **2Q** Radiation Protection Plan
- **2R** Preliminary Decommissioning Plan
- **2S** Waste Management Plan
- **2T** Environmental Management Plan
- **2U** Hazardous Materials Management Plan
- **2V** Mine Geotechnical Reports

Volume 3 Public Engagement and Inuit Qaujimajatuqangit

Part 1
- Public Engagement

Part 2
- Inuit Qaujimajatuqangit

- **3A** Public Engagement Documentation
- **3B** Inuit Qaujimajatuqngit Documentation
- **3C** Community Involvement Plan

Volume 4 Atmospheric Environment

Part 1
- Air Quality and Climate Change

Part 2
- Noise and Vibration

- **4A** Climate Baseline
- **4B** Air Dispersion Assessment
- **4C** Air Quality Monitoring Plan
- **4D** Baker Lake Long-Term Climate Scenario
- **4E** Noise and Vibration Assessment
- **4F** Noise Abatement Plan

Volume 5 Aquatic Environment

- Surface Hydrology
- Hydrogeology
- Water and Sediment Quality
- Aquatic Organisms
- Fish and Fish Habitat

- **5A** Hydrology Baseline
- **5B** Geology and Hydrogeology Baseline
- **5C** Aquatics Baseline
- **5D** Groundwater Flow Model
- **5E** Prediction of Water Inflows to Kiggavik Project Mines
- **5F** Mine Rock Characterization and Management
- **5G** Thermal and Water Transport Modelling for the Waste Rock Piles and Tailings Management Facilities
- **5H** Waste Rock Water Balance
- **5I** Hydrology of Waste Rock Piles in Cold Climates
- **5J** Tailings Characterization and Management
- **5K** Historical and Climate Change Water Balance
- **5L** Kiggavik Conceptual Fisheries Offsetting Plan
- **5M** Aquatics Effects Monitoring Plan
- **5N** Hydrology Assessments
- **5O** Sediment and Erosion Control Plan
- **5P** Technical Assessments of Water Withdrawal Locations and Baker Lake Dock Site

Volume 6 Terrestrial Environment

- Terrain
- Soils
- Vegetation
- Terrestrial Wildlife

- **6A** Surficial Geology and Terrain Baseline
- **6B** Vegetation and Soils Baseline
- **6C** Wildlife Baseline
- **6D** Wildlife Mitigation and Monitoring Plan

Volume 7 Marine Environment

- Marine Water and Sediment Quality
- Marine Mammals
- Marine Fish

- **7A** Marine Environment Baseline
- **7B** Underwater Acoustic Modelling

Volume 8 Human Health

- Occupational Dose Assessments
- Human Health Risk Assessment

- **8A** Ecological and Human Health Risk Assessment
- **8B** Radiation Protection Supporting Document

Volume 9 Socio-Economic Environment and Community

Part 1
- Socio-Economic Environment

Part 2
- Heritage Resources

- **9A** Socio-Economic Baseline
- **9B** Archaeology Baseline
- **9C** Human Resources Development Plan
- **9D** Archaeological Resource Management Plan

Volume 10 Accidents, Malfunctions and Effects of the Environment on the Project

- Risk Assessments
- Effects of the Environment on the Project

- **10A** Transportation Risk Assessment
- **10B** Spill Contingency and Landfarm Management Plan
- **10C** Emergency Response Plan

Volume 11 Executive, Popular and Volume Summaries Translated into Inuktitut

KEY:

Tier 1 Document	Tier 2 Document	Tier 3 Document
Main Documents	Environmental Effects Assessment Report	Technical Appendices, Baseline Reports, Technical Development and Management Plans

Executive Summary – Socio Economic Environment

Nunavut is the regional assessment area for the Kiggavik Project. There will be economic benefits to the territorial economy and increased revenues to Government of Nunavut (GN) and Nunavut Tunngavik Inc. (NTI). The Kivalliq Region and its seven communities of Arviat, Baker Lake, Chesterfield Inlet, Coral Harbour, Repulse Bay, Rankin Inlet and Whale Cove make up the local assessment area for the Project. Baker Lake and Chesterfield Inlet are the communities closest to lands and natural resources with some potential to be affected by the Project, but in addition all communities will see economic and social benefits as well as some changes to traditional culture and wellbeing.

Nunavut's Economy

Nunavut's economy and people have unique characteristics, including i) the importance of the mixed economy; ii) a requirement to use renewable and non-renewable resources in sustainable ways that benefit Inuit; iii) the value of Inuit Qaujimajatuqangit (IQ) to economic and social development decision making; iv) decentralization to give communities control of their own development; v) a need to develop self-reliance in face of overdependence on federal transfers; and vi) a very young and rapidly growing population with important socio-economic challenges.

Nunavut's economic development plans focus on the economic sectors that can provide the most growth and employment, without harming the environment. These sectors are mining, tourism and commercial fishing. To achieve growth in these sectors, investments are needed in education, small business development, transportation, energy and telecommunications.

Nunavut's mixed economy has both wage and land based components. The wage based economy provides cash income. The land based economy provides food and materials, but also important social and cultural benefits to Inuit. Most people try to be active in both the wage and land based parts of the economy. The wage based part of Nunavut's economy has been growing, however not as quickly as needed to provide enough jobs for employable population. The land based component is growing slower still. Constraints include the high cost of travel on the land, less harvesting by the young, poor markets for animal pelts and climate change. Young Inuit have, however, indicated that traditional, land based skills are being adapted into modern ones associated with the wage economy, and that this provides means of earning money (IQ BLY 2009).

Unemployment rates have been going up. The unemployment rate in Nunavut was about 19% in July 2011, but for young people it was almost 40%. Most of the unemployed are young Inuit men. Jobs will need to be created faster than they have been in the recent past to reduce unemployment rates as the young grow up to working age. GN expects that mining will bring more economic growth and wage employment over the coming decade than any other sector. Nunavut is rich in mineral

resources, there are large mining projects in development (Meliadine, Mary River and Kiggavik) and exploration interest is very high.

The description of the existing environment for Kivalliq and its communities comes from over ninety i) focus groups discussions in the seven communities with elders, women, youth, hunters, workers, spouses of workers and/or artists; and ii) interviews with individuals. The socio-economic baseline report also relies on IQ collection and consultation results.

Kivalliq's Economy

Kivalliq has an approved land use plan that also says that the best potential for economic development is likely in the mining sector. The plan sets out conditions for mining, indicating that mining projects should cause no environmental damages and that benefits of mining should go to Kivalliq communities and people. The plan for Kivalliq also states that people in Kivalliq value employment opportunities for youth.

Activity on the land provides food, clothing and arts and crafts materials but it is also very important to maintaining Inuit culture. Very few people hunt full time or almost full time anymore but most people continue to go out on the land. Elders are concerned that mine workers may become too dependent on mine work and not buy hunting equipment or go hunting (IW RIE 2009), however, rotational workers said that having employment means they can afford hunting gear, such as ATVs or snowmobiles, and that combined with a two week on and two week off rotation, they can go on the land and hunt more than they were able to prior to employment (IQ BLRW 2009).

It is possible to very roughly estimate how important harvesting is to Kivalliq households. Country food substitutes for about half of what total food costs would be if all food was bought in stores. The practice of harvesting also confirms identity, social relations, values and knowledge.

Kivalliq's Social Context

Kivalliq's population grew from 7,944 to 9,479 people between 2001 and 2009, an average growth of close to 2% per year. The region's population in 2013 was 10,266, an average growth of 2.4% from 2007 to 2013. At the time of writing for the Draft Environmental Impact Statement (DEIS), the fastest growing community was Repulse Bay and the slowest growing was Chesterfield Inlet. From 2007 to 2013 all Kivalliq communities experienced some population growth Repulse Bay and Whale Cove experiencing the highest increase percentages and Chesterfield Inlet and Rankin Inlet the lowest.

While the most complete information on education levels is from 2006 at the time the DEIS was written, it is still generally representative of educational trends in the region, and shows that less than 40% of adults have completed high school. On average, younger people are less educated than

older people. The problem of not finishing high school is particularly serious in males. Some claim that it is harder for boys to get through school than it is for girls. There are, however, some recent signs that this trend may be changing. In Kivalliq there were twice as many high school graduates in 2010 than there were in 1999. Most high school principals think that up to half of their students will graduate over the coming years. This is positive, but still means that half of children will not complete high school.

People in Kivalliq feel better about their health than people do in Nunavut as a whole. But they also feel that their health has gotten worse recently, even though people see doctors more often. Flu and respiratory problems are the most common health issues in the region. Infectious disease outbreaks are frequent, mostly because of overcrowding and shortages of water. Sexually transmitted infection rates are high. Health care workers are seeing more instances of diabetes and low blood iron, both of which are attributed to reduced activity on the land and less consumption of country foods than in the past. Health workers also state that it is hard for them to diagnose psychological problems such as suicidal intentions and other mental illnesses, and that these are important health problems. Smoking, alcohol and drug abuse and uncontrolled gambling are also problems. These harmful behaviours lead to other negative effects on health and on family and community wellbeing.

The maintenance of traditional culture is a very important component of people's wellbeing. Traditional culture gives people identity, and protects more vulnerable people by providing food and other assistance. Many Elders depend on traditional harvesting for food and clothing (IQ CHE 2009). Family and community ties are maintained through sharing of country food. Traditional celebrations demonstrate recognition and emotional support for people's achievements. Activity on the land keeps skills alive and reinforces Inuit values such as environmental protection, cooperation, resourcefulness and providing for others.

It has been hard for some people to adjust to recent cultural shifts and changes in values. Employer expectations of those engaged in the wage economy and the expectations of people in Inuit culture can vary, causing cross-cultural conflict. Some people may feel that their social obligations interfere with their goals for advancing in the new economic environment. People also speak about the misunderstanding between generations that has come with the introduction of southern people's values and material goods. Some elders feel that traditional culture is losing strength in the young. Most of the young say that they are close to their families, respect their elders and respect their culture, but that traditional skills and values are not, in their view, as useful now.

Traditional life meant people had clear gender roles. Men hunted to provide food and materials, while women gathered resources and cared for children and matters of the home. Today, men find it difficult to provide for their families if they don't have wage employment and money to go on the land. While some women are still occupied with traditional roles associated with child care, others have begun to hunt caribou and small mammals such as fox (IQ ARE 2009).

Inuit no longer live exclusively off the land, and traditional culture has begun to change. Most people are focused on how to manage change, with the realization that it will continue to happen in the future. Inuit have, however, maintained their language over the past decade, with strong commitment to learning and speaking Inuktitut. Elders note, however, that many children are using English more now than they did in the past (IQ BL EL Sep 2013).

High crime rates reduce community wellbeing. Kivalliq has lower crime rates than Nunavut as a whole, but rates are still much higher than in Canada overall. People in communities note that smaller and more traditional communities have less crime than Arviat, Baker Lake and Rankin Inlet. Poverty and substance abuse are contributing factors in high crime rates, but difficulty associated with cultural change is also part of the explanation.

Housing is an ongoing problem in all of Nunavut, but is worse in most Kivalliq communities. More than half of houses are overcrowded or in need of major repairs. Poor housing has negative effects on health, on the way family members get along, and on children's school work. About 40% of people in Kivalliq say they would move if they could. This high demand for housing will continue to increase as the young population grows older, and as more people decide they want to live in their own houses rather than with their families.

At the time that the DEIS was written numbers on employment in Kivalliq were out of date, and did not describe the employment changes that have come with Meadowbank. In 2006, Kivalliq was worse off than the rest of Nunavut, and much worse off than Canada, in terms of unemployment rates. The numbers show that some people in Kivalliq had become so discouraged that they were not looking for work. Women's unemployment rates were lower than men's. Most jobs were with government or in retail stores. Since 2006, for a number of new employment opportunities have been created in Kivalliq, most notably associated with the Meadowbank mine, exploration companies and businesses supplying the mining industry. People believe that unemployment rates have gone down, particularly in Baker Lake.

Most people say that there is a need for jobs for people who want to work but that it can be hard for Inuit willing to work on rotation, away from their families. Some people can take rotational jobs and be successful, while others have greater difficulty. People who get and keep jobs at Meadowbank say they are more confident in themselves, are proud to be able to provide for their families, and are learning skills on the job. Other people don't like the work and/or the rotation, so they resign.

As part of the socio-economic field work, in 2010 AREVA asked people in 90 different families in Baker Lake questions about their harvesting practices and diets. This was done to corroborate and update the results of studies done ten years ago, to see if there had been changes to harvesting and diets after the development of Meadowbank. It seems clear from AREVA's study results that traditional activity is very highly valued, and has stayed constant or increased. The results also show that high employment in Baker Lake in 2010 has not become a barrier to traditional activity.

Issues and Effects

With thousands of engagement, IQ and socio-economic comments from people in Kivalliq and governments, there are very many issues that people have said are important to assess. For purposes of the socio-economic assessment, these have been grouped into six major socio-economic components: i) community economies; ii) traditional culture; iii) community wellbeing; iv) public infrastructure and services; v) non-traditional land use and land use planning; and vi) the economy of Nunavut. Each of these major socio-economic components has been further broken down into VSECs, including such things as employment, harvesting levels, language, health, family function, savings, demand for housing, policing, tourism, land use in Baker Lake and revenues to GN and NTI.

Community Economies

There are many interactions not just between VSECs and the Project, but between one VSEC and another. For example, the Project will create jobs, which in turn can affect the practice of traditional culture, which in turn can affect wellbeing. Different individuals or groups of people can respond differently to an effect. For example, some individuals respond negatively to rotational work with poor personal choices, and a rotational job will have a different effect on the worker than on the spouse, who is more likely to be a woman. Generalizing about effects quickly becomes unsatisfactory to many people, but is necessary.

Very broadly, the Project's primary effect is the creation of economic opportunities for Kivalliq labour and businesses, during both construction and operations. Because such direct benefits have ripple effects throughout economies, more people that just Kiggavik workers and suppliers will see new economic opportunities. Community economies will grow, and job experience, education and training, and contracting experience will enhance the capacity of the labour force. The benefits of economic opportunities to Kivalliq residents are expected to gain momentum with time.

Rotational work does not require people to move, but people with jobs are free to choose to move, should they desire, and have the economic means to do so. Most jobs created in community economies are expected to be in Baker Lake and Rankin Inlet as these two hamlets have the competitive advantages of geography and experience to date. Thus some in migration, predominantly from other areas of Kivalliq, may occur in these two hamlets. Decisions to migrate are considered more likely to occur during the early years of operations, as people adjust to rotational employment and foresee some economic security for themselves and their families.

Traditional Culture

Taking up these new economic opportunities has implications for traditional culture, as more people transition into the wage based economy and adapt to the expectations and requirements of operating in cross cultural working environment. Particularly in concert with ongoing cultural change in Kivalliq, this process is expected to contribute to a cultural shift.

Income and rotational work provide resources and opportunities for harvesting. But a cultural shift can result in less practice of traditional activity, more use of English, and less commitment to the application of traditional values and knowledge (IQ RIE 2009; CHW 2009; CHAH 2009; CHW 2009). Any reduction of harvesting, or sharing of harvest, has potential for effect on food security (particularly of the more vulnerable), nutrition and thus health (IQ CIHT 2009).

Ongoing government support for traditional culture is expected to ensure that at least some proportion of the population retains traditional skills, language, values and knowledge. The effect, again not only of the Project but also of other factors, is expected to one of reduced practice rather than loss.

Wellbeing

Both increased incomes and cultural shifts have implications for wellbeing at the individual, family and community levels. Many people thrive with expanded economic opportunity, securing their roles as providers within families and having the incomes and savings to increase their standards of living and household economic security. Some people, however, do not. In failing to personally manage stresses, they can have negative effects on their families. As well, any erosion of traditional culture can have negative effects on some individuals' sense of wellbeing and also sets up potential for discord within families, including between genders and between generations.

Individual challenges with new economic opportunities are not expected to manifest in reduced individual, family or community wellbeing overall. Unemployment and poverty also are causes of negative social behaviours, and some people may not respond well to new economic opportunities. To the extent that people do struggle with transitioning to the wage economy, this is likely to be most often seen during the construction phase and early years of operations, until such time as adjustments and adaptations can be made.

Not all people will have access to new economic opportunities. Some will be of the more vulnerable segments of the population, such as single female parents of young children and the more unemployable. Any erosion of traditional culture, particularly of harvesting and sharing – a safety net for the less fortunate – has potential for harm, including to elders no longer able to harvest. Inuit values of sharing, consensus decision making and equity have some potential to give some way to

the more individualistic ethic of southern culture, with consequent effects on, for example, crime levels and social cohesion.

Public Infrastructure and Services

In the expectation that overall, community wellbeing will increase as a result of the Project, need for some social services should also decrease, particularly social assistance. There is however a correlation between increased income and increased demand for health, housing and municipal services. Increased incomes also imply more need for police, as people have greater access to controlled substances and alcohol, which can lead to increased mischief and disorderly conduct-related crime. Improving economic opportunities are expected to motivate more demand for education, and thus increase demand for educational services.

These are benefits to the extent that government is able to deliver in a timely way, but where there is some disconnect between new demand and supply response, the more vulnerable are expected to disbenefit disproportionately. There are also cost implications where capacity constraints are identified, however AREVA's payments of royalties and taxes will provide significant additional revenues to GN (as well as NTI). As with most other potential negative effects of the Project, any disconnects between supply and demand are expected to be resolved with time.

Nontraditional Land Use

The Project, if approved, is expected to be a stimulus to mining development, including uranium mining development, in western Kivalliq. Mining development is a stated goal of both territorial and regional governing agencies. Nunavut does not yet have a finalized land use plan that identifies appropriate use for specific areas but draft plans have been made publically available for review and comment so that land use designations to support both the land-based and wage-based economy are known.

Economy of Nunavut

As Meadowbank has demonstrated, large mining projects can be expected to have enormous effects on Nunavut's economic indicators. GDP, employment, labour income and investment levels will change dramatically for the better in response to both the construction and operations phases of the Project. As noted above, revenues of GN and NTI will also increase.

Socio-economic Management

To manage socio-economic effects, AREVA has developed a Community Involvement Plan and a Human Resource Development Plan. Project design has been adjusted, in response to community

input, to protect environmental resources (and consequences on harvesting) and to alleviate some perceived risk with uranium development. Socio-economic management, however, is primarily effected through commitments to implement measures to mitigate the potential for negative effects, and, more importantly, to enhance benefits for Inuit. Socio-economic management also includes extensive opportunities for community engagement and participation in Project decision making, and collaborative monitoring.

It is noted that proposed socio-economic mitigation focused on benefit enhancement is anticipated to be further detailed in the Inuit Impact Benefit Agreement (IIBA) negotiated with KIA. The measures are derived from lessons learned elsewhere in Nunavut and northern Canada, and suggestions during engagement. AREVA's corporate experience in Saskatchewan has also been drawn upon.

AREVA intends to maximize **employment and contracting opportunities** for people in Kivalliq communities. The major elements of this are i) preferential hiring, including points of hire in each of the Kivalliq communities; ii) preferential contracting, and helping businesses to overcome barriers to accessing Project contracting; iii) education, training and scholarship programs; iv) accommodating Inuit culture in the workplace as practical for improved job satisfaction; and v) wide dissemination of information on available employment and business opportunities.

It is noted that **education and training** will include a range of programming, for example pre-employment, life skills, high school completion, postsecondary, on the job, and mentoring programs for workers and prospective workers are anticipated. AREVA will also work with Kivalliq education authorities and others to create multi-party initiatives to implement school based programs for children, to contribute to their ability over the longer term to successfully participate in both the wage and land based economic activity.

Work force management policies are largely intended to ensure that Inuit employees are equitably compensated, have the opportunity to engage in traditional activity and are provided workplace conditions that accommodate Inuit culture. There is also the expectation that all workers will conduct themselves appropriately both at the mine site and when in communities. Workforce management measures emphasize; i) rotational work schedules to enable trips on the land in weeks off work; ii) worker codes of conduct (including expectations of respect for difference) iii) facilitating, where appropriate, use of Inuktitut and traditional practices at the mine site.

AREVA's initiatives to support individual, family and community **wellbeing** include: i) providing a confidential employee and family assistance program; ii) making available at the mine site peer or elder counselors; iii) providing communication systems for people to stay in touch with families; and iv) supporting community initiatives to address community priorities towards enhanced wellbeing, including as potential examples, assistance to elder and child care and recreational opportunities for youth.

Risks to worker and public health and safety are managed through i) the application of best health and safety practice; ii) emergency response planning; and iii) avoiding and minimizing any environmental effects that have potential to affect livelihood resources and/or public health. Nevertheless heightened perception of risk is expected. This will be addressed through continuing education on uranium mining, and its environmental and socio-economic effects.

AREVA will continue to **engage**, including with elders to capture **IQ** for input on socio-economic management measures and needed adjustments (adaptive management) throughout Project development, operation, and decommissioning. AREVA will also continue to provide the information people need to engage and participate in the Project effectively. AREVA fully acknowledges the importance of conducting meetings and providing information in both English and Inuktitut.

Monitoring with include reporting on the uptake of economic opportunities, and topics identified through collaboration with communities, KIA, GN and AANDC. A framework for collaborative monitoring of community wellbeing will be developed, primarily through participation with the Kivalliq Socio-Economic Monitoring Committee (SEMC). Details remain to be worked out as the Project moves towards construction.

Closure (premature or final) effects are most keenly felt at the end of employment and business opportunities, and the consequent negative social effects of an economic downturn. The measures described above include a number of elements that are intended to enhance the economic and social resiliency of communities, which will attenuate some potential for negative closure effects. Work and business experience will give people a competitive edge in other sectors of the economy. The emphasis on education and training will enhance workforce and business capacity to offer services. Further, at closure, retrenchment programs and alternative livelihood training will be offered where necessary.

It is noted that many of the residual effects are contributions of the Project to the ongoing socio-economic dynamic and trends in the Kivalliq Region. As such, governments already have in place a large number of legal instruments and programs that have been developed to address the same kinds of socio-economic change, positive and negative, that has potential to result from Kiggavik. Examples include language preservation initiatives, support for traditional harvesting, and expansion of postsecondary education and public health programs.

Residual Project Effects

Project effects are summarized on the basis of a single conclusion for each of 26 Valued Socio-Economic Components (VSECs) identified for assessment. Many actual effects will depend on socio-economic conditions in Kivalliq at the time of development and beyond. In a rapidly changing socio-economic context, extrapolating current baseline trends can introduce substantial error. Further, the effects of the Project may act in combination to those of the proposed Meliadine Gold Project near

Rankin Inlet, which is expected to be in construction, and perhaps operation, by the time the Kiggavik Project advances to construction.

Although there are some differences in detail, many of the processes are the same in both construction and operations and change in response to the Project will be continuous. Overall, as people adjust to change with time, most negative effects are expected to moderate while positive effects gain momentum. At closure, the same processes may reverse, however, the socio-economic conditions in Kivalliq will again be quite different.

Effects on **community economies** are positive and significant. The Project will preferentially employ, educate, train and contract in the Kivalliq. Incomes will increase for many people and community economies will grow. A small net in migration is anticipated to continue in the Kivalliq Region with most new comers expected to settle in Rankin Inlet or Baker Lake. Although the Project will come to an end, the life-long benefits of job experience and learning are not reversed.

Effects on **traditional culture** are, overall, expected to be negative and substantial. The Project will not force or require changes to traditional culture, as AREVA's mitigation measures are intended to support and facilitate people's choices. However, some drift away from harvesting, use of Inuktitut, and traditional values and knowledge may be expected, particularly in the context of other ongoing forces of cultural change. Climate change is also a factor in changing traditional lifeways.

Effects on **individual, family and community wellbeing** are largely expected to be positive and significant. Although negative effects on traditional culture have the potential to erode wellbeing for some, broadening choices and opportunities for livelihoods are counteracting factors. There will be individual exceptions to improved wellbeing, and there is some expectation that crime, or awareness of crime, could increase in response to, for example, any developing inequities.

Increased demand for **public infrastructure and services** would be a negative effect if the government is unable to meet that demand. However, the assessment shows the effect of the Project is positive and significant. Revenues to GN and NTI will allow the provision of additional services, to the benefit of people. In this regard it is noted that the Project itself is not expected to be a source of increased demand.

The Project is expected to stimulate exploration and mining interest particularly in western Kivalliq. This is a benefit, and significant, insofar as the ongoing **land use planning** process determines that this is the path forward Nunavut and Kivalliq choose. The consequent negative effect on tourism is considered of low magnitude because of little current use of the area by tourists. Land use effects in Baker Lake (including use of the shipping channel) are considered highly manageable, and therefore not significant.

Economic and fiscal effects at the territorial level are positive and significant. There will be very large jumps in gross domestic product, employment, labour income, own source GN revenues and payments to NTI. Subsequently the Project will represent a sustained contribution to the economy and revenues until closure.

Residual Cumulative Effects

For purposes of assessing cumulative socio-economic effects, the scenario is construction and operations of a total of nine large mining projects in Nunavut over the period to 2028. In addition to the Project, the other operating or reasonably foreseeable projects are Meadowbank, Meliadine, Mary River, Doris North phases 1 and 2, Hackett River, Izok Lake and Back River. Most of these are not in the Kivalliq Region. However, their very high demands for labour and goods, the imperative to maximize Project benefits to Inuit and rapidly growing capacity in Kivalliq to supply the mining sector suggest that there will be spillover effects into Kivalliq Region even where projects are located elsewhere in Nunavut.

These projects are expected to have similar socio-economic effects as the Project. Most of these effects will be additive; for example more people will be employed, economies will grow more quickly, and crime levels may go up. However, there is some potential that the total effects of all these projects together could be more, or less, than additive. That is, the combination of effects from multiple projects can result in a shift in the socio-economic environment to a state that adding up effects from multiple projects does not fully account for.

In the shorter term, should the combined demand for labour and goods outstrip capacity to supply, and should mining proponents then be forced to go south, benefits that notionally could have been retained by Inuit will not be. Nunavut's labour force is growing quickly, however, and this is not a longer term worry.

The integrity of traditional culture will, in the longer term, depend on a significant proportion of people maintaining its practice. The Project alone will not create economic opportunities for all, but any potential for employment, particularly of the young, may have long term negative implications for traditional culture. Government programs in support of traditional culture and ongoing importance given by people to maintaining cultural integrity will mitigate the potential for this to some extent.

Rapid development of the mining sector has important implications for the interfaces between traditional and non-traditional land use, including for aspirations to develop a tourism sector. Land use planning in Nunavut continues to advance with to the phase of delimiting areas appropriate for different uses and finalization for land use plan implementation.

Finally, the cumulative effects of multiple projects will be a significant benefit to the economy of Nunavut. Mining projects eventually close, with potential to cause severe economic and consequent

social dislocation for both individuals and the territorial economy. The availability of new projects to take the place of older ones provides alternative jobs and markets for labour and business.

ᓇᐃᓴᖅᓯᒪᔪᖅ – ᐃᓄᐃᑦ ᐱᑭᖅᑕᓪᓕᐊᔪᓪᓗ ᐊᐟᑎᖏᑦ

ᓄᓇᕗᑦ ᑐᖃᓚᓱᐅᔪᖅ ᖃᐅᐅᓴᐃᓂᖅᑎᑦ ᑭᖑᓕᕆᖅ ᐱᓕᓚᐊᒧᑦ. ᐱᑭᖅᑕᓪᓕᐊᓂᖅᒧᑦ ᐃᑲᔪᐃᓂᖅᖃᓂᐊᖅᑐᖅ ᓄᓇᕗᑦ ᐱᑭᖅᑕᓪᓕᐊᓂᖓᓄᑦ ᐊᖏᑭᓕᓕᐊᑎᖅᑎᑦᑎᓗᓂᓗ ᑭᓇᐅᔾᖅᑕᖏᓪᓕᐊᔪᓂ ᓄᓇᕗᑦ ᓚᖓᒪᑲᖏᓐᓄᑦ (GN) ᐊᒪᓗ ᓄᓇᕗᑦ ᑐᙳᓚᕆᑲᓐᓄᑦ (NTI). ᑭᖓᓕᓂᖅ 7-ᖏᒍᑦᓗ ᓄᓇᓕᖏᑦ ᐊᖏᐃᐊᑦ, ᖃᑦᒪᓂᑐᐊᖅ, ᐃᓗᓕᑎᑦᓯᒪᒃ, ᓴᓪᓕᓂᖅ, ᓇᐅᔾᔨᑦ, ᑲᖏᖅᑕᓂᖅ ᐊᒪᓗ ᑎᑭᕋᖏᐊᖅ ᖃᐅᓂᖅᑕᓂᖅ ᐊᖏᐃᐊᑦ ᐱᓪᓗᓕᓱᐊᖅ ᖃᐅᓂᖅᑕᓂᖅᑐᑦ ᐊᓕᓚᐅᖅᑐᑦ ᐱᑦᓴᓕᕆᓂᖅᑐᑦ ᐊᒪᓗ ᓄᓇᒥᒃ ᐱᖓᓱᐊᖅᓂ ᐊᑲᖅᑕᐅᓂᖅᑭᑦᓴᖅᓯᓇᖅᓴᖅᑐᒃ ᐱᓕᓚᐊᒥᑦ, ᑭᓯᐊᓂ ᐃᓕᓴᒃᓗᓂ ᑕᒪᐃᓄᑦ ᓄᓇᕗᖓᓄᑦ ᐱᑭᖅᑕᓪᓕᐊᓂᖅᒥᒃ ᐊᒪᓗ ᐃᓄᖅᑭᖓᓄᑦ ᐃᑲᔪᐃᓂᖅᑐᒃᓴᓇᖅᓴᖅᑐᒃ ᐊᓯᐊᖏᓂᐅᔪᓂᖓᓪᓗ ᐱᖅᑯᓯᑐᖅᖁᖅᑭᖅᑐᓂᖅ ᖃᓄᖅᑭᐅᓄᖅᑭᖅᑐᓂᖅᓗᒃᑐᓂᖅ.

ᓄᓇᕗᑦ ᐱᑭᖅᑕᓪᓕᐊᓂᖏᓐᓄ

ᓄᓇᕗᑦ ᐱᑭᖅᑕᓪᓕᐊᓂᖏᓐ ᐃᓄᖏᑦᓗ ᐊᔪᐅᖏᖅᑭᑎᒥᒃ ᐱᑕᖃᐅᖅᑕᒧᑦ, ᐃᓕᐅᕐᓗᑎᒃ i) ᐱᓪᓚᓕᐅᓂᖏᓐ ᐊᑯᕐᓕᓴᒃᑐᓄᒃ ᐱᑭᖅᑕᓪᓕᐊᓂᖅ; ii) ᐱᖃᓕᐊᖃᖅᖁᓂᖅ ᐊᑐᖅᓂᖅᑎᒃ ᐱᑎᐊᒃᓂᕐᓇᖅᑐᑦᓂᒃ ᐊᓚᓗ ᐱᑎᐊᒃᓂᖅᓂᖅ ᐊᔪᖅᑐᑦᓂᒃ ᑲᔪᓂᖃᖅᖁᓇᖅᑐᑦᑎᔪᓂ ᐃᑲᔪᐃᓂᖅᖃᖅᑐᒃ ᐃᓄᖏᓂᒃ; iii) ᐃᓕᐱᑎᕆᐅᓂᖏᓐ ᐃᓄᐃᑦ ᖃᐅᐅᓴᒪᕐᑐᖅᑎᑎᑦ (IQ) ᐱᑭᖅᑕᓪᓕᐊᓂᖅᑎᑦ ᐊᓚᓗ ᐃᓄᐃᑦ ᐱᓵᓕᓪᓕᐊᓂᖓᓄᑦ ᐃᓱᒪᓕᐅᓚᓂᖅᑎᑦ; iv) ᐃᓂᓕᐅᓚᓂᖅᑎᑦ ᓄᓇᓕᖏᑦ ᐊᐅᓕᕐᑎᓂᖅᑲᖓᓇᓴᐅᓂᖅᑕᖏᑦ ᓇᖏᓂᖅ ᐱᓵᓕᓪᓕᐊᓂᕐᓚᓕᐊᓂᖅᑕᖏᓐᓄᓂᒃ; v) ᐱᖃᓕᐊᖃᖅᓂᖅ ᐱᓵᓕᓪᓕᐊᓂᖅᑎᒃ ᓇᖏᓂᖅ-ᐱᔪᖏᓇᓂᖅᑎᒃ ᐊᑐᖅᑕᐅᔪᓂᖅ ᐅᖏᓚᑎᑐᐊᖏᓐᓄᓂᖅ ᑲᓵᒪᖅᑐᓂᖅ ᐱᖃᐅᔪᓂᖅ; ᐊᓚᓗ vi) ᒪᑦᓂᖅᑐᒃ ᑐᐊᕐᓇᖅᑐᒥᓪᓗ ᐱᑭᖅᑕᓪᓕᐊᓂᖅᑎᖅᑐᖅ ᐃᓄᖏᓐᓂᒃ ᐱᓪᓚᓕᐅᔪᓂᒃ ᐃᓄᐃᑦ-ᐱᑭᖅᑕᓪᓕᐊᓂᖅᑎᑦ ᐊᑦᓯᕆᔨᓂᖅᑎᑦ ᐃᓕᓴᕐᓂᖅᑐᑦ.

ᓄᓇᕗᑦ ᐱᑭᖅᑕᓪᓕᐊᓂᖅᑎᑦ ᐱᓵᓕᓪᓕᐊᓂᖏᓐᓄᓂᒃ ᑕᕐᔪᐅᕆᓂ ᑕᐅᑐᓚᖅᑐᖅᑐᖅ ᐱᑭᖅᑕᓪᓕᐊᓂᖅᑎᒍᓱᓐᓂᒃ ᑐᓂᓱᔾᔨᖅᑐᑦ ᐱᑭᖅᑕᓪᓕᐊᓂᖅᑎᑦ ᐊᒪᓗ ᐱᓕᓚᐊᖏᓪᓕᐊᓂᖅᑐᒃ. ᑕᒪᒃᑯᐊ ᐅᓴᖏᓂᐊᖏᖅᑭᑦ, ᐅᓪᓚᓂᖅᑎᓂᒃ ᐊᓯᐊᓂᖅᑐᒃ. ᑕᒪᒃᑯᐊ ᐅᓴᖏᓂᐊᖏᖅᑭᑦ ᐃᓄᐃᑦ ᐱᓕᓚᐊᖏᓪᓕᐊᓂᖅᑐᒃ ᐊᒪᓗ ᐱᓕᓚᐊᖏᓪᓕᐊᓂᖅᑐᒃ ᐃᓄᐃᑦ ᐱᑭᖅᑕᓪᓕᐊᓂᖅᑎᑦ

ᐱᓕᕆᐊᖏᓴᖅᑎᑕᐃᓐᓇᑦ ᐃᓕᓴᐅᑎᑦ ᖃᐅᑎᖏᓪᓗᓕᕆᓂᐊᖅᓯᒪᔪᖅᑐᑦ. ᐱᓕᕆᐊᖏᓴᖅᑎᑕᐃᓐᓇᑦ ᐃᓕᓴᐅᑎᑦ ᓄᓇᕗᒻᒥᑦ 19%-ᓗᐊᖅᐱᒥᐅᖅᑐᑦ ᐋᓕᐃ 2011-ᒥᑦ, ᑭᓪᓗᓂ ᒪᑯᐊᖅᑐᓄᑦ 40%-ᖃᓄᐅᑦᓗᓂ. ᐱᓕᕆᓴᑎᑕᐃᓐᓇᑐᑦᑕᖅᓴᐃᑦ ᐃᓄᐃᑦᓗᑎᒃ ᒪᑯᐊᖅᑐᒃᓴᖅ ᐊᖏᖅᑎᑦ. ᐱᓕᕆᐊᖏᐃᑦ ᐱᐊᓕᓂᖅᓴᒥᒃ ᓴᖅᑭᑎᑕᐅᓪᓕᐊᓂᖅᓴᖅᓯᕆᓕᐊᖅᑎᓕᖅᑐᖅᑐᑦ ᐅᑦᓗᒥᐅᓕᖅᑐᖅᑐᑦ ᒥᓂᐅᕐᓂᖅᑐᑦ ᐱᓕᕆᐊᖏᓴᖅᑎᓴᓪᓂᒧᑦ ᐃᓕᓴᐅᑎᑦ ᒪᑯᐊᖅᑐᐃᑦ ᐱᓕᕆᓵᓴᖅᓯᒪᔪᓂᐊᖅᓯᒪᔪᖅᑐᓂᖅ ᓕᓐᓄᓗᑎᑦ. ᓄᓇᕗᑦ ᑲᓇᒪᑯᓂᑦ ᓂᕆᐅᑦᓂᐊᖅᑐᑎᓂᖅ ᐱᑭᖅᑕᐅᓂᖅᑐᑦ ᐱᑭᖅᑎᑦᑕᖅᑐᓂᖅᓴᖅᑐᑦ ᐱᓕᕆᓂᐊᖅᓯᒪᔪᖅᑐᑦ ᐱᑭᖅᑎᑦᑕᖅᑐᓂᖅᓴᖅᑐᑦ ᐃᓕᓴᐅᑎᑦ ᐱᓕᕆᓵᓴᖅᓯᒪᔪᓂᐊᖅᓯᒪᔪᖅᑐᑦ ᓕᓐᓄᓗᑎᑦ. ᓄᓇᕗᑦ ᑲᓇᖅᑐᓂᑦ ᐅᑭᐅᖅᓯᒪᔪᖅᑐᑦ ᐱᑭᖅᑎᑦᑕᖅᑐᓂᖅᓴᖅᑐᑦ ᐱᑭᖅᑎᑦᑕᖅᑐᓂᖅᓴᖅᑐᑦ ᐃᓕᓴᐅᑎᑦ ᐱᓕᕆᓵᓴᖅᓯᒪᔪᓂᐊᖅᓯᒪᔪᖅᑐᑦ ᐱᓕᕆᓵᓴᖅᓯᒪᔪᓂᐊᖅᓯᒪᔪᖅᑐᑦ ᐱᓕᕆᓂᐊᖅᓯᒪᔪᖅᑐᑦ ᐱᓕᕆᓵᓴᖅᓯᒪᔪ

ᑭᓯᓪᓕᐅᕐ ᐃᓄᖅᑎᑐᓂᖓᔪᓂᖓ

ᑭᓯᓪᓗᒥᐅᑦ ᖃᐅᔨᓕᐅᓂᕐᑐᑦ ᐱᑕᖅᓯᒪᔨᖅ 7,944-ᒥᑦ 9,479-ᒧᑦ ᐊᑯᓂᓂᕐᑐᓂᑦ 2001-ᓗ 2009-ᓗ, ᐱᑕᖅᑭᓪᓕᐊᓂᖅ ᖃᐅᓂᒃᑯᓕᔪᓂ 2% ᐅᑭᐅᑕᒫᑦ. ᑭᓯᓪᓗᒥᐅᑦ ᖃᐅᔨᓕᐅᓂᕐᑐᑦ 2013-ᒥᑦ 10,266-ᖃᓄᐊᕐᕕᖅᑐᑦ, ᐱᑕᖅᑭᓪᓕᐊᓂᖅ 2.4%-ᖃᐅᔨᓗᓂ 2007-ᒥᑦ 2013-ᒧᑦ. ᑎᑎᕋᖅᑭᓪᓕᐊᓂᐅᑎᓪᓗᒍ ᐅᖅᔨᑎ ᐊᐅᑎᒧᑦ ᐊᖅᑐᖅᓯᓂᕐᒧᑦ ᑎᑎᖅᑲᖅ (DEIS)-ᒥᑦ, ᐱᐊᓕᓴᖃᐅᔨᓗᓂ ᓄᓇᓕᓂᖅ ᐱᑕᖅᑭᓪᓕᐊᓂᖅᑕᓕᐅᕐᕕᖅᑐᖅ ᓇᐅᔭᑦ ᐊᓕᓗ ᐱᐊᓕᐊᓴᖃᐅᔨᓗᓂ ᐃᓗᓕᓕᒫᖅᓯᖅ. 2007-ᒥᑦ 2013-ᒧᑦ ᑕᒪᓗᐊᑦᖃᖅ ᑭᓯᓪᓗᒥᑦ ᓄᓇᓴᓂ ᐱᑕᖅᓂᖅᑕᓕᐅᕐᕕᖅᑐᑦ ᓇᐅᔭᑦ ᐊᓕᓗ ᑎᑭᕋᖅᓯᐊᖅ ᖃᓄᐊᖅᓯᐊᖅ ᓴᓂᑎᑎᔪᖅ ᐳᓴᓂᑎᔪᖅ ᐊᓕᓗ ᐃᓗᓕᓕᒫᖅᓯᖅ ᑲᖏᖅᑕᓂᖅᑐᑦ ᐊᑎᑕᐅᔨᓗᓂ.

ᐱᐊᓂᖅᓯᒪᓕᑎᐊᖅᑐᑎᓪᓗᑎᑦ ᑐᑭᓯᐊᕐᓂᐅᔨᓴᓂᑦ ᐃᓕᓴᐃᓂᓪᓕᐊᓂᐅᔨ ᓇᑲᓂᓴᓂᓗᓄᑦ 2006–ᒥᐅᔭᒥᑦ DEIS ᑎᑎᕋᖅᑕᐅᓕᐅᖅᓯᒪᓂᑦ, ᐊᑐᖅᑐᖏᑎᓇᖅᑐᖅ ᐃᓕᓴᐃᓂᐊᓂᖅᓯᒧᑦ ᓇᑲᔨᓪᓕᓕᓂᐊᓂᐅᔭᔨᓂᖅ ᑭᓯᓪᓗᒥᑦ, ᐊᒪᓗ ᑕᑯᖅᕕᐅᑎᑎᔨᓗᓂ 40% ᑐᖏᓂᑦ ᐃᓴᓇᐅᔭᔨᓂᖅ ᖃᓄᐊᖅᓯᓂᖅᕕᒥᑦ ᐃᓕᓴᐃᓂᐊᓂᖅᑲᓂᖅᓯᒪᔨᓂᖅ. ᒪᖅᑯᓂᖅᕕᖅᓴᐃᑦ ᐃᓕᓴᐃᓂᐊᖅᓯᒪᓴᖅᓂᖅᕕᖅᑕᐅᔭᑦ ᐅᑭᐅᖃᑯᖅᑐᖅᓂᖅᕕᖅᑕᐅᔭᔨᓂᖅᑐᖅ ᐃᓴᓇᖃᓂᑦ. ᐃᓕᓴᐅᑦ ᐅᖃᖅᑎᖅᑕᒥᖅᑐᑦ ᐃᓕᓴᐃᓂᐊᓂᖅᑲᓂᖅᓯᒪᔨᓂᖅ ᐊᓗᐊᓂᖅᑎᖅᓂᖅᕕᖅᑕᐅᔭᔨᓂᖅᑐᖅ ᐊᓯᒍᑕᐅᔭᓕᓂ. ᐃᓕᓴᐅᑦ ᐅᖃᖅᑎᖅᑕᒥᑦ ᐊᓯᒪᑎᓕᓂ ᐊᔪᖃᓂᖅᓯᐊᖅᑐᖅᓂᖅᕕᖅᑕᐅᔭᔨᓂᖅᑐᖅ ᐊᔪᖃᓂᖅᓯᐊᖅᑐᖅᓂᖅᕕᖅᑕᐅᔭᔨᓂᖅᑐᖅ ᐊᓗᐊᓂᖅᑎᖅᓂᖅᕕᖅᑕᐅᔭᔨᓂᖅᑐᖅ ᐊᓯᒪᑎᓕᓂ ᐊᔪᖃᓂᖅᓯᐊᖅᑐ

ᑕᐃᒪᓐᓇᐃᖅᑐᓐᓇᖅᑐᓂᖅ ᐱᖅᑯᓯᐅᕐᓴᖅ ᐱᓕᒪᓚᐅᕐᓴᖅ ᐃᓕᑎᐅᔨᓂᒃᑯ ᐃᓄᐃᑦ ᖃᓄᐃᖅᐅᓂᖅᑐᑦ ᐃᓄᐃᑦ
ᐱᖅᑯᓯᓚᐅᕐᓴᑦ ᑐᓂᓯᓴᖅ ᐃᓄᐃᑦ ᑭᓇᐅᓂᖅᑐᓂᒃ, ᐊᒪᓗ ᒥᐊᓂᖅᓯᕐᓗᓂ ᓴᖅᑭᑎᓂᖅᑐᐃᓐᓇᖅᑎᑦ ᐃᓄᐃᑦ
ᑐᓂᓯᓂᒃᑯᑦ ᓂᕿᓂ ᐊᓯᖅᑎᓂᓕᓗᓂ ᐃᑲᔪᕈᑎᓂᒃ. ᐊᒥᓱᑦ ᐃᓕᓐᓇᑐᖅᑕᐃᑦ ᐊᑐᖅᑕᕐᑐᑐᑦ ᐱᖅᑯᓯᓚᐅᕐᓴᖅ
ᐊᓐᓇᖏᓐᓂᖅᑕᖅᑐᓗᒃ (IQ-CHE 2009[1]). ᖃᑕᖓᔪᑎᑎᑦ ᐊᒪᓗ ᓄᓇᓕᖅᔪᑦ ᐊᐅᑐᐊᔪᕐᓇᓂᑦ ᑕᐃᒪᓐᓇᐃᑎᑎᒋᑦ
ᐃᓄᐃᑦ ᓂᓀᖅᑎᓂᓂᒃ ᑐᓂᓯᑕᐅᑎᓂᒃᑯᑦ. ᐱᖅᑯᓯᓚᐅᔨᕐᓗᑎᒍᑦ ᖁᑦᓚᐊᓯᑎᖅᑐᓂᖅ ᑕᑯᖅᓴᐅᑎᑕᐅᔨᓂᖅ
ᐃᓕᓴᖅᓯᓂᒃᑯ ᐊᒪᓗ ᐃᓇᐟ ᐃᐅᐱᔪᓂᓚᐅᖏᓐᓄᑦ ᐃᓕᔨᐃᓂᒃᑯ ᐃᓄᐃᑦ ᑎᑭᐅᑎᓂᑎᒃᑐᓂᖅᑐᒃ ᐃᓄᐃᑦ ᐃᐅᑎᖅᓯᓚᐅᖏᓐᓄᑦ
ᓄᓇᒋᖁᑐᓂᖅ ᐊᔨᖏᑐᓂᓚᐅᐊᓂᒃ ᐅᒪᑎᓂᑎᔨᖅ ᐊᒪᓗ ᐱᑎᐊᖅᑎᓂᑎᒃᑐᓂᖅᑐᒃ ᐃᓄᐃᑦ ᐃᐅᑎᖅᓯᓚᐅᖏᓐᓄᑦ
ᔪᓐᓗ ᐊᐳᑎᒥᒃ ᒥᐊᓂᖅᓯᓂᖅᑐᖅ, ᑲᑐᔾᔨᖅᑎᑎᒋᔭᖓᓂᖅᑐᓂ ᐊᒪᓗ ᑐᓂᓯᖅᑎᑦᓂᖅᖢᓂ ᐊᓯᒥᖓᓂ.

ᐃᓕᖏᑐᓄᑦ ᐃᓄᖓᓄᑦ ᐊᔨᖁᓇᖅᑎᑕᖅᓯᒪᔨᖅ ᐊᔨᓚᐅᓂᒃᑎᒃ ᒪᐅᓇᓵᖅ ᐱᖅᑯᓯᓚᐅᔨᓄᑦ
ᐃᖅᐱᑎᓂᖅᑲᐃᑎᕐᖏᓐᓄᑦᓗ ᐊᓯᐊᖓᔪᓂᐅᔨᓂᖅ. ᐱᓕᓚᖕᖃᐃᐅᔨᑦ ᓂᓚᐅᑎᕐᖏᑎᑦ ᐃᓕᐅᖅᑕᐅᔨᓂᑦ
ᐲᓇᐅᔨᓕᐅᖅᓴᖅᓯᓕᐊᓂᖅᑎᑦ ᐊᒪᓗ ᓂᓚᐅᑎᕐᖏᑎᑦ ᐃᓄᐃᑦ ᐃᓄᐃᑦ ᐱᖅᑯᓯᓚᕐᓂᐅᓪᓗᓄᑦ ᐊᔪᐸᑎᓂᖓᓄᑦ,
ᐃᓐᓇᐃᓐᓂᑎᐅᑎᓗᓂ ᐊᔪᐸᑎᓂᖓᓄᑦ ᐃᓄᐃᑦ ᓇᐱᖏᓐᓂᖅᑐᓂ ᐊᒪᓗ ᐱᖅᑯᓯᓚᐅᔨᓄᑦ ᐊᐅᓚᑦᑎᓂᖅᑐᓂᒃ
ᓄᓇᑦᓱᐃᓕᑦ ᐱᐲᖅᓴᓂᖅᑐᓂᒃᑯᑦᓗᓕᑦ. ᐃᓄᐃᑦ ᐅᖅᑲᐅᔪᖅᑕᖅᑐᓂᖅ ᑐᖅᓯᓚᓚᖏᓐᓄᑦ ᓴᖅᑭᒪᓚᖏᓐᓄᑦ ᔪᐳᒪᒃᓴᓂᐅᓇᖅᑎᑦ
ᓄᑦᓱᐃᔨᑦ ᐱᐲᖅᓴᓂᖅᑐᓂᒃᑯᑦᓗᑦ. ᐃᓄᐃᑦ ᐅᖅᑲᐅᔪᖅᑕᖅᑐᓂᖅ ᑐᓂᓯᒪᓚᖏᓐᓄᑦ ᐱᖅᑯᓯᓚᐅᔨᓄᑦ
ᐃᓄᐃᑦ ᐱᖅᑯᓯᓚᐅᖏᓐᓄᑦ ᐱᐲᖅᓴᓂᖅᑐᓂᒃᑯᑦᓗᑦ ᐃᓄᐃᑦ ᐊᐅᓚᑦᑎᓂᖅᑐᓂᒃᑯᑦᓗᑦ ᐱᐲᖅᓴᓂᖅᑐᓂᒃᑯᑦᓗᑦ
ᐃᓄᐃᑦ ᐊᐅᓚᑦᑎᓂᖅᑐᓂᒃᑯᑦᓗᑦ ᐃᓄᐃᑦ ᐊᐅᓚᑦᑎᓂᖅᑐᓂᒃᑯᑦᓗᑦ ᐃᓄᐃᑦ ᐊᐅᓚᑦᑎ

ᐃᓄᐃᑦ ᓄᓇᒥᐅᑕᐅᖏᓪᓗᓂᒃᑐᑦ, ᐱᖃᓐᓇᕐᓗ ᐊᓯᐊᖓᖃᓕᕐᓂᒪᐊᑦᑕᓗᒍ. ᑕᒪᕐᒥᖃᓕᕆᐃᑦ ᐃᓄᐃᑦ ᑕᐅᑐᖃᓕᑕᐅᑦᑐᑦ ᐊᐅᓚᑎᓂᕐᒥᒃ ᐊᓯᐊᖓᔪᓂᐅᐊᒥᒃ, ᐅᓴᐅᓯᖅᓯᑎᓂᒃ ᑕᐃᒪᓐᓇᐃᓂᒃ ᑲᔪᓯᐊᖏᓂᖓᓂᒃ ᓯᐅᓂᕐᒥᑦ. ᐃᓄᐃᑦ, ᑭᓯᐊᓂ, ᐸᐸᑦᑏᓇᖅᑐᑦ ᐅᖏᑲᐅᓯᕐᓂᓂᒃ ᐅᑭᐅᑦ ᖃᓄᐃᓂᒃᑐᓂ, ᓴᓐᖑᓂᐊᒥᒃ ᐃᓐᓇᖏᓂᖃᖅᓯᓯᑎᓂᒃ ᐃᓕᓴᐅᓂᖅ ᐊᒪᓚᐅᖏᓂᖃᖅᓯᑎᓂᒃ ᐃᓕᓴᐅᓂᖅ ᐊᒪᓚᐅᖏᓂᖃᖅᓯᑎᓂᒃ ᐃᓐᓇ

ᐱᖏᑎᒃᑎᓕᓵᑦ ᐅᓴᖏᓐᓂᐊᖏᐊᕐᓄᑦ. ᐃᓄᐃᑦ ᐅᐱᐱᓗᑐᑦ ᐱᓕᓕᐊᐦᓴᒋᖏᑐᓐᓂᖏᓐᓇᑦ ᐅᓴᕆᑎᑦ ᑲᑕᓐᓂᑐᓄᑦ, ᐱᓗᐊᖏᑐᒥᑦ ᖃᒋᓕᓂᑐᐊᖏᑦ.

ᐃᓄᓗᒃᑖᖏᑲᐃᑦ ᐅᖏᖏᓗᒪᕐᑎᑦ ᐃᓄᐃᑦ ᐱᓕᓕᒪᕐᓄᑦ ᐱᓕᓕᐊᐦᓴᒋᖏᑕᓕᐊᖏᖏᓂᖅᓱᓂᒃ ᑭᓗᐊᓂ ᐃᓄᐃᑦ ᐊᕐᖏᐅᑉᐅᓂᖅᓱᓂᒃ ᐅᑎᖏᒋᖏᒋᖏᓂᒃᑯᑦ, ᖏᒋᓪᓚᑎᒥᐃᓂᒃ ᖃᑭᒪᓕᓗᒪᓂᑎᒃ. ᐃᓕᐃᑦᑕ ᐱᓕᓕᐃᖅᐅᓂᑦ ᐅᑎᖏᒋᖏᒋᖏᓗᑎᒃ ᐊᕐᓪᑕᓕᓗᑎᓗ, ᐊᓗᑦᑕ ᐊᕐᖏᓂᖏᐊᕐᓗᑎᒃ. ᐃᓄᐃᑦ ᐱᓕᓕᐊᖏᑖᖏᑦ ᐊᒪᓗ ᐱᓕᓕᖏᓂᖏᐊᖅᓯᓗᑎᒃ ᐊᐳᖏᑎᓂᐊᖅᑭᑦ ᐅᖏᖏᒋᖏᒋᖏᓂᖏᐊᖅᑭᑦ ᐃᖅᑎᓂᐊᓂᒃ ᐊᐳᓪᓚᑦᑎᓂᒃ ᐊᐳᓪᓚᑦᑎᓂᒃ, ᐊᓗᑦᑕ ᐊᕐᖏᓂᖏᐊᖅᑭᑦ ᐱᓕᓕᐊᖏᖏᓂᖅᓱᓂᒃ ᐊᐳᓪᓚᑦᑎᓂᒃ ᐃᓄᐃᑦ ᖃᐅᔨᓴᓂᐊᓕᖅᑐᑦ ᐱᓕᓕᐊᖏᖏᓂᖅᓱᓂᒃ ᐊᐳᓪᓚᑦᑎᓂᒃ ᐊᐳᓪᓚᑦᑎᓂᒃ ᐊᐳᓪᓚᑦᑎᓂᒃ ᐱᓕᓕᐊᖏᑖᖏᑦ. ᐊᓗᑦᑕ ᖃᐅᔨᓴᓂᐊᓕᖅᑐᑦ ᐃᓄᐃᑦ ᐊᕐᓪᑕᓕᓗᑎᓗ ᐊᐳᓪᓚᑦᑎᓂᒃ ᐊᐳᓪᓚᑦᑎᓂᒃ ᐊᐳᓪᓚᑦᑎᓂᒃ ᐱᓕᓕᐊᖏᑖᖏᑦ.

ᐃᓕᒥᕆᐅᐸᓗᓂᑦ ᐃᓄᐃᑦ-ᐱᐸᖏᐸᑦᑕᐊᖏᓪᓗᑦ ᐱᓕᓕᐊᖏᖏᓗ, 2010-ᒥᑦ ᐊᐸᓐᓄᑦᑯᑦ ᐊᐱᓕᓕᐅᐅᖏᑦᑐᑦ ᐃᓄᐃᓂᒃ 90-ᐅᐸᓂᒃ ᐊᖅᐸᑲᓂᑐᓂᑦ ᖏᑕᖕᒪᑎᑲᓂᑦ ᖏᓚᒋᑐᑦᑎᒥᑦ ᒪᖏᐃᖏᑕᖅᓂᖓᓂᒃ ᓂᓕᓐᓄᖏᓂᓗᓕᒃ. ᑕᐃᒪᓐᓇᐃᑕᐅᓕᐅᖏᖏᑦ ᐃᓕᓴᒪᓕᐸᓗᒥᑦ ᐊᒪᓗ ᐄᓐᓇᒧᓕᖏᖏᑐᑦᓗᓗᒥᑦ ᖏᐅᐅᓴᐱᐃᓂᐅᓕᐅᖏᖏᑐᖏᓂ ᖏᑯᑦᑕ ᐅᑭᐅᑦ ᐊᓂᔪᑐᓂ, ᐊᓯᖏᓐᓄᖅᓱᓐᓂᒃ ᒪᖏᐃᖏᑕᖅᓂᖓᓂᒃ ᓂᓕᓐᓄᖏᓂᓗᓕᒃ ᐊᐳᖏᑎᓂᐊᖅᑭᑦ ᐱᓕᓕᐊᖏᖏᓂᖅᓱᓂᒃ ᐊᐳᖏᑎᓂᐊᖅᑭᑦ ᐃᓄᐃᑦ ᐅᖏᓪᓗᑎᒃ ᐃᓐᓇᐅᑉᐳᖏᓐᓂᖅᓱᓂᒃ ᐊᐳᖏᑎᓂᐊᖅᑭᑦ ᐱᓕᓕᐊᖏᖏᓂᖅᓱᓂᒃ ᐊᐳᖏᑎᓂᐊᖅᑭᑦ ᐃᓄᐃᑦ ᐅᖏᓪᓗᑎ

ᐊᐳᑐᖅᓯᓂᐅᔨᒪᑦ. ᐅᐳᑐᑎᑭᓗᒍ, ᐃᓕᓴᕆᑦ ᐃᓄᐃᑦ ᑭᐅᔭᐊᑎᖅᑭᖏᓐᓇᖅᑐᑦ ᐱᐅᓴᕆᑐᖅᓯᑦ ᐅᑎᖅᑕᖅᑕᕐᓂᖅᑭᒃ ᐱᓕᕆᐊᒪᑦ ᓇᓴᒥᓂᖅ ᓂᕈᐊᖅᑕᓴᕆᓄᑦ, ᐊᒪᓗ ᐅᑎᖅᑕᖅᑕᕐᓂᕐᒪᑦ ᐱᓕᕆᐊᒪᑦ ᐊᔪᐅᓚᕆᑕᖏᓐᓄᑦ ᖃᐅᔨᓴᖅᑎᓂᖅᓴᓂᒃ ᐱᓕᕆᔨᒪᑦ ᑭᓱᐊᓂᕆᑐᖅᓴᓂᒃ, ᑕᒪᓐᓇ ᐊᖏᓇᓇᔭᖏᓂᖅᓴᓂᒃ ᐃᓕᓴᕆᑐᖅᓴᓂᒃ. ᑭᑐᓂᒋᓇᖏᑦᓴᓗᒍ ᖃᓄᐃᖏᓕᕆᓂᖅᓴᓂᖅ ᖁᔭᐅᓂᖅᓴᓂᖅ ᐊᒥᓱᓕᕆᓂᖅᓴᓗᒍ ᑭᓇᐅᔭᖅᑎᓂᖅᓴᓂᖅ ᑭᓯᐅᖅᓯᒪᓕᕆᓂᖅᓴᓂᖅ ᑭᓇᐅᔭᖅᑎᓂᖅᓴᓂᖅ ᐃᓕᓴᕆᑐᖅᓴᓂᖅ ᐊᑐᖅᓴᖅᑐᑦ ᐃᓄᐃᑦ ᐱᓕᕆᔨᒪᑦ

ᖃᓄᐃᑦᑐᑦᓯᐅᕐᓂᖅ, ᖃᓄᐊᓕᐊᑎᑐᓯᒥᒃ ᐊᑐᖅᓯᖏᓪᓗᑎᑦᓯᖅ, ᐊᒪᓗ ᐱᓕᕆᖅᓯᖏᓪᓗᑎᑦᓯᖅ ᐱᖅᑯᓯᖅᑯᑦ ᐃᒃᐱᒋᐊᕐᓂᖅ ᐊᑐᓚᐅᖅᓯᐅᕐᓂᖅ (IQ-RIE 2009[4]; IQ-CHW 2009[5]; IQ-CHAH 2009[6]; IQ-CHW 2009[7]). ᒥᑭᓪᓕᐊᕆᓯᖅᑕᕆᓂᖅᐸᑦ ᒪᖅᐃᓐᓂᒥᒥᑦ, ᐅᓐᔪᓂᓄᑦ ᑐᓂᓯᑎᑦᑕᐅᑎᓂᒥᒃ ᐱᑕᖅᑕᐅᔪᓂᖅ, ᖃᓄᐃᙱᓪᓕᖅᑎᑦᑎᓂᖅᑐᙱᓐᖅᑐᖅ ᓂᖅᑭᑎᕆᐅᔪᓂᖅ (ᐱᓗᐊᖅᑐᒥᒃ ᒪᓂᒪᓂᖅᓄᖅᓴᕆᐅᔪᓄᑦ), ᓂᖅᑭᑎᐊᓀᐃᑦ ᑕᐃᒪᓐᓇᒧᑦᓗ ᐅᓐᓂᐊᕐᓇᖅᑕᐃᓕᓚᒥᓪᓗᑦ (IQ-CIHT 2009[8]).

ᑌᓀᒪᑲᓐᓂᑦ ᐃᑲᔪᖅᑕᐅᓂᖅ ᑲᔪᓂᙱᓄ ᐱᖅᑯᓯᒪᓕᕆᔪᓄᑦ ᓂᒪᐅᑎᓕᕆᔪᖅ ᐃᓕᐃᓇᕆᓗᐊᖅᑎᑦᓴᓐᓂᑦ ᖃᑲᓯᐅᓂᙱᓄᑦ ᐊᐸᖅᑕᓯᖅᑕᐅᓂᖅᑐᙱᓐᖅᑐᖅ, ᐅᖅᑲᐅᔪᓂᖅ, ᐃᑲᐱᒪᓕᕆᔪᖅ ᐊᒪᓗ ᓄᓇᓕᖅᓯᐊᖅᑎᑦᑎᓂᖅᑲᖅᑐᒃ ᐊᔪᐅᓐᖅᑐᖅ. ᐃᓐᓇᒪᓕᕆᔪᑦ ᐃᔪᓚᓂᑎᑦᑎᓂᖅᑲᖅᑐᒃ ᒪᓕᕆᔪᖅᑐᑦ ᐃᓕᓴᐅᔪᖅᑐᑦ ᐊᒪᓗ ᓄᓇᕗᑦ ᐃᔪᓚᓂᑎᑦᑎᓂᖅᑲᖅᑐᒃ ᐊᑐᖅᑕᐅᔪᓂᖅ, ᐊᒪᓗ ᓄᓇᕗᑦ ᐃᔪᓚᓂᑎᑦᑎᓂᖅᑲᖅᑐᒃ ᐊᑐᖅᑕᐅᔪᓂᖅ.

ᓄᓇᕗᓂᒃᑯᐊᓂᖅ

ᑕᒪᕐᒥᒃ ᑭᓇᐅᔭᓕᐊᑦ ᐊᓂᕆᔨᓕᓂᖅᓴᒃ ᐊᒪᓗ ᐊᔪᐊᖏᕐᓂᐅᔪᓂᖅ ᐱᖅᑯᓯᒪᓕᕆᔪᓄᑦ ᓄᓇᕗᑦᑎᓂᒥᓂᖅᑲᖅᓯᒃ ᓄᓇᕗᑦᓂᕆᔨᑦᑎᓂᖅᒥᒃ ᐃᓇᓂᒍᑎᓕᕐᒥᒃ, ᓄᓇᕗᑦᓂᕆᔨᑦᑎᓂᖅᒥᒃ ᐊᒪᓗ ᓇᓇᓕᓂᖅᑐᖅ. ᐊᒥᔪᑦ ᐃᓇᐃᑦ ᐱᐊᓂᖅᑕᕐᓂᒃ ᐊᓂᕆᔨᓕᓂᖅᓴᒃᑐᒥᒃ ᐱᐳᖅᐸᓐᓂᐊᕐᓂᖅᑐᒥᒃ, ᐱᓕᕆᔨᒪᒃ ᑐᓂᔪᐊᖅᑐᓂᖅᓯᒪᒥᒃ ᐊᑐᖅᑕᐅᔪᖅᑐᖅ ᐃᓇᓂᖅᓯᒪᒥᒃ ᐃᓕᓴᐅᔪᖅᑐᑦ ᐃᓐᓇᑐᑦᓯᒪᒥᒃ ᐊᑐᖅᑕᐅᔪᖅᑐᖅ ᐊᑐᖅᑕᐅᔪᖅᑐᑦ ᐃᓐᓇᑐᑦᓯᒪᒥᒃ ᐊᑐᖅᑕᐅᔪᖅᑐᖅ. ᐃᓕᓐᓂᑦ, ᐸᔪᐊᓂ, ᑕᐃᒪᓐᓇᐃᖅᑎᑦᑐᑦ. ᓇᖅᒥᓂᖅ ᐊᔫᖅᑐᑦ ᐊᐅᓕᓂᖅᑎᒥᒃ ᐅᖅᑯᓯᐊᕐᓂᕆᔨᓂᖅᑐᖅ, ᐱᐅᖅᑐᒥᒃ ᖃᓄᐃᑦᑎᓂᖅᑲᖅᑐᒃ ᐃᓐᓇᑐᑦᓯᒪᒥᒃ ᐅᖅᑯᓯᐊᕐᓂᕆᔨᓂᖅᑐᖅ. ᐃᓐᓇᑐᑦᓯᒪᒥᒃ ᐅᖅᑯᓯᐊᕐᓂᕆᔨᓂᖅᑐᖅ ᐃᓐᓇᑐᑦᓯᒪᒥᒃ ᐅᖅᑯᓯᐊᕐᓂᕆᔨᓂᖅᑐᖅ.

---

[4] IQ-RIE 2009: ᐃᓐᓇᒪᓕᕆᔪᓄᑦ ᐃᓕᓴᐃᓚᐅᑎᖅᑐᓂ ᐅᓴᖃᖅᓯᐊᕐᓇᖏᓐᓂᑦ ᐱᓕᓂᓵᕆᔨᓄᑦ ᐊᑐᓚᐃᖅᑲᐊᓕᓕᒫᓂᖅᓂᑦ ᐅᓴᖃᖅᓯᐊᕐᓇᖏᓐᓂᑦ ᐱᓕᓂᐃᖅᑎᑦᑎᓂᖅᑎᒃ ᐊᒪᓗ ᓂᐅᐃᖏᕐᓂᓗᑎᒃ ᒪᖅᑲᐃᑕᑦᓂᓪᓗᑦ ᐊᑐᖅᓯᐊᕐᓇᖅᑕᖅᑎᓂᖅ. ᐃᓐᓇᒪᓕᕆᔪᓄᑦ ᐃᓕᓴᐃᓚᐅᑎᖅᑐᓂ ᒪᐅᐃᑐᐃᑦ ᐃᓕᓐᓂᐅᑦᓯᐊᕐᓇᖏᓐᓂᖅᑐᙱᓐᖅᑐᖅ. ᐅᒪᓕᓂᖅ ᐊᑐᓚᐃᖅᑲᐊᓕᓕᒫᓂᖅᓂᑦ ᐱᓕᓂᐃᖅᑎᑦᑎᓂᖅᑎᒃ ᐊᒪᓗ ᓄᓇᕗᑦ ᐃᓕᓴᐅᔪᖅᑐᑦ ᐃᓐᓇᑐᑦᓯᒪᒥᒃ ᐊᑐᖅᑕᐅᔪᖅᑐᖅ ᐃᓐᓇᑐᑦᓯᒪᒥᒃ ᐊᑐᖅᑕᐅᔪᖅᑐᖅ.

[5] IQ-CHW 2009: ᐃᓄᐃᑦ ᒪᖅᑲᐃᖅᑕᕐᓂᐅᓂᖅᓴᐅᓕᓂᖅᑐᓂ ᑕᐃᒪᓕᖅᑲᓂᖅᓂᑎᒥᐅᖅᓯᓂᑦ ᐊᐹᖅ ᒪᖅᑲᐃᖅᓂᒪᑦ ᐊᐸᑐᓗᐊᕐᓂᖅᓯᐅᓂᖅᑐᓄᑦ, ᐱᓚᖅᑎᓂᒪᑦ ᐊᔪᓇᓐᔪᑦ, ᓱᐸᑐᑦ ᐃᔪᒪᓂᖅᑲᖅᑕᐅᓴᖅᑎᓂᖅᓯᐅᓂᖅᑐᓄᑦ, ᐊᒪᓗ ᐱᔪᒪᓂᖅᓯᐅᓂᖅᓴᐅᓕᓕᒫᓂᖅᓯᐅᓂᖅᑐᓄᑦ. ᓴᑦᓂᖅᑐᒥᒃ ᐃᓐᓇᑐᑦᓯᒪᒥᒃ ᐊᔪᓇᓐᔪᑦ ᐊᐅᓕᓂᖅᑎᒥᒃ ᓂᐅᐃᖏᕐᓂᓗᑎᒃ. ᐃᓐᓇᑐᑦᓯᒪᒥᒃ ᐃᓕᓴᐃᓚᐅᑎᖅᑐᓂ ᒪᖅᑲᐃᖅᓂᒪᑦ ᐃᓐᓇᑐᑦᓯᒪᒥᒃ ᐊᑐᖅᑕᐅᔪᖅᑐᖅ ᐃᓐᓇᑐᑦᓯᒪᒥᒃ ᐊᑐᖅᑕᐅᔪᖅᑐᖅ.

[6] IQ-CHAH 2009: ᒪᖅᑲᐃᓂᖅ ᐃᖅᑲᓇᐱᐅᓂᓴᓂ ᖁᐊᐊᓱᑎᑎᑭᐅᓂᖅᑐᓂ ᐃᓱᒪᒥᑭᐅᖏᓐᓂᑦ, ᑭᓱᓚᐅᔪᓂᖅᑐᖅ ᐱᓕᓂᐃᖅᑎᑦᑎᓂᖅᑎᒃ ᐊᔪᓇᓐᔪᑦ ᐱᓕᓂᐃᖅᑎᑦᑎᓂᖅᑎᒃ ᐊᒪᓗ ᐃᓐᓇᑐᑦᓯᒪᒥᒃ ᐊᑐᖅᑕᐅᔪᖅᑐᖅ ᐃᓐᓇᑐᑦᓯᒪᒥᒃ ᐊᑐᖅᑕᐅᔪᖅᑐᖅ.

[7] IQ-CHW 2009: ᐃᓄᐃᑦ ᓂᓚᔪᒪᓂᖅᑎᖅᑐᓂᖅᑕᐅᑎ ᓱᓕ ᐃᓄᐃᑦ ᓂᓴᑭᓚᓂᖅ, ᐱᓗᐊᖅᑐᒥ ᐱᖅᑯᓯᒪᒥᒃ ᓂᓚᔪᓗᓂᖅᔪᖅ, ᐊᒪᓗ ᓇᓕᑎᓄᑦ ᐃᓕᓴᐃᓚᐅᑎᖅᑐᓂ ᐃᓐᓇᑐᑦᓯᒪᒥᒃ "ᐃᓄᐃᑦᓂᓗᑎᑦ".

[8] IQ-CIHT 2009: ᐃᓗᓕᑦᑎᓐᓂᐅᑕᐃᑦ ᓂᓴᖅᑲᓇᐊᓂᖅᑲᐃᓇᖅᑐᓂ ᑐᖅᑐᓂ, ᐃᖅᑲᓚᓂ ᐊᒪᓗ ᓇᓕᑎᓂᓕ. ᓂᓚᖅᑕᑦᓂᓂᖅ ᐃᓄᐃᑦ ᓂᓴᑭᓂᖅᓂᒪᑦ ᐃᓐᓇᑐᑦᓯᒪᒥᒃ ᐊᑐᖅᑕᐅᔪᖅᑐᖅ ᐃᓐᓇᑐᑦᓯᒪᒥᒃ ᐊᑐᖅᑕᐅᔪᖅᑐᖅ.

ᓭᕋᐃᓂᖅ ᐱᖅᑯᓭᐅᔪᒥᒃ ᐱᐅᖏᑕᑐᒃ ᖃᓄᐃᖓᑕᖅᑎᑕᑎᓂᖅᑲᖏᓐᓇᖅᑐᖅ ᐃᓕᖏᑭᓄᒃ ᐃᓄᐃᑦ ᖃᓄᐃᖏᑕᑎᐊᖅᓂᓚᖏᑭᓄᒃ ᐊᒪᓗ ᖃᑕᖓᐅᑎᑦᓄᒃ ᐃᓅᖅᑎᑦᑎᐊᖏᑭᓂᐅᓂᖅᑐᒃ, ᐃᓕᑦᔨᓗᓂ ᐊᖓᓇᐅᔪᑦ ᐊᖓᔪᑦᑕᐅᔪᒥᒃ ᐊᒪᓗ ᑭᖓᓚᐅᖅᑕᓗᓄᑦ.

ᐃᓄᖓᒍᖓᓴᑦ ᐊᑦᓭᑭᓇᖅᓂᐅᔪᑦ ᓄᑖᒥᒃ ᐱᑭᖅᑕᑦᓂᐊᓂᖅᒪᑦ ᐱᐃᖅᑎᖅᓂᐅᔪᓄᑦ ᓂᓚᐅᑎᑦᐅᖏᓐᓂᑐᑦ ᒥᑭᓚᑎᐊᖅᑐᓂᒃ ᐃᓄᖓᒍᑦ, ᖃᑕᖓᐅᑎᑦᑎᐊᓂᖅᑲᖏᓐᓇᖅᑐᖅᓄᑦ, ᐃᓕᑦᔨᓂᖅᑐᖅᓄᑦ ᐊᓂᒪᓂᖅᑐᖅᓄᑦ ᐱᓕᕆᐅᖅᑕᕐᒥᑦ ᐱᐃᖅᑎᖅᓂᐅᔪᓄᑦ. ᐱᓕᕆᐊᖃᖅᖓᑐᓂᖅ ᐊᒪᓗ ᐊᓂᖃᖅᑎᖅᓂᖅ ᐱᓱᕈᐅᔪᖅᑐᑦᓂᖅ ᐱᐅᖏᑕᑐᒃ ᐃᓄᐃᑦ ᐃᓕᑦᔨᓂᖅᑐᖅᓄᑦ, ᐊᒪᓗ ᐃᓕᖏᑦᓂ ᐃᓄᐃᑦ ᐊᓂᓂᖅᑐᑎᓂᐊᖅᑐᖅᓄᑦ ᓄᑖᒍ ᐱᐃᖅᑎᖅᓂᐅᔪᓄᑦ. ᐃᓄᐃᑦ ᐱᓇᓱᓂᓚᖏᓐᓇᖅᑐᓄᑦ ᐊᓯᐊᐃᖅᑐᒍᑎᓂᖅᓂᖅ ᑭᓇᐅᔨᓕᐅᔨᓂᖅᓂᑦ, ᑕᒪᓐᓇ ᑕᑯᐅᑲᓚᐅᖅᓂᑎᓂᐊᖅᑐᒃᑲᐅᔪᖅ ᓴᓇᐅᑎᓕᒫᑦ ᐊᓯᐊᓂᖅᑐᑦ, ᐅᒪᐃᓐ ᐃᓐᓇᐅᑎᓂᖅᑐᑦ ᐊᐅᓚᑦᑎᐊᖅᑐᖅᓄᑦ ᐃᓄᐃᑦ ᐱᐃᖅᑎᖅᓂᐅᔪᓄᑦ. ᓄᑖᒍᑦ ᐱᐃᖅᑎᖅᓂᐅᔪᓄᑦ ᐊᓯᐊᓂᖅᑐᑦ ᐊᒪᓗ ᐅᓪᓗᑎᒃ ᐅᑭᐅᑭᐃᓂᖅᑐᖅᓄᑦ, ᐃᓕᑦᔨᓂᖅᑐᖅᓄᑦ ᐱᐃᖅᑎᖅᓂᐅᔪᓄᑦ ᐃᓄᐃᑦ ᐃᓕᖏᑦᓂ ᐃᓄᐃᑦ ᐱᐃᖅᑎᖅᓂᐅᔪᓄᑦ ᐊᒪᓗ ᐃᓄᐃᑦ ᐃᓕᑦᔨᓂᖅᑐᖅᓄ

ᐃᓄᐃᑦ ᐱᖁᓯᓱᓇᖅᑐᓂᒃ ᓄᓇᒥᒃ ᐊᑐᖅᓂᒃ

ᐱᓕᕆᐊᖅ, ᐅᓚᒪᑎᓴᐅᒃᑯᑦ, ᓂᕆᐅᑎᓴᐅᔪᖅ ᐱᑎᐊᖅᑎᑎᓂᐅᐅᓂᐊᖅᓂᖏᓄᓂ ᐅᓴᖅᖏᓂᐊᖅᑐᑦᑕᓂᕆᓂᖅᑭᑦ ᐱᓕᕐᓚᐊᓂᖅᑭᒃ, ᐃᓕᐅᕐᓗᓂ ᓄᖓᓯᐃᑐᒥᒃ ᐅᓴᖅᖏᓂᐊᖅᑐᑦᑕᓂᕆᓂᖅᑭᑦ ᐱᓕᕐᓚᐊᓂᖅᑭᒃ, ᐱᖓᓐᓇᖅᑭᓯᖏᓂᓂ ᑭᓕᕐᓚᐅᕐᓂ. ᐅᓴᖅᖏᓂᐊᖅᑐᑦᑕᓂᕆᓂᖅᑭᑦ ᐱᓕᕐᓚᐊᓂᖅ ᐅᖅᖃᖅᑕᐅᓯᒪᓂᐅᑉᑯᑦ ᑐᕐᖁᑎᒪᓂᖅᑭᑦ ᑕᒪᐃᓄᐅᕙᖅ ᓄᓇᕗᑦᓯᑦᑕᓂᖅᑭᑦ ᑭᐅᓂᕆᑎᓂᖅᑭᑦ ᑐᓕᕐᓚᓂᖅᑭᑦ ᑲᒪᔨᐅᕙᓄᓂ. ᓄᓇᕗᑦ ᑭᖑᓂᓚᖅᑲᐃᓐᓇᕐᒥᒃ ᓄᓇᒥᒃ ᐊᑐᖅᓂᖅᑭᑦ ᓴᖅᓄᖅᑕᐅᓂᖅᑭᑦ ᓂᕆ ᐃᓕᑕᖅᑭᓯᐊᒥᒃ ᐊᑐᖅᓂᖅᑭᒃ ᓄᓇᓂᒃ ᑐᖓᔪᖅᑎᑦ ᐊᐅᑎᓂᖅᑭᑦ ᑭᓴᖅᑐᖅᑭᑦ ᓄᓇᕗᑦ ᐊᑐᖅᓂᖅ ᑭᖑᓂᖅᑭᑦ ᓄᓇᕗᑦ ᐊᑐᖅᓂᖅᑭᑦ ᑭᖑᓂᖅᑭᑦ ᓴᖅᑭᑎᓂᖅᑭᑦ ᐃᓄᐃ

ᐊᒪᓗ ᐃᑲᔪᐃᓂᖅ ᐱᓕᓂᓪᓕᖅᑐᒃ ᐊᓂᔪᐃᑎᑦᑎᓂᓂᕐᒧᑦ ᑐᓗᖅᑕᕐᑎᓂᒃ ᐱᑕᕆᐊᒥᑦ ᑲᓐᑐᖅᑕᖅᓂᓂᕐᒧᑦ; iii) ᐃᑕᓐᓂᐊᕐᓂᖅ, ᐊᔪᕐᓗᓴᖅᓱᐃᓂᖅ ᐊᒪᓗ ᐃᑕᓐᓂᐊᕆᐊᕐᓂᔨᖓᔪᓂᒃ ᑐᖏᖓᔪᓂᒃ; iv) ᐃᓂᖅᑲᖅᑎᓐᓂᖅ ᐃᓄᐃᑦ ᐱᖅᑯᓯᖏᓐᓂᒃ ᐱᑕᕆᓪᓚᕐᑎᑦ ᐊᓗᐊᖅᑐᓂᖅ ᐱᑕᕆᐊᒧᑦ ᐅᓪᓚᒃᓯᓂᒧᑦ; ᐊᒪᓗ v) ᐊᒥᓯᓄᑦ ᑐᓂᐅᖅᑲᐃᓂᖅ ᑐᑭᓯᐅᒪᓂᒃ ᒪᓂᒪᔪᓂᒃ ᐱᑕᕆᐊᖅᓴᓂᒃ ᐊᒪᓗ ᐱᓕᓯᓄᑦ ᐱᐃᖅᑲᓂᐅᔪᓂᒃ.

ᖁᐅᓴᒪᓕᐅᔪᖅ **ᐃᑕᓐᓂᐊᕐᓂᖅᑎᑦᑕ ᐊᔪᕐᓗᓴᖅᓱᐃᓂᖅᑎᓗ** ᐃᑕᒪᐅᓂᐊᖅᑐᑦ ᐊᓯᔨᖏᑕᑐᓂᒃ ᑐᖏᓚᔪᑕᐅᓚᓂᖅᑎᒃ, ᐅᓵᑐᑎᒥᑐᓗᒍ ᐱᑕᕆᐊᖅᓴᖅᑕᕐᓂᐊᓘᓐᓄᑦᑎᓗ, ᐃᓅᓯᔪᓄᑦ ᐊᔪᖏᓐᓂᖅᑕᕐᓂᔪᓄᑦ, ᖁᓯᑎᖏᓂᖅᓴᓄᑦ ᐃᑕᓐᓂᐊᕋᓂᖅᓴᓂᔪᓄᑦ, ᓯᓚᑕᑐᖅᓴᖅᓇᖏᓄᑦ ᐃᑕᓐᓂᐊᕆᐊᒃᓐᓂᕐᓂᔪᓄᑦ, ᐱᑕᕆᓗᓂ ᐊᔪᕐᓗᓴᖅᓴᓂᔪᓄᑦ, ᐊᒪᓗ ᐱᑕᕆᐊᖅᓴᖅᑕᕐᓗᓄᑦ ᑐᓂᐅᕐᓂᖅᓴᖅ ᐱᑕᕆᐊᓂ ᐊᑐᑕᖅᑎᑎᓂᓂᔪᓄᑦ ᐃᑕᓐᓂᐊᕐᓇᖏᓐᓄᑦᑎᓂᓂᔪᓄᑦ ᐃᓅᓯᔪᓄᑦ ᐊᔪᖏᓐᓂᖅᑕᕐᓂᔪᓄᑦ ᐃᓅᓂᒃᑐᓂᖅᓴ

ᐊᖏᑎᓪᓗᐊᖅᑐᖅ ᑕᐅᑐᖃᐅᔨᖅ ᐅᓗᓕᐊᓇᖅᑐᒃ ᓂᓚᐅᑎᕆᐅᔨᖅ. ᑕᒪᐟᓇ ᐱᓪᓚᐊᖓᓂᐊᖅᑐᖅ ᑲᔪᓂᑲᑦ ᐃᓪᓕᓂᐊᖅᑎᑎᓂᑲᑦ ᓂᓚᐅᑎᕆᐅᔨᖅᑐᓪᓗᓂᑦ, ᐊᒪᓗ ᐊᐅᑎᖓᓂᓂ ᐊᒪᓗ ᐃᓄᐃᑦ-ᐱᑭᖅᐸᓪᓕᐊᓂᖓᓂ ᖃᓄᐃᖓᑦᓂᖅᑎᑎᓂᐅᔨᓂᒃ.

ᐊᐸᐅᑦ ᑲᔪᓂᐊᖅᑐᑦ **ᐃᓪᓕᐅᖅᑕᐅᓂᖓᖅ**, ᐃᓪᓕᐅᖅᑕᐅᓗᑎᒃ ᐃᓐᓇᓚᖅᑐᔨᑦ ᐅᖅᑲᐅᔪᖅᑐᓂᖓᖅ **ᐃᓄᐃᑦ ᖃᐅᐅᒪᖏᑐᓂᒃ** ᑐᓂᔪᓂᖓᑦ ᐃᓄᐃᑦ-ᐱᑭᖅᐸᓪᓕᐊᓂᐅᓐᓄᓄᑦ ᐊᐅᓪᓕᕐᓂᓂᖓᑦᔪᖓᓚᔨᓄᑦ ᐊᒪᓗ ᐊᑐᖅᑕᐅᖅᓯᐊᓪᓕᐊᓂᐅᓐᓄᓄᑦ ᐊᐅᓚᖅᑐᖅᓯᐊᓪᓕᐊᓂᐅᓐᓄᓄᑦ. ᐊᐸᐅᑦ ᑲᔪᓂᐊᖅᑐᑦ ᐃᓪᓕᐊᓂᐸᓪᓕᐊᓂᐅᓐᓄᓄᑦ ᐊᐅᓚᖅᑐᖅᓯᐊᓪᓕᐊᓂᐅᓐᓄᓄᑦ ᐃᓄᐃᑦ-ᐱᑭᖅᐸᓪᓕᐊᓂᐅᓐᓄᓄᑦ ᐊᒪᓗ ᐃᓄᐃᑦ-ᐱᑭᖅᐸᓪᓕᐊᓂᐅᓐᓄᓄᑦ

ᐱᓕᕆᓂᐊᓂᐅᑎᑦᓗᒍ ᐅᖅᑲᓪᓕᑦᓗ. ᐱᐊᒋᓯᒥᑦ ᐊᓯᐊᖏᖅᐸᑦᕆᐊᓂᖅᑫᕕᐅᓯᒥᑦ ᐃᓄᐃᑦ-ᐱᑭᖅᐸᑦᕆᓂᐅᑦᓗ ᐃᓗᐊᓂᑦ, extrapolating-ᖏᓴᒥᑦ ᒧᐧᓄᕕᐅᓴᓂᖅ ᑭᑐᕆᐅᓴᓂᖅᑭᑦᕆᐊᓂᖅᑭᓐᓂᖅ ᐊᖏᕐᒥᒃ ᑕᒪᒪᖅᓯᓂᖅᐃᓴᖏᓐᓇᖅᑐᖅ. ᐊᒪᓗ, ᖃᓄᐃᖏᕆᖅᑎᑎᓂᐅᕐᓴᑦ ᐱᕆᓗᒥᑦ ᑕᐃᒪᐧᓇᐃᑐᖏᓐᓇᖅᑐᖅ ᐃᑕᖅᖃᓗᓂᑦ ᑕᓯᓴᐊᒥᑦ ᒍᓗᒪᑦ ᐱᕆᓗᐊᖏᓴᒪᓴᖃᖅᑐᑦ ᑲᑎᕆᐊᖃᖅᑐᑦ ᐊᑐᓕᕆᓂᖅᑐᑦ ᐊᐅᓚᓂᖅᑐᒥᓂ, ᐅᑎᐅᕈᑲᐅᓴᖅ ᓴᓇᐅᐊᖅᑐᓂᖅ, ᐊᒪᓗ ᐊᐅᓚᓂᖅᑐᓂ, ᕈᑦᑲᖓᓗ ᐱᑕᖅᑭᑦᓗ ᐊᐅᓚᓂᖅᑐᓂ.

ᐊᓴᒋᖏᓐᓂᕆᔨᖅᑎᓂᒍ ᓇᓗᓇᐃᔪᖅᓯᒪᔨᓂᒃ, ᐊᒥᓱᑦ ᐊᑐᖅᑕᐅᔨᑦ ᐊᓴᒋᖏᑐᑦ ᑕᒪᐃᓂᒃ ᓴᓇᔪᐅᓂᖏᓐᓄᑦ ᐊᒪᓗ ᐊᐅᓚᓂᖅᓂᖏᓂᑦ ᐊᒪᓗ ᐊᓯᐊᖏᖅᓂᖓᑦ ᕈᐅᓴᒋᑦ ᐱᑕᕆᓗᒪᑦ ᑲᔪᓯᓚᖅᑯᓂᐅᕐᓂᖅᓱᑎᓄᒃ. ᑕᒪᐃᓂᒃ ᑲᑎᒪᓂᖅᑐᓂ, ᐃᓕᓴᖅᑐᓂᒃ ᐊᒪᓗ ᐅᓴᖅᑭᒃᓂᓗ ᑐᑭᓯᐊᓂᒃ ᐊᒪᓗ ᐃᓇᓗᓇᖅᑐᖅ ᐱᑕᖅᐸᑦᕆᐊᓂᖅᑐᖅ ᐱᐅᓂᑦ ᐃᓗᐊᓂᑦ ᐊᒥᔪᖅᐸᑦᕆᐊᓂᖅᑐᖅ ᐱᑕᖅᐸᑦᕆᐊᓂᖅᑐᑦ ᐱᐅᓂᑦᓗᒍ, ᐱᐅᖏᑕᒥᓂᒃ ᑲᑎᒪᓂᖅᑎᑎᓂᐅᕐᓂᖅᑐᑦ ᕿᑎᕐᓂᖅᑐᓂᒃ ᐱᐅᓂᐅᕐᓴᑦ ᐱᐅᓂᐅᕐᓴᑦ ᑲᑎᒪᓂᖅᑎᑎᓂᐅᕐᓂᖅᑐᑦ ᑲᑎᒪᓂᖅᑎᑎᓂᐅᕐᓂᖅᑐᑦ ᑲᑎᒪᓂᖅᑎᑎᓂᐅᕐᓂᖅᑐᑦ ᐱᐅᓂᐅᕐᓴᑦ ᐱᐅᓂᐅᕐᓴᑦ ᐱᐅᓂᐅᕐᓴ

ᑌᖅᒪᑲᓕᕐᓂᓄᑦ ᑐᖏᑲᓕᑲᓕᕐᓂᓄᑦᑕ ᐃᓕᓴᕐᓂᐅᕐᓂᖅᑕᕆᑦᑐᑦ ᐱᓵᑎᕆᐅᑎᓂᖅ, ᐃᑲᔪᐃᓂᐅᔪᖅ ᐃᓄᖏᓄᑦ. ᑕᐃᒪᓐᓇᐃᑎᑦᓴᔪ ᖃᐅᔨᒪᔨᐅᔪᖅ ᐱᓕᕆᐊᖅ ᓂᕆᐅᕈᑲᐅᖏᑕᑐᖅ ᐃᖏᕐᓗᕈᕐᐊᖅᑎᑎᓄᓕᒃᑐᑦ ᐱᖅᐅᔪᒪᕐᒥᖅ.

ᐱᓕᕆᐊᖅ ᓂᕆᐅᕈᑲᐅᔪᖅ ᐱᕈᐊᖅᑎᑎᓂᐅᐊᓂᖏᓐᓄᓕᑦ ᖃᐅᓂᖅᓴᐃᓂᕐᒥᐅ ᐊᒪᓗ ᐅᓴᕃᖏᓂᐅᐊᖅᑐᑕᕆᔪᒪᔪᓂᐅᒃ ᐱᓗᐊᖅᑐᒥᑦ ᑭᖑᓪᓕᐅᕐᓴᐸ ᐱᖏᓐᓇᖏᓂᓕᕐᓂ. ᑕᒪᓇ ᐃᑲᔪᑎᑲᓂᐅᐊᔪᖅ, ᐊᖏᕐᕿᓗᓂᓗ, ᑲᔪᓯᓂᐅᐊᔪᖅ **ᓄᓇᒥᒃ ᐊᑐᖅᓂᓕᒧᑦ ᕿᖅᓇᐃᓂᕐᒧᑦ** ᐊᑐᖅᑕᐅᔪᖅ ᖃᐅᔨᓴᔪᑕᐅᔪᖅ ᑕᒪᓇ ᐊᕿᖅᑯᑕᐅᖏᓐᓇᑦ ᓯᕗᓕᒧᖓᓂᕐᒧᑦ ᓄᓇᕗᑦ ᐊᓕᓗ ᑭᑭᓴᐃᓂᐅᐊᖅᑐᑕᕆᔪᒪᔪᓂᐅᒃ ᓂᕈᐊᖅᑕᖏᓐ. ᐱᐅᖏᓂᑐᒥᒃ ᖃᓄᐃᖏᓕᖅᑎᑎᓂᓂᖅ ᐅᓴᓕᕿᓂᕐᒧᑦ ᐃᓯᒪᑎᕆᐅᔪᖅ ᐊᓂᑎᑐᕐᑕᐊᖅᑎᓂᓄᓕᒃᑐᑦ ᐊᖏᓂᓂᐅᔪᓕᒥᑦ ᒥᑭᒐᕐᑕᐊᖅᑎᓂᓄᓕᒃᑐᑦ ᐃᓄᐅᔪᖅ ᐅᓴᒥᓂᐅᖅᑎᓄᓕᒃ. ᓄᓇᒥᒃ ᐊᑐᖅᓂᒧᑦ ᖃᓄᐃᖏᓕᖅᑎᑎᓂᓂᐅᔪᓕᒥᑦ ᖃᐅᓕᑐᖅᑎᑎᓂᓂᐅᔪᓕᒥᑦ (ᐃᓕᐅᔪᓕᒥᑦ ᐊᑐᖅᓂᖅ ᐊᐅᓕᖅᑎᑎᓂᐅᖅᑎᓂᒧᑦ ᐊᕿᖅᑯᑎᑭᖅᐅᔪᖅ) ᐃᓯᒪᑎᕆᐅᔪᖅ ᐊᐅᓕᑕᐅᔪᓐᓇᕆᑎᑎᓂᖏᓐᓄᑐᖅ, ᑕᐃᒪᓐᓇᒪᑦ ᐅᖏᕐᔨᖏᕐᑕᖅ.

ᐱᑭᖅᕿᓕᕆᐊᖅᑎᓂᒧᑦ ᐊᒪᓗ ᐅᑭᐅᓚᕆᐅᔪᒪᒧᑦ ᖃᐅᓂᐃᖏᓕᖅᑎᑎᓂᑎᓄᓕᒃ ᓄᓇᓕᖓᓂᕐᒧᑦ ᐱᐅᔨᔪᖅ ᐊᒪᓗ ᐊᖏᕐᕿᓗᓂᓂᐅᖅᑎᓄᓕᒃ, ᐱᓕᕆᐊᐅᓚᓂᓕᒃ, ᐱᓕᕆᓵᓕᒃ ᐅᓇᓕᖅᑎᓂᓂᐅᖅᑎᓄᓕᒃ ᐊᒪᓗ ᐊᑭᓕᐅᑕᐅᔪᒪᒧᑦ ᐃᓄᐃᑦᑐᖅᑕᐅᖏᓐᓇᑦ ᐱᑭᖅᕿᓕᕆᐊᖅᑎᓂᒧᑦ ᐊᒪᓗ ᐊᖏᕐᕿᓗᓂᓂᐅᖅᑎᓄᓕᒃ

<<ᑕᐅᔨᓐᓇᓕᐅᕆᑐᑦ ᐃᓄᓐᓄᑦ ᑕᐃᒪᐅᖅᓱᕐᓂᑐᑦ. ᓄᓇᕗᑦ ᐱᓕᓚᔭᓐᓂ ᐱᑭᕆᑦᑕᐊᕆᓕᕆᓪᒍᔨᕆᑦ, ᑭᓯᐊᓂ ᑕᑭᔨᔪᒥᐅ ᐃᓯᒪᓗᑎᒃᓴᐅᓐᓂᑐᑦ.

ᐃᓗᐃᑐᑎᑦᐊᖏᓐᓄᑦ ᐱᕆᑯᓯᐅᔨ, ᐊᑯᓂᐅᓂᕆᓴᐅᔨᒥᑦ, ᐊᓐᑎᔨᒥᐅ ᐃᓄᐃᑦ ᐊᑐᕋᐊᕆᑦᑎᖏᕆᑦᑐᑦᑐᑦ. ᐱᓕᓚᐊᕆ ᑭᓯᑭᑎᖅᓱᓐᓂᑐᑦ ᑕᒪᐃᓄᓗᑉᑕᕆ ᐱᐅᕆᑦᑕᓕᖏᓂᑦ ᐱᕆᑯᓯᓕᕆᓂᑦ, ᑭᓯᐊᓂᓕ ᐱᓕᓚᔭᓐᓂᑦ, ᐊᑯᓂᐅᔨᒥᑦ ᐱᐅᓐᓂᑐᓂᓐᒃ ᑐᓂᓯᓂᑦᑐᓐᓇᖅᑐᑦ ᐱᖏᑯᓯᓚᕐᔪᒪᑦ. ᑕᒪᓐᓇᖅᑐᑦ ᐱᕆᑯᓯᓚᕐᔪᒪᑦ ᐃᓄᐃᑦ ᐊᑐᕋᐊᕆᑦᑎᖏᕆᑦᑐᑦ ᐱᓕᓚᔭᓐᓂᑦ ᐱᕆᑯᓯᓚᕐᔪᒪᑦ ᐃᓄᐃᑦ ᐊᑐᕋᐊᕆᑦᑎᖏᕆᑦᑐ

Table of Contents

1 Introduction 1-1
1.1 Background 1-1
1.2 Nunavut Impact Review Board Guidelines for the Environmental Impact Statement and Preliminary Conference Decision 1-3
1.3 Purpose and Scope 1-5
1.4 Report Content and Related Documents 1-5
2 Project Overview 2-1
2.1 Project Fact Sheet 2-1
2.2 Assessment Basis 2-2
3 Assessment Approach 3-1
4 Scope and Broad Methodology of the Assessment 4-1
4.1 Issues and Concerns Identified During Inuit, Government and Stakeholder Engagement 4-1
4.2 Project-Environment Interactions and Effects 4-6
4.3 Valued Socio-Economic Components 4-10
4.4 Spatial Boundaries 4-18
4.4.1 Local Assessment Area 4-18
4.4.2 Regional Assessment Area 4-19
4.4.3 Temporal Boundaries 4-19
4.5 Environmental Effects Criteria 4-20
4.6 Determination of Significance 4-24
4.7 Influence of Inuit, Government and Stakeholder Engagement on the Assessment 4-26
4.8 Integration of IQ 4-28
4.9 Consideration of Comparable Experiences 4-28
5 Summary of Existing Environment 5-1
5.1 Baseline Methodology 5-1
5.2 Nunavut 5-5
5.2.1 Government 5-5
5.2.2 Economy 5-6
5.2.3 Social Context 5-8
5.3 Kivalliq Region and Communities 5-11
5.3.1 Economy 5-12
5.3.2 Social Context 5-15
6 Socio-Economic Management 6-1

6.1 AREVA Corporate Standards 6-1
6.2 Approach to Socio-Economic Management 6-2
6.2.1 Objectives 6-2
6.2.2 Principles 6-2
6.2.3 Socio-Economic Management Components 6-3
6.3 Mitigation and Benefit Enhancement Measures 6-5
6.3.1 Employment 6-5
6.3.2 Contracting 6-8
6.3.3 Education and Training 6-10
6.3.4 Workforce Management 6-11
6.3.5 Effects on Wellbeing 6-13
6.3.6 Public Health and Safety 6-14
6.3.7 Community Contributions 6-15
6.3.8 Compensation 6-15
6.3.9 Closure 6-17
6.4 Role of Engagement and IQ 6-20
6.5 Monitoring 6-22
6.5.1 Objectives and Principles 6-22
6.5.2 Socio-economic Monitoring Context 6-24
6.5.3 Monitoring Issues 6-25
6.5.4 Community Level Data Availability and Analysis 6-26
6.5.5 Operations Monitoring 6-28
6.5.6 Collaborative Monitoring 6-29
6.6 Inuit Impact Benefit Agreement 6-37
6.7 Other Initiatives in Support Of Socio-Economic Development and Culture in Nunavut 6-39

7 Comparable Experiences 7-1
7.1 Nunavut 7-2
7.2 Northwest Territories Diamond Mines 7-3
7.3 Northern Saskatchewan Uranium Mines 7-8
7.4 Northern Alberta Oil Sands 7-18

8 Assessment of Effects on Community Economies 8-1
8.1 Assessment of Effects on Community Economies 8-2
8.1.1 Analytical Methods 8-2
8.1.2 Employment 8-3
8.1.2.1 Construction 8-3
8.1.3 Contracting Opportunities 8-12
8.1.4 Training 8-15
8.1.5 Economic Growth and Diversification 8-17

8.1.6 Incomes 8-19
8.1.7 Population 8-21
8.1.8 Closure 8-27
8.1.9 Residual Effects 8-30
8.2 Cumulative Effects Analysis for Community Economies 8-34
8.3 Summary of Effects on Community Economies 8-39

9 Assessment of Effects on Traditional Culture 9-1
9.1 Residual Project Effects Assessment On 9-1
9.1.1 Analytical Methods 9-1
9.1.2 Harvesting 9-1
9.1.3 Food Security 9-15
9.1.4 Language 9-17
9.1.5 Values and Knowledge 9-19
9.1.6 Cultural Heritage Sites 9-22
9.1.7 Residual Effects 9-22
9.2 Cumulative Effects Analysis for Traditional Culture 9-25
9.3 Summary of Effects on Traditional Culture 9-28

10 Assessment of Effects on Individual, Family and Community Wellbeing 10-1
10.1 Residual Project Effects Assessment on Individual, Family and Community Wellbeing 10-1
10.1.1 Analytical Methods 10-1
10.1.2 Health 10-2
10.1.3 Family Function 10-6
10.1.4 Savings 10-9
10.1.5 Public Security 10-10
10.1.6 Public Health and Safety 10-13
10.1.7 Social Cohesion and Participation 10-16
10.1.8 Residual Effects 10-19
10.2 Cumulative Effects Analysis for Individual, Family and Community Wellbeing 10-21
10.3 Summary of Effects on Individual, Family and Community Wellbeing 10-24

11 Assessment of Effects on Public Infrastructure and Services 11-1
11.1 Residual Project Effects Assessment on Public Infrastructure and Services 11-1
11.1.1 Analytical Methods 11-2
11.1.2 Social Infrastructure and Services 11-2
11.1.3 Policing 11-7
11.1.4 Housing 11-8
11.1.5 Other Infrastructure and Services 11-18

11.1.6 Institutional Capacity and Governance 11-18
11.1.7 Residual Effects 11-19
11.2 Cumulative Effects Analysis for Public Infrastructure and Services 11-22
11.3 Summary of Effects on Public Infrastructure and Services 11-24

12 Assessment of Effects on Non Traditional Land Use and Land Use Planning 12-1
12.1 Residual and Cumulative Project Effects Assessment on Non-Traditional Land Use and Land Use Planning 12-1
12.1.1 Analytical Methods 12-2
12.1.2 Mining 12-3
12.1.3 Tourism 12-5
12.1.4 Baker Lake 12-6
12.1.5 Residual and Cumulative Effects 12-7
12.2 Summary of Effects on Non Traditional Land Use and Land Use Planning 12-9

13 Assessment of Effects on the Economy of Nunavut 13-1
13.1 Residual Project Effects Assessment on the Economy of Nunavut 13-1
13.1.1 Analytical Methods 13-1
13.1.2 Economic Effects 13-5
13.1.3 Other Economic Effects 13-11
13.1.4 Fiscal Effects 13-12
13.1.5 Final Closure and Post Closure 13-14
13.1.6 Assessment of Options 13-15
13.1.7 Residual Effects 13-15
13.2 Cumulative Effects Analysis for the Economy of Nunavut 13-18
13.3 Summary of Effects on Economy of Nunavut 13-24

14 Summary of Residual Effects 14-1
14.1 Residual Effects 14-1
14.1.1 Project Effects 14-1
14.2 Cumulative Effects 14-9
14.3 Socio-Economic Management 14-10

15 References 15-1

List of Tables

Table 2.2-1 Project Assessment Basis 2-3
Table 2.2-1 Far Future Scenario..... 3-4
Table 4.1-1 Issues and Concerns from Large Community Engagement Events (% age of comments)..... 4-5
Table 4.2-1 Primary Project/Socio-Economic Environment Interactions and Effects..... 4-9
Table 4.3-1 Results of Valued Component Inquiry, 2010 (%of Responses)..... 4-11
Table 4.3-2 Valued Socio-Economic Components 4-14
Table 4.3-3 Primary Linkages between VSECs..... 4-16
Table 4.5-1 Definitions of Criteria Used in the Assessment 4-23
Table 5.1-1 Data Collection Events by Community..... 5-3
Table 5.2-1 Health Indicators, Various Years 2007 to 2012..... 5-10
Table 5.3-1 Sectoral Employment in Kivalliq, Nunavut and Canada 5-14
Table 5.3-2 Population 5-15
Table 5.3-3 Selected Socio-economic Indicators 2006 and (2011) 5-16
Table 5.3-4 Violent and Non Violent Crime Rates 5-21
Table 5.3-5 Social Housing 5-23
Table 6.5-1 Monitoring Indicators 6-33
Table 7.2-1 Summary of Community and Diamonds Findings 7-4
Table 8.1-1 Values Available, Calculated or Estimated for Scenario Building 8-2
Table 8.1-2 Recent Employment Data..... 8-4
Table 8.1-3 Kivalliq Labour Force Growth Rate Scenario 8-6
Table 8.1-4 Employment Scenario, 2011 and 2017..... 8-8
Table 8.1-5 Historical Expenditures on Goods and Services ($000) 8-13
Table 8.1-6 Population Growth Rates, June 30 to July 1, 2006 to 2013..... 8-23
Table 8.1-7 Inuit Population Distribution..... 8-25
Table 8.1-8 Inuit and non Inuit Population Growth Rates (% increase on previous year)..... 8-25
Table 8.1-9 Temporary Closure and/or Premature Permanent Closure Effect Scenarios 8-30
Table 8.1-10 Summary Impact Matrix, Effects on Community Economies..... 8-33
Table 8.2-1 Summary Impact Matrix, Cumulative Effects on Community Economies 8-37
Table 9.1-1 Summary Impact Matrix, Effects on Traditional Culture 9-24
Table 9.2-1 Summary Impact Matrix, Cumulative Effects on Traditional Culture..... 9-27
Table 10.1-1 Violent and non Violent Crime Rates 10-11
Table 10.1-2 Summary Impact Matrix, Effects on Individual, Family and Community Wellbeing 10-20
Table 10.2-1 Summary Impact Matrix, Cumulative Effects on Individual, Family and Community Wellbeing..... 10-23
Table 11.1-1 Social Assistance Recipients and Expenditures 11-3
Table 11.1-2 Demand for Health Education Services 11-4
Table 11.1-3 Historical School Enrollment in LAA Communities..... 11-5
Table 11.1-4 K-12 Educational Institutions in Kivalliq, Capacity and Graduation Rates (2013 / 2014)..... 11-6
Table 11.1-5 Housing Information in LAA Communities 11-8
Table 11.1-6 Annual Wait List Scenarios..... 11-16

Table 11.1-7 Summary Impact Matrix, Effects on Public Infrastructure and Services..... 11-21
Table 11.2-1 Summary Impact Matrix, Cumulative Effects on Public Infrastructure and Services..... 11-23
Table 12.1-1 Summary Impact Matrix, Cumulative Effects on Non-Traditional Land Use and Land Use Planning..... 12-8
Table 12.2-1 Summary Impact Matrix, Effects on Non-Traditional Land Use and Land Use Planning 12-10
Table 13.1-1 Summary Input Output Model Results, Construction..... 13-6
Table 13.1-2 Summary Input Output Model Results, Operations 13-9
Table 13.1-3 Operations Phase Tax and Royalty Payments ($ million)..... 13-13
Table 13.1-4 Summary Impact Matrix..... 13-17
Table 13.2-1 Cumulative Effects Scenario, Employment 13-19
Table 13.2-2 Summary Impact Matrix, Cumulative Effects on the Economy of Nunavut 13-23
Table 14.1-1 Summary Impact Matrix..... 14-3
Table 14.1-2 Summary Impact Matrix – Baker Lake Specific..... 14-7

List of Figures

Figure 1.1-1 General Location of Proposed Kiggavik Project in Canada..... 1-2
Figure 5.3-1 High School Graduation Rates (%)..... 5-17
Figure 5.3-2 Total Crime Rates..... 5-22
Figure 8.1-1 Unemployment Rates, 2011 and 2017..... 8-9
Figure 9.1-1 Land Use and Hunting Intensity..... 9-4
Figure 9.1-2 Preferred Land-Based Hunting Areas..... 9-5
Figure 9.1-3 Hunting and Caching Areas around Baker Lake 9-6
Figure 9.1-4 Preferred Marine-Based Hunting Areas 9-7
Figure 9.1-5 Fishing Areas near Judge Sissons Lake..... 9-9
Figure 9.1-6 Fishing Areas near Baker Lake..... 9-10
Figure 10.1-1 Total Crimes (number per 1,000)..... 10-12
Figure 11.1-1 Annual Wait Lists, Low Growth Scenarios 11-13
Figure 11.1-2 Annual Wait Lists, Medium Growth Scenarios 11-14
Figure 11.1-3 Annual Wait Lists, High Growth Scenarios..... 11-15
Figure 13.2-1 Mining Related Jobs and Labour Force Size..... 13-20
Figure 13.2-2 Labour Force and Mine Labour Demand 13-21

Attachments

Attachment A Socio—Economic Data Collection Events
Attachment B Kiggavik Labour Market Analysis
Attachment C Interprovincial Input-Output Model

Abbreviations

AANDC ..... Aboriginal Affairs and Northern Development Canada

AEM ..... Agnico Eagle Mines Ltd.

AREVA ..... AREVA Resources Canada Inc.

CBoC ..... Conference Board of Canada

CNSC ..... Canadian Nuclear Safety Commission

CVMPP ..... Community Vitality Monitoring Partnership Process

EFAP ..... Employee and Family Assistance Program

EIS ..... Environmental Impact Statement

DEIS ..... Draft Environmental Impact Statement

GDP ..... Gross Domestic Product

GN ..... Government of Nunavut

GNBS ..... Government of Nunavut Bureau of Statistics

GNED&T ..... Government of Nunavut Department of Economic Development and Transportation

GNDoF ..... Government of Nunavut Department of Finance

GNWT ..... Government of Northwest Territories

GoC ..... Government of Canada

GoS ..... Government of Saskatchewan

GST ..... Goods and Services Tax

HIV ..... Human Immunodeficiency Virus

HTO ..... Hunters and Trappers Organizations

IIBA ..... Inuit Impact and Benefits Agreement

INAC ..... Indian and Northern Affairs Canada

IQ ..... Inuit Qaujimajatuqangit

ITK ..... Inuit Tapiriit Kanatami

KIA ..... Kivalliq Inuit Association

KMTS ..... Kivalliq Mine Training Society

MVEIRB ..... Mackenzie Valley Review Board

NAC ..... Nunavut Arctic College

NTEDT ..... Northwest Territories Economic Development and Tourism

NGMP ..... Nunavut General Monitoring Plan

NIRB ..... Nunavut Impact Review Board

NLCA ..... Nunavut Land Claims Agreement

NPC ..... Nunavut Planning Commission

NSRT ..... Nunavut Surface Rights Tribunal

NTI ..... Nunavut Tunngavik Incorporated

NWMB ..... Nunavut Wildlife Management Board

NWT ..... Northwest Territories

NWTBS ..... Northwest Territories Bureau of Statistics

PHAC ..... Public Health Agency of Canada

RCMP ..... Royal Canadian Mounted Police

RSA ..... Regional Study Area

SEMC ..... Socio-economic Monitoring Committee

Statcan ..... Statistics Canada

VC ..... Valued Component

VEC ..... Valued Environmental Component

VSEC ..... Valued Socio-Economic Component

WASI ..... Wildlife Area of Significant Interest

Glossary

Note: A glossary for terms general to this EIS is provided in Appendix 1B to Volume 1. This includes, as examples, terms such as residual effect, sustainable development, access road and biodiversity. This glossary includes only those terms specific to this volume and defines terms in the ways they are used in this volume.

Adaptive management	Managing socio-economic effects in a way that recognizes that the socio-economic environment is always changing, and that changes need to be monitored so that mitigation and benefit enhancement measures can be adjusted over time to make sure that they are as effective as they can be.
Benefit	An effect that is positive
Coefficient	A number that comes from data collected on what has happened in the past in an economy, used in the input output model to calculate an estimate of what will happen in the future. The input output model has tens of thousands of coefficients.
Demography	Data on groups of people, with emphasis on things like births, deaths, migration, age and gender.
Direct effect or benefit	An economic term that includes effects that result from the Project's payments to workers and suppliers for example.
Disaggregation	The separation of a big grouping of economic activities, such as mining, into smaller groups such as gold mining, iron ore mining and uranium mining. Disaggregation for modelling produces more accurate results for a particular economic activity.

Economic shock	An economic event that is so large that it changes a whole economy in a major way. The construction of the Project is an economic shock because alone, it will change unemployment rates and the size of the economy by whole percentage points as opposed to fractions of a percentage point.
Externality	An economic term for things that are not addressed because it is really possible to assign a market dollar value. Input output models for example do not address environmental costs because there are no good data to use to describe the market value of, for example, an increase in dust in the air at some times.
Fiscal effect	An effect on government revenues or on government spending.
Final domestic demand	The total amount of money that is spent in an economy in a year, by government, businesses and people, including money spent on importing goods and services.
Government	Used as a general term to refer to all or most governing agencies at the hamlet, regional, territorial and national levels, including institutions of public government.
Gross domestic product	The total value of all goods and services produced within Nunavut, it in indicator of how big the economy is.
Indicator	A socio-economic characteristic that can be measured and so can be monitored to identify changes in a component of the socio-economic environment that is valued. The unemployment rate and the number of households speaking Inuktitut in the home are examples.
Indirect effect or benefit	An economic term that includes effects that result from the suppliers contracted by the Project in turn hire workers and buy from others what they need to fulfill their contracts with the Project.

Induced effect or benefit	An economic term that includes effects that result when income earned by workers and businesses supplying the Project is spent on things not related to the Project, such as new equipment for harvesting, new housing or better quality food.
Input output model	A mathematical model developed every year by Statistics Canada to estimate what will happen in an economy if a new economic activity starts.
Labour force	The total number of people (in a community, region or other area) that are either working or are looking for work.
Leakage	When used in a discussion of economic effects, the spending of money earned in Nunavut that is spent outside Nunavut, for example money spent on imported goods and services or money spent when a Nunavut resident is outside the territory.
Median	The number which identifies the data point for an indicator at which half the population has a lower value and half has a higher value. For example a median income of $30,000 means that half of households have less income than this and half have more.
Migration	Relocation of an individual or a household from one community (or province or territory) to another with the intent of living in the new community. People relocating out migrate from their old community and in migrate to the new one.
Offset	Something done to make up for something else done, so that nothing really changes. For example, if one mining project closes and lets people go the opening of another mining project, hiring those people, offsets the closing.

Primary data	Data collected by AREVA's socio-economic and IQ data collection team themselves, for purposes of this EIS.
Qualitative data	Information that does not include a number, for example 'many people have moved into this hamlet recently' is qualitative data.
Quantitative data	Information that includes a number, for example '25 families have moved into this hamlet recently is quantitative data.
Royalties	Payments made by the Project to government, calculated on the basis of laws that set a percentage to be paid of the value of the output is defined as the market value of the uranium minus the costs of getting that uranium to the market.
Secondary data	Data obtained from documents that have been published, or come from the work of people other than AREVA's socio-economic and IQ data collection team, and used in the preparation of this EIS.
Threshold	The point at which an indicator value stops being manageable and becomes unmanageable. There are very few, if any, socio-economic indicator thresholds that people agree on.
Work force	The total number of people working for the Project, or for another project or activity.
Vulnerable	Word used to refer to people or households that because of economic or social challenges (poor health or education) or other factors (single parent, elderly) are more likely to be made worse off because of a Project negative effect, or are less likely to be able to take advantage of a Project benefit.

1 Introduction

1.1 Background

The Kiggavik Project (Project) is a proposed uranium ore mining and milling operation located in the Kivalliq region of Nunavut approximately 80 kilometres (km) west of the community of Baker Lake (Figure 1.1-1). The Project is operated by AREVA Resources Canada Inc. (AREVA), in joint venture partnership with Japan-Canada Uranium Company Limited (JCU) and Daewoo International Corporation

Within the Kiggavik Project there are two general site areas referred to herein as the Kiggavik site and the Sissons site. The two sites are located approximately 17 km apart. Three uranium ore deposits will be mined at the Kiggavik site: East Zone, Centre Zone and Main Zone. A uranium mill, related facilities, main accommodations, and landing strip will also be located at the Kiggavik site. The Sissons site has two uranium ore deposits to be mined: Andrew Lake and End Grid. Open pit mining will be used to extract the ore from the three Kiggavik deposits as well as the Andrew Lake deposit. Mining of End Grid ore will require underground methods.

All ore extracted from the mine sites will be processed through the Kiggavik mill. Mined out pits at the Kiggavik site will sequentially be used as tailings management facilities (TMFs) with East Zone being the initial TMF. The uranium product will be packaged and transported via aircraft to southern transportation networks. Initially, mill reagents, fuel and other supplies will be transported by barge to Baker Lake and then by truck to the mine site over a winter access road. An all-season road between Baker Lake and the Kiggavik Site is carried through the assessment as an option proposed as a contingency in case the winter road cannot adequately support the Project over its life-span.

Decommissioning of the Project will include demolition of site facilities, clean up and reclamation of any disturbed areas, closure of the TMFs and reclamation of mine rock piles to promote vegetative growth and to provide wildlife access.

Projection: NAD 1983 UTM Zone 14N
Creator: CDC Revised: TL
Date: 9/03/2014 Scale: 1:16,000,000
File:
Data Sources: *Natural Resources Canada, Geobase®, Nation Topographic Database, Geological Survey of Canada, AREVA Resources Canada Inc.*

FIGURE 1.1-1
GENERAL LOCATION OF PROPOSED KIGGAVIK PROJECT IN CANADA

ENVIRONMENTAL IMPACT STATEMENT
SECTION 1 INTRODUCTION

Kiggavik Project
AREVA

AREVA Resources Canada Inc - P.O. Box 9204 - 817 - 45th Street West - Saskatoon, SK - S7K 3X5

The Kiggavik Project is subject to the environmental review and related licensing and permitting processes established by the Nunavut Land Claims Agreement (NLCA) (NIRB [Nunavut Impact Review Board] 2011), and to the licensing requirements of the Canadian Nuclear Safety Commission (CNSC). The Minister of Indian and Northern Affairs Canada (now Aboriginal Affairs and Northern Development Canada; AANDC) referred the Kiggavik Project to the NIRB for a Review under Part 5 of Article 12 of the NLCA in March of 2010.

The final NIRB "Guidelines for the Preparation of an Environmental Impact Statement for AREVA Resources Canada Inc.'s Kiggavik Project (NIRB File No. 09MN003)" (NIRB 2011) were issued in May of 2011. AREVA submitted the Draft Environmental Impact Statement in December 2011 and again in April 2012 with the NIRB determining that the submission successfully conformed to the EIS guidelines in May 2012. Two review periods followed with the Information Request stage completed in January 2013 and the Technical Review stage completed in May 2013. An in-person technical meeting was hosted in Rankin Inlet, Nunavut by the NIRB in May 2013 with a Community Roundtable and a Pre-Hearing Conference (PHC) hosted in Baker Lake, Nunavut shortly after in June 2013. Following the Pre-Hearing Conference the NIRB issued the "Preliminary Hearing Conference Decision Concerning the Kiggavik Project (NIRB File No. 09MN003)" in July 2013.

1.2 Nunavut Impact Review Board Guidelines for the Environmental Impact Statement and Preliminary Conference Decision

The DEIS, including this volume, was determined by the NIRB on May 4, 2012 to have adequately addressed relevant sections of the NIRB "Guidelines for the Preparation of an Environmental Impact Statement for AREVA Resources Canada Inc.'s Kiggavik Project (NIRB File No. 09MN003)" (NIRB 2011).

Greater clarity, consistency and, in some cases, additional design or assessment were provided within AREVA's responses to information requests in January 2013 and technical comments in May 2013. AREVA commitments for the preparation of the FEIS and regulatory review requirements are listed in the NIRB PHC Decision dated July 2013. Changes from the draft to final EIS including the location of information related to information requests, technical comments, and PHC requirements is noted in the Final Environmental Impact Statement (FEIS) conformity table (Tier 1, Volume 1, Technical Appendix 1A).

This volume is intended to address Section 8.2 of the NIRB "Guidelines for the Preparation of an Environmental Impact Statement for AREVA Resources Canada Inc.'s Kiggavik Project (NIRB File No. 09MN003)" (NIRB, 2011), whereby:

'The Proponent shall present baseline information on the functioning and stability of the socio-economic environment in the *regional study area*, with a corresponding impact assessment covering

all Project phases of development [construction, operations, temporary closure, final closure (decommission & reclamation) and post-closure]. The Proponent shall also describe the components of the socio-economic environment and the processes affecting them as they exist without the Project. This will serve as a baseline against which the potential changes and impacts of the Project can be measured and will also justify the Proponent's selection of *valued socio-economic components* and indicators.

The Proponent shall provide a clear rationale for its selection of communities, the public consultation carried out, and relevant reference studies and reports from which baseline data is collected. The Proponent shall describe the interactions between the socio-economic and biophysical environments, including the roles of the land- and wage-based economies and the nature of the mixed economy of the North. This is not meant to suggest that the Proponent is responsible for the current socio-economic situation of the Kivalliq Region or of Nunavut, or that it is expected to resolve any problems that are identified. Nevertheless, a proper understanding of the structure and functioning of the potentially affected societies is needed in order to identify the potential of the Project to affect them, whether positively or negatively, and to ensure that any socio-economic mitigation measures put in place by the Proponent have a reasonable likelihood of attaining their objectives.

Whenever relevant and appropriate, data shall be disaggregated by age, gender, and ethnic affiliation. Socio-economic indicators are used to present baseline information and subsequently measure impacts related to the proposed project, those indicators selected must be adequate to address all types of foreseeable impacts, including cumulative and residual impacts. The *environmental impact statement* shall clearly identify and justify the Proponent's selection of indicators. In addition, the Proponent should include a treatment on the temporal aspect of when potential impacts on each relevant *valued socio-economic component* could reasonably be expected to manifest. Finally, the Proponent is expected to clearly identify limitations and knowledge gaps encountered in its efforts to collect the information required by the following sections of these Guidelines.' [9]

The location of information related to each individual guideline is noted in the environmental impact statement (EIS) Conformity Table (Appendix 1).

[9] Italics indicate where acronyms used in the NIRB document have been spelled.

1.3 Purpose and Scope

The purpose of this document is to describe the Project's expected residual socio-economic effects. The volume first describes the potential for effects, and then describes what socio-economic management measures AREVA will put in place to mitigate negative effects and enhance positive effects (benefits) to Kivalliq Region and its seven communities and to Nunavut more generally.

The FEIS has been prepared to fulfil the intent of the NIRB Guidelines and PHC Decision, ultimately providing the information required to confidently proceed with an environmental assessment determination. The assessment has been influenced and reflects input provided from Inuit, Land Claim, Government, community, and other interested stakeholders. The EIS has been prepared in fulfillment of the requirements of the NIRB Guidelines.

1.4 Report Content and Related Documents

In addition to this introduction (Section 1), this volume consists of the following sections.

- Section 2 presents a brief overview of the Project.
- A description of the approach used to assess Project effects, somewhat different from the approach general to the rest of the EIS for the Project, is in Section 3.
- The scope and broad methodology of the assessment in Section 4 sets out issues, Valued Socio-Economic Components (VSECs), spatial and temporary boundaries, assessment criteria and methods to determine significance. The section also outlines the roles in the assessment of engagement, Inuit Qaujimajatuqangit (IQ) and lessons learned from comparable experiences in northern Canada.
- The socio-economic baseline results of particular relevance to the assessment are summarized in Section 5.[10]
- AREVA's socio-economic management is summarized in Section 6,[11] which describes how AREVA intends to mitigate potential negative effects of the Project, enhance potential positive effects (benefits), engage affected people, integrate IQ in socio-

[10] The full baseline (2011) is in Technical Appendix 9A, Socio-Economic Baseline. It is noted that Section 5 includes updated socio-economic data where these have become available.

[11] Detailed socio-economic related management plans are in Technical Appendix 3C, Community Involvement Plan and Technical Appendix 9C, Human Resource Development Plan.

economic management and monitor socio-economic effects towards adaptive management. This section also provides information available at the time of writing on the Inuit Impact Benefit Agreement (IIBA) under negotiation with the Kivalliq Inuit Association (KIA).

- Section 7 presents lessons learned from comparable experiences in northern Canada to set some context for the discussion of the potential for effects in subsequent sections.
- Sections 8 to 13 present the assessments of effects on the VSECs under each of six major socio-economic components: 1) community economies; 2) traditional culture; 3) individual, family and community wellbeing; 4) public infrastructure and services; 5) land use and planning; and 6) the economy of Nunavut. These sections discuss linkages, briefly consider relevant baseline and socio-economic management measures and then come to conclusions on the significance of residual Project effects. Each of these sections also includes treatment of cumulative and transboundary effects (where relevant). Finally, each of these sections also considers how climate change has affected the conclusions on Project effects and/or has potential to change these conclusions (again, where relevant).
- Section 14 is a summary.
- Section 15 lists references cited.
- Section 16 is a glossary of terms used.

Tier 3 documents are appended to this volume to provide further details. These Technical Appendices are as follows:

- 9A Socio-Economic Baseline
- 9B Archaeology Baseline
- 9C Human Resources Development Plan
- 9D Archaeological Resource Management Plan

2 Project Overview

2.1 Project Fact Sheet

Location	• Kivalliq Region of Nunavut, approximately 80 km west of Baker Lake. • The Project includes two sites: Kiggavik and Sissons (collectively called the Kiggavik Project). • The Kiggavik site is located at approximately 64°26'36.14"N and 97°38'16.27"W. • The Sissons site is located approximately 17 km southwest of Kiggavik at 64°20'17.61"N and 97°53'14.03"W. • The Kiggavik and Sissons sites are composed of 37 mineral leases, covering 45,639 acres.
Resources	• The total quantity of resources is currently estimated at approximately 51,000 tonnes uranium (133 million lbs U3O8) at an average grade of 0.46% uranium.
Life of Mine	• Approximately 12 years of production, based on studies to date. It is anticipated that pre-operational construction will require three years while remaining post-operational decommissioning activities will require ten years. • Date of Project construction will be influenced by favorable market conditions, completion of detailed engineering, and successful completion of licensing and other Project approvals.
Mining	• There are five individual mines proposed for the Project: East Zone, Center Zone and Main Zone at the Kiggavik site; End Grid and Andrew Lake at the Sissons site. • The three Kiggavik deposits and the Andrew Lake deposit will be mined by truck-shovel open pit, while End Grid will be an underground mine.
Mine Rock	• Mine rock will be segregated into material suitable for use in construction (Type 1), non-acid generating (Type 2), and potentially problematic material (Type 3). • Type 1, Type 2 and Type 3 rock will be managed in surface stockpiles during operation. • Upon completion of mining, Type 3 mine rock will be backfilled into mined-out pits.
Mill	• The ore will be processed in a mill at the Kiggavik site to produce 3,200 to 3,800 tonnes uranium (8.3 to 9.9 million lbs U3O8) per year as a uranium concentrate, commonly referred to as yellowcake.
Tailings	• The mill tailings will be managed at in-pit tailings management facilities constructed using the mined-out East Zone, Centre Zone and Main Zone open pits at the Kiggavik site. • Administrative and action levels will be used to control and optimize tailings preparation performance for key parameters.
Water Management	• A purpose-built-pit will be constructed at the Kiggavik site to optimize water management, storage, and recycling. • All mill effluent, tailings reclaim, and site drainage will be treated prior to discharge to meet the Metals Mining Effluent Regulations and site-specific derived effluent release targets. • Administrative and action levels will be used to control and optimize water treatment plant performance for key elements.

Site Infrastructure	• Power will be supplied by on-site diesel generators. • The operation will be fly-in/fly-out on a 7 to 14 day schedule with on-site employees housed in a permanent accommodations complex.
Access	• Access to the site will be provided by a winter road between Baker Lake and Kiggavik. An all-season road is assessed as an option should the winter road be unable to adequately support the Project. Supplies will be shipped to a dock facility at Baker Lake during the summer barge season and trucked to Kiggavik via the road. • An airstrip will be constructed and operated at site for transportation of personnel and yellowcake.
Environment	• Site-specific environmental studies have been on-going since 2007 • Public engagement and collection of Inuit Qaujimajatuqangit has been on-going since 2006; this information is integrated into the environmental effects assessment reports • AREVA's approach has been to integrate environmental assessment and decommissioning requirements into the Project design cycle to enhance mitigation of effects by design and to support the development of management, mitigation, and contingency plans to protect the environment
Benefits	• AREVA is negotiating an Inuit Impact Benefit Agreement with the Kivalliq Inuit Association • The total taxes and royalties to be paid on the Kiggavik project would be approximately $1 billion, payable to Nunavut Tunngavik Inc., Government of Nunavut, and Government of Canada. • The Project is expected to employ up to 750 people during construction and 400 to 600 people during operation.

The economic feasibility of the Kiggavik Project depends on 1) the production cost for the uranium concentrate including construction, operation and decommissioning costs and 2) the market value of the final product. The latest feasibility study completed for the Kiggavik Project was in November 2011. The study assessed the technical and economic viability of developing and operating a uranium mine and mill site in the Kiggavik area and estimated the capital cost of the Project at $2.1 billion and the operating cost at $240 million per year. This initial feasibility study will be updated and refined prior to a development decision. The market price for uranium concentrate over the last years has been within the range needed for a reasonable return on investment to its owners, however at the time of FEIS preparation was below the threshold needed for Project advancement. AREVA believes future opportunities are strong enough to encourage Project advancement with the intent of development that will coincide with viable future markets

2.2 Assessment Basis

To ensure that the potential environmental and socioeconomic effects of the Kiggavik Project are adequately considered in this environmental assessment, it was determined that it would be advantageous to develop a clear "assessment basis" for the Project. The purpose of the assessment basis is to clearly and consistently define how the design parameters detailed in Tier 2 Volume 2 Project Description encompass the more conservative values for various design features and options. It is consistent with the precautionary principle to assess potential environmental effects

conservatively to improve confidence that the Project can be realized within the predicted effects and approved environmental assessment.

The assessment basis is summarized in Table 2.2-1 and presented with greater detail in Tier 2 Volume 2 Section 20. For biophysical and some socio-economic effects, the range value with the greatest potential to result in an adverse effect is used. In the case of socio-economic benefits, the range value resulting in the lowest benefit is used.

Table 2.2-1 Project Assessment Basis

Project Activities/Physical Works	Parameter	Units	Parameter / Assumption Values	
			Base Case (PD)	Assessment Case
Overall	Production Rate	Tonnes U per year	3,200 – 3,800	3,200 - 4,000
	Mill Feed Rate	Kilotonnes per year	71 - 977	1,000
	Project Operating Life	Years	2 years pre-production 12 years production	25
	Project Footprint	Hectares (ha)	938	1,102
	Access Road Route	Not Applicable	Winter Road	Winter Road All-Season Road
	Dock Site Location	Not Applicable	Site 1	Sites 1,2, Agnico Eagle's Meadowbank Dock Site
Milling	Flowsheet	Not Applicable	Resin in Pulp (RIP)	Resin in Pulp (RIP), possibly solvent extraction (SX) and / or calciner
	Final Product	Not Applicable	Non-calcined uranium concentrate	Non-calcined or calcined uranium concentrate
Tailings Management	Containment volume	Million cubic metres (Mm^3)	28.4	30.0
	Total tailings volume (un-consolidated)	Million cubic metres (Mm^3)	21	30.0
	Design		Natural surround, no drain	Various design contingencies
Water Management	Freshwater requirements – no permeate or site	Cubic metres per day (m^3/day)	7,910	8,000

Project Activities/Physical Works	Parameter	Units	Parameter / Assumption Values	
			Base Case (PD)	Assessment Case
	drainage recycle			
	Freshwater requirements – permeate and site drainage recycle	Cubic metres per day (m^3/day)	2,000	8,000
	Freshwater requirements - Sissons	Cubic metres per day (m^3/day)	60	60
	Treated effluent discharge at base quality – Kiggavik	Cubic metres per day (m^3/day)	2,707	3,000
	Treated effluent discharge – Sissons	Cubic metres per day (m^3/day)	1,700	1,700
Power Generation	Kiggavik peak load	megaWatt (MW)	13.0	13.0 – 16.8
	Sissons peak load	megaWatt (MW)	3.8	0 – 3.8
Logistics & Transportation	Number of barge trips – 5000t & 250 containers	Barge trips / year	9 - 31	31
	Number of barge trips – 7500t & 370 containers	Barge trips / year	7 - 22	22
	Number of truck trips – 56,000L & 48t	Truck trips / year	328 – 3,233	3,300
	Number of truck trips – 70,000L & 60t	Truck trips / year	243 – 2,405	2,500
	Number of yellowcake flights	Flights / year	310 - 350	355
Decommissioning	Period	Years	10	10

3 Assessment Approach

This section briefly describes the approach used in the assessment of socio-economic effects associated with the Project. The approach is somewhat different to that used for other disciplines, but meets applicable regulatory requirements while focusing the assessment on the matters of greatest economic, social, and cultural importance. The approach recognizes the iterative nature of project-level socio-economic assessment, considering the integration of engineering design and environmental effects and management programs into comprehensive socio-economic management planning for the life of the Project.

The assessment focuses on specific VSECs that are of particular value or interest to Inuit, regulators, government agencies and stakeholders. VSECs were selected for assessment based on consultation with Inuit, regulators, government agencies and stakeholders; regulatory issues and guidelines; field studies; and professional judgment of the study team. For assessment purposes, selected VSECs are grouped as major socio-economic components: i) community economies; ii) traditional culture; iii) individual, family and community wellbeing; iv) public infrastructure and services; v) land use and planning; and vi) the economy of Nunavut.

The term 'effect' is used to broadly refer to the response of a component of the socio-economic environment to a disturbance. The assessment addresses both Project-related (including transboundary) and cumulative effects. Project-related effects are changes to the socio-economic environment that are caused by the Project, or arise solely because of the Project, as defined by the scope of the Project. Cumulative effects are changes to the socio-economic environment that are caused by the Project in combination with other current and reasonably foreseeable future projects and activities.

The assessment first considers AREVA's proposed socio-economic management framework, including its component parts of i) mitigation and benefit enhancement measures; ii) ongoing engagement; iii) integration of IQ; iv) monitoring; and v) eventual negotiation and agreement with the KIA of an IIBA. The assessment then considers some experiences in Nunavut, the Northwest Territories (NWT) and northern Saskatchewan with regard to large mining projects and in northern Alberta with regard to rapid population growth as a result of oil sands development. The presentations of the Project's socio-economic management measures and comparable experiences provide background information for the assessment of socio-economic effects.

For the assessment of socio-economic effects, the mechanisms through which a socio-economic effect may occur are discussed first, taking into account Project design measures, socio-economic management measures and comparable experiences. Any residual effect is characterized, at a

minimum using the criteria of direction, magnitude, geographic extent, duration, and significance is determined, in most cases qualitatively.

Where there is potential for the Project to contribute to a cumulative effect, Sections 8 through 13, Assessment of Effects on major socio-economic components, differentiate between 'additive' effects and 'more than additive' effects.

Additive effects are simply a second project's effects added to a first project's effects, and then a third's added to those of the combination of the second's and first's. Many socio-economic effects can be expected to be comparable between the Project and other large projects that may be developed in Nunavut. In developing their respective EISs each additional project is expected to treat the effects of earlier projects as baseline. For the Project, for example, Meadowbank's effects are reflected in baseline information on population growth, incomes, unemployment levels, social assistance case numbers, etc. The Project effects are discussed in terms of impacts relative to current socio-economic parameter values and trends, which have to some degree been affected by Meadowbank. It is recognized that this is somewhat complicated by i) lags in availability of data to capture effects of, in this case, Meadowbank; and ii) the need to predict what the future effects will be as 'baseline' for Project at time of development.

More than additive effects are cumulative effects that essentially shift the playing field, and are therefore considered to be of more interest. For example, on the basis of past experience in Nunavut, it may be expected that large mining projects can achieve a 25% Inuit employment share in their workforces. However should more projects come on stream and the total mining workforce requirement rise quickly, given the small populations and the rigours of rotational mining work, it may be more and more difficult for later projects to achieve such a percentage. The cumulative effect could be a shift from an environment of labour availability to an environment of labour shortage and the 'leakage' of economic opportunities that could notionally be taken up by Nunavummiut to workers from elsewhere in Canada.

Where the effects of other projects and activities are expected to be additive, that is, are expected to add to change through mechanisms similar to those of the Project, these are not discussed at length.

Although there will be exceptions,[12] almost all of the potential effects identified the Project will be identified for other projects and discussed in their respective EISs.

Only where there is potential for a shift, a change that is more – or less – than the sum of the effects of individual projects and activities, is the potential for a cumulative effect considered in some depth. Residual cumulative effects are then assessed for significance, again necessarily qualitatively.

In determining the potential for cumulative effects, the assessment considers, as relevant, two future scenarios:

- The future scenario includes reasonably foreseeable projects, activities and actions, defined as those that are likely to occur, including projects that are in some form of regulatory approval or have made a public announcement to seek regulatory approval. For this assessment, these reasonably foreseeable projects are:
    - Meadowbank[13]
    - Hope Bay
    - Meliadine
    - Mary River
    - Hackett River
    - Back River
    - Izok/High Lake
- The far future scenario includes the future scenario, in combination with possible far future developments in Kivalliq Region.

It is recognized that exploration activities will continue in the vicinity of the Kiggavik Project, and that there is the potential for additional resources to be discovered during the life of the Project. To address such a possibility, a potential far future development scenario was developed. This scenario assumes additional deposits within a 200 km radius of the Kiggavik site, and the development of a non-uranium operation located within the Kiggavik region. The Meadowbank gold operation is used as the model for this non-uranium operation. The far future case also assumes that additional

[12] For example, perceptions of harm from uranium (see Section 10.1.6 Public Health and Safety) will not apply to a gold project, and detailed impact assessments for other projects may identify additional socio-economic effects that do not apply to Kiggavik such as constraints to sea supply of Baker Lake that will need to be accommodated by new road construction and consequent effects (see Section 12.1.2 Mining).

[13] Meadowbank is currently in operations; resonably foreseeable projects are presented in Tier 1 Appendix 1E.

resources are found in the Meadowbank area, and that operation of Meadowbank continues. The following projects and activities are included in this scenario.

Table 2.2-1 Far Future Scenario

Component	Locations
Uranium mines	3 mines within 200 km of Kiggavik
Uranium mills	Kiggavik mill
Gold mines	1 mine within Kiggavik RSA Meadowbank region
Gold mills	Meadowbank region Additional mill within Kiggavik RSA
Access Roads	Meadowbank region Additional mill within Kiggavik RSA
Exploration	Induced exploration near the access road(s) and in the Kiggavik area

Due to the lack of information regarding the specific details of potential future developments (e.g., footprint of projects and activities), the assessment of cumulative effects under this far future case is by definition qualitative and is limited to a description of how these projects, activities and actions could affect the magnitude, duration and extent of identified cumulative effects. For more information on activities within the study area and the creation of the far future scenario refer to Technical Appendix 1E to Volume 1.

4 Scope and Broad Methodology of the Assessment

4.1 Issues and Concerns Identified During Inuit, Government and Stakeholder Engagement

Project socio-economic issues and concerns were identified on the basis of:

- input on the Project received during engagement over the course of the preparation of this EIS, including from NIRB
- regulatory requirements applicable to the Project
- Nunavut and Kivalliq economic and social development contexts
- experiences in comparable contexts in northern Canada
- professional experience and judgment of potential interactions between the Project and the socio-economic condition of affected people

Volume 3, Public Engagement and IQ and associated Technical Appendices provides the detail of engagement carried out over the EIS preparation period, from 2006 to mid-2014. Engagement, as well as socio-economic and IQ data collection over 2009 and 2010, enabled the drafting of a preliminary list of issues and concerns that were expected by people in affected communities to be addressed in the socio-economic effects assessment. In addition, AREVA's experience in northern Saskatchewan, lessons learned from other mining projects in Nunavut and NWT, consultant experience with the effects of large mining projects, the Final Guidelines for the Preparation of the Environmental Impact Statement (EIS) for the Project (NIRB, 2011), and the Pre-Hearing Conference Decision concerning the Kiggavik Project (NIRB, 2013) have suggested issues additional to those raised by communities during engagement and data collection events. For purposes of this socio-economic assessment, issues and concerns taken into consideration are summarized as:

- The seven communities in Kivalliq have limited employment opportunities. People expect the Project to create employment opportunities across the region. Youth employment and quality employment are given particular emphasis.
- People recognize the importance of training, both to prepare for employment and to advance once employed. Training is regarded as not only AREVA's obligation but also an obligation of government.
- Contracting opportunities are also expected. Business activity creates additional jobs and income to that generated by direct employment by the Project and is a source of employment that may be preferred by people whose personal circumstances make rotational employment a difficult choice.
- There may be some potential for migration in response to the economic stimulus that Project will represent. Migration in turn can have multiple effects, both positive and

negative, on socio-economic conditions. Potential migration to Baker Lake has become less of a concern at the time of FEIS preparation than at the time of DEIS preparation.

- There are concerns that sufficient benefits are retained in Nunavut, that is, do not flow outside the territory. There are also concerns that large projects benefit some but not others and that economic benefits of projects are not always distributed according to the potential for negative effects.
- While rapid increases in employment opportunities benefit many, subsequent effects on local businesses and service providers – who must compete in the labour market for workers – include the potential for rapid turnover of staff, difficulties in identifying replacement staff, increased training costs and lost productivity.
- Large projects have potential for environmental effects on land, water, air, wildlife, fish and marine mammals. There are three major socio-economic aspects to this i) many people still depend on such resources for at least a part of their livelihoods; ii) traditional use of such resources is central to people's sense of identity and wellbeing; and iii) environmental conservation is a fundamental Inuit cultural value.
- Related to the bullet above, people's concerns about environmental effects are heightened on two grounds – the Project is a uranium project and climate change is observably underway.
- *Some have expressed concern that mining will take away land from hunting grounds, or that uranium may escape and contaminate the grounds, especially the land along the Thelon River, or on the south side of Baker Lake (IQ BLE 2009).*
- Any environmental effects should be considered not only in terms of traditional use of the land and resources for household consumption, but also in terms of commercial uses including commercial harvesting and tourism. The Project may also have implications for the further development of the mining sector. These three sectors are priority economic development sectors in Nunavut and mining and tourism are priority sectors in Kivalliq.
- While participation in the wage based component of the economy is critical to the economic and social wellbeing of Inuit, this needs to accommodate continued land based economic activity. Wage based employment should not be at the expense of retention, at the community level, of traditional activity, language, skills, knowledge or values.
- *Some have expressed concern that increased employment may cause people to be too dependent on mining wages for subsistence (IQ RIE 2009), which may result in less time spent hunting, and less country food being brought into the communities (IQ AR04 2009). Others, conversely, have suggested that employment will allow people to buy the equipment they need to go out on the land, and that increased hunting and having more money will have a positive effect on nutrition (IQ AR03 2009).*
- *Some respondents are generally in favour of the Project and the employment it may bring (IQ ARE 2009). Young adults in particular expressed more interest in jobs than concerns about the potential effects of the Project on the environment (IQ WCYA 2009).*
- While people look forward to increased incomes and many individuals and families will benefit in terms of household economies and wellbeing, there is some concern that rotational work and new income can lead to poor personal choices, such as substance

abuse, excessive gambling and inappropriate sexual behaviors. In turn, these choices can be associated with physical and mental health problems, domestic violence, family breakdown, poor parenting, crime and suicide, which can affect not only individual and family wellbeing, but also potentially community wellbeing. Women, elders and children are particularly vulnerable in the event of reduced family wellbeing.

- Social and physical infrastructure and services are often ill equipped to deal with any increased demand that may result from a large project. There are many potential linkages. As examples, changed public behaviors can put pressures on health and policing services, population growth can result in more crowded housing and schools, and the use of any community infrastructure by a project can mean reduced availability for community needs.
- Related to the above, there is an expectation that some Project infrastructure could be of benefit to nearby communities. There is high interest for example in public use of a Project access road. Docking facilities are also expected to benefit communities where these are built.
- Institutional capacity and governance are issues. For example, there are concerns about the oversight capacity of Nunavut's institutions of government relative to the Project with regard to the monitoring of AREVA environmental and socio-economic performance and Government of Nunavut's (GN) capacity to respond to shifts in demand for some government services.
- Concerns about the health and safety of people (including workers) and emergency response preparedness, which are general to large projects, are more acute because of the perceived risks to human health as these are related to uranium mining.
- The construction of a road between Baker Lake and the Project raises an opportunity for improved access to land and its resources, and consequent changes to the intensity, seasonality and geographic distribution of harvesting.
- Road construction may also have implications for traffic and road safety.
- Project effects on all heritage resources need to be considered, including on archaeological sites but also effects on other sites of cultural value.
- The Project is expected to have positive economic effects (growth and diversification) not only on the economy of Kivalliq and its seven communities but also on the economy of Nunavut.
- The Project will affect the fiscal position of the GN, both through generation of revenues but also potentially from costs that may be imposed by Project activities and their effects on demand for public infrastructure and services. There will also be fiscal benefits to Nunavut Tunngavik Incorporated (NTI).
- The effects of premature closure, final closure and post closure need to be considered in the assessment. Negative socio-economic effects are of primary concern however the disposition of Project assets at final closure (including, for example, the all-weather access road –if constructed, docking facilities, airstrip and accommodation complex) may also be of interest.

- Cumulative effects are of high interest, especially in Baker Lake and Chesterfield Inlet, given that the Agnico Eagle's Meadowbank Gold Project is in operation and given that many other exploration projects, including for uranium, are active in western Kivalliq.
- There is a requirement to take full account of IQ in the assessment of Project effects, and the development and implementation of mitigation and benefit enhancement measures and monitoring programs.
- Engagement with governments at all levels and with people in Kivalliq communities will be required throughout the development and implementation of the Project. There is also an expectation of participation by people in Project decision making that may affect them.
- Engagement requires that people have the information they need to engage from an informed position. People have commented during various engagement events on the need for accessible, increasingly comprehensive, and continued information on the Project, environmental approval processes and the uranium mining industry. There is concern about accessibility of information for unilingual Inuktitut speakers.

Table 4.1-1 presents a tabulation of large community engagement event[14] results, to provide an indication of the priority people in communities have given to different issues and concerns. It is emphasized that the table is indicative only. The various engagement events have had different objectives, presented different information and posed different questions of participants. When one person raises an issue, a number of others may wish to comment as well even though they might not have raised the issue themselves. There are language and interpretation issues in decisions to assign comments to a small number of categories. People's comments, concerns and questions have shifted over time as more information has become available. These and other factors influence people's input. Nevertheless, the large number of statements considered in the analysis – over 3,100 – suggests the results are approximately representative.

[14] It is noted that AREVA's engagement has been continuous for some years and includes ongoing interactions of AREVA staff and consultants with individuals, civil society organizations and government representatives. Comments made during special purpose meetings and casual contacts are not included in the table.

Table 4.1-1 Issues and Concerns from Large Community Engagement Events (% age of comments)

	2009, Valued Component Inquiry	2009, Survey on Main Interests	2009, Town Hall Comments	2010 Valued Component Inquiry	2010, Town Hall Comments	2011, NIRB's Guideline Consultations	2012, Open House Comments	2013/14, Open House Comments	All Input
	n=564	n=157	n=175	n=875	n=356	n=299	n=446	n=234	n=3,106
Wildlife	36	21	9	27	10	26	16	9	23
Environment	30	12	13	25	12	17	13	12	19
Employment, training and business	9	35	26	13	19	7	14	16	15
Public health	12	9	7	7	13	7	8	13	8
Social	7	12	2	17	1	1	4	0	10
Uranium and Project	nr	nr	26	nr	22	16	24	29	9
EIS process	3	0	10	0	16	16	13	8	7
Infrastructure and services	2	11	2	7	4	7	2	8	4
Benefits	nr	na	5	4	4	3	4	3	3
Heritage	2	na	1	0	0	1	2	2	1
Total	100	100	100	100	100	100	100	100	100

Source: Derived from review of AREVA's records of the results of various engagement events and from NIRB, 2010

Notes: n=number of comments; nr indicates that an attribute was not relevant to a particular engagement event; na indicates that data are not available.

Volume 3, Public Engagement and IQ provides more detail on the engagement events that head the columns in the above table.

Broadly, points to note about Table 4.1-1 are:

- Wildlife (caribou, fish and marine mammals primarily) and environment (air and water primarily) together accounted for 42% of input. The concerns derive largely from fundamental Inuit values and from dependence on natural resources for livelihoods, but also reflect some apprehension about uranium.
- There was stronger interest in employment and business opportunities initially, but input in these regards has decreased over time. The contents of comments suggest that as of 2014 people had good information on constraints to local hiring, on the need for preparation for employment and on when jobs and business opportunities are likely to become available but still had questions regarding AREVA's hiring procedures and working conditions.
- The uranium and Project category for purposes the table includes requests for factual information on uranium and the Project, rather than concerns. Most concerns about uranium were framed in terms of wildlife, environment and public health.
- The *Nunavut Land Claim Agreement* (NLCA) provides for significant empowerment of Inuit in decision making. However there is some lack of understanding of government processes to ensure participation in decision making, some distrust of both government and its associated institutions, and some skepticism regarding objectivity of information disclosed by both government and AREVA. This is reflected in the unexpectedly high percentage of input about the EA process.
- The social category for purposes of the table includes primarily concerns about potential effects of the Project on individual, family and community wellbeing. Generally, Project effects on wellbeing, infrastructure and services and heritage resources were of less concern to people, and there was little input on any potential for benefit, aside from employment, contracting and training.

Overall, input suggests that whereas there is still some lack of knowledge, some uncertainty about uranium mining and some opposition to the Project in Nunavut, people in Kivalliq are generally receptive to continuing the EIS process, provided they can be confident about environmental performance, will see employment, training and contracting opportunities, can be better informed and are able to participate in decision making.

4.2 Project-Environment Interactions and Effects

This presentation of socio-economic interactions with the Project and consequent socio-economic effects departs significantly from the presentation used for biophysical effects, for the following reasons.

- Although there are exceptions, socio-economic effects are largely in response to the totality of a project, to its location, scale and operational procedures, and not to its

component parts. It is not helpful to attempt to look at the individual effects of water management systems, waste disposal or energy supply (as examples) on employment or levels of traditional activity. Socio-economic assessment more usefully considers responses to a project as a whole. Exceptions can be spatially distinct project components with unique effects such as, in the case of the Project, the access road options and the marine transportation route.

- The linkages between various potential socio-economic effects are interrelated in complex ways, and can be mutually reinforcing. They may also cascade. For example, in migration is itself an effect, but in turn may engender additional effects such as pressures on housing. In migration can also combine with increased incomes to result in public security challenges. Socio-economic effects are thus often in response to 'drivers of change', particular elements and combinations of elements of a project that may have more to do with, as an example, its operational policies and procedures than its built environment.
- For many biophysical disciplines, there are substantive differences between construction and operations phase effects. However, most socio-economic effects occur on a continuum from the initiation of construction activity through operations. Many effects on individuals, families and communities are a result of the same processes (interactions) in both phases. For example, employment and its socio-economic effects will begin with the start of construction and continue through operations. Where construction and operations phase effects are clearly different in detail, these differences are noted in the assessments of effects in Sections 8 to 13 below, however in not all cases are effects of construction and operations discussed separately. Premature closure, final closure and post closure effects are quite distinct from those of construction and operations and are discussed separately, although they are in fact the result of many of the same interactions, operating in reverse.

Accordingly, Table 4.2-1 presents what are considered to be primary Project/socio-economic environment interactions and effects in terms of 'drivers of change', phenomena that can be expected to occur as a result of the Project and that have the potential to result in a significant change to a VSEC.[15] It is acknowledged that there are more interactions than the table includes – the interrelatedness of socio-economic conditions suggests that almost any driver of change can be conceived to have at least some consequent effect on almost any VSEC for at least some individuals. Table 4.2-1 thus indicates where the emphases are placed, on primary interactions and

[15] Section 4.3, Valued Socio-Economic Components, provides information on the identification of VSECs.

effects, in the socio-economic assessments in Sections 8 to 13. This however is not to the exclusion of considering additional interactions and effects related to issues that have been raised during engagement and socio-economic and IQ data collection events.

Table 4.2-1 Primary Project/Socio-Economic Environment Interactions and Effects

Major Socio-Economic Component	Community Economies						Traditional Culture					Individual, Family and Community Wellbeing						Public Infrastructure and Services					Non Traditional Land Use and Land Use Planning				Economy of Nunavut	
	Valued Socio-Economic Components																											
Primary Drivers of Potential Effects on Valued Socio-Economic Components	Employment	Education and Training	Contracting	Economic growth and diversification	Incomes	Population change	Harvesting	Food security	Language	Values and knowledge	Cultural sites	Health	Family function	Savings	Public security	Public health and safety	Social cohesion and participation	Social infrastructure and services	Policing	Housing	Other infrastructure and services	Institutional capacity and governance	Mining	Commercial harvesting	Tourism	Land use in Baker Lake	Economic effects	Fiscal effects
Project Policies and Procedures*																												
Employment	■	■		■	■	■	■	■	■	■		■	■	■	■		■	■	■	■	■	■				■	■	■
Education and training	■	■	■	■	■				■	■				■			■	■				■						
Contracting	■	■	■	■	■	■								■													■	■
Increased incomes				■	■		■	■				■	■	■	■		■	■	■	■	■					■	■	■
Migration	■			■		■									■		■	■	■	■	■					■		
Working conditions	■	■				■	■	■	■	■		■	■		■	■		■										
Rotational work	■					■	■	■	■	■		■	■		■		■	■	■									
Stakeholder engagement										■						■	■					■						
Community contributions										■							■	■			■							
IIBA	■	■	■		■		■	■	■	■	■	■	■			■	■	■			■	■					■	■
Environmental Effects*																												
Project footprint							■	■			■					■					■		■		■	■		
Biophysical effects							■	■			■					■								■	■			
Traffic, ecological health and human health risks							■	■								■								■	■			
Project Components*																												
Winter road							■	■			■					■					■		■					
All-weather road							■	■			■					■					■		■	■	■		■	
Marine transportation							■	■			■					■					■		■	■	■		■	
Project Economics**																												
Project capital investment																											■	■
Project operations expenditures																											■	■
Project taxes and royalties	■		■	■	■													■			■	■					■	■
Closure***																												
Premature, final and post closure	■		■	■	■							■	■	■	■		■	■	■								■	■

Notes: Shaded boxes indicate primary interactions and effects; * interactions apply during both construction and operations; ** capital investment is primarily a construction phase effect while operations expenditures and taxes and royalties are primarily operations phase effects; *** closure effects include almost all of those in other rows, many operating in reverse

4.3 Valued Socio-Economic Components

VSECs are typically defined as being components of the socio-economic environment – such as employment, language retention and access to adequate social services – that are important to people's wellbeing and quality of life. Any change to a VSEC that can be attributed to a project represents a project effect.

For a socio-economic component to qualify as valued for purposes of a project's effects assessment, the component must be known (or be reasonably expected) to occur in the project's area of influence, there must be a reasonable expectation that the component could be meaningfully affected by the project and people must articulate in some way that value is in fact assigned to the component.

Most people do not speak explicitly in terms of valued environmental or socio-economic components (collectively Valued Components or 'VCs'). Engagement results – the content of concerns, comments and questions – suggest VCs for assessment purposes, but are less useful in detailed understanding of why a specific VC is valued or what relative value is assigned a VC. During open house meetings in 2010, AREVA presented wall charts with matrices of 24 VCs (in rows) and 18 grounds on which VCs might be valued (in columns). People were provided sticky notes and invited to indicate at intersections between specific columns and rows where they felt the strongest associations were. There were a total of 875 sticky notes pasted in the seven communities. There were no restrictions on the numbers of sticky notes any individual placed.

The results are presented in Table 4.3-1. The VCs[16] are listed in order of the total number of times each was assigned a sticky note, that is the number of times they were associated with any ground. There are also columns to indicate associations by grounds (for all communities) and by community (for all grounds). For purposes of the table, the 18 grounds were grouped into three broad categories: i) wellbeing, which includes beauty, comfort, peacefulness and happiness; ii) basic needs, which include food, clothing, health and money; and iii) traditional culture, which includes respect, spirituality and culture. It is noted that Arviat, Repulse Bay and Whale Cove had low participation rates in the inquiry thus these community level results should be interpreted with caution.

[16] The selection of VCs for purposes of this exercise was preliminary and based on engagement results up to mid 2009, experiences of AREVA in northern Saskatchewan and review of the other environmental assessments in northern Canada. With time, the list of VCs has evolved. The list in table 4.3.1 is therefore not completely consistent with VCs as presented in this EIS.

The basic message of Table 4.3-1 is the diversity of grounds assigned to VCs. In total, about 30% of responses assigned VCs each of wellbeing and traditional culture grounds; and about

40% assigned basic needs grounds. Each of the 24 VCs was valued, on various grounds, by at least 1.4% but no more than 8.1% of responses for the region as a whole. Diversity is also reflected in the few zeros in any column of the table. That is, almost all VCs are valued on each of the three grounds and by at least someone in each community. Finally, diversity is reflected in the mixing of colours in the table (see note at the bottom of the table). Twenty-three of the VCs are each valued from low (white color cells) to high (orange cells), depending on the grounds and/or the community.

Table 4.3-1 Results of Valued Component Inquiry, 2010 (%of Responses)

Valued Component	All responses	Grounds			Community							Total Number of Reponses
		Wellbeing	Basic needs	Traditional culture	Arviat	Baker Lake	Chesterfield Inlet	Coral Harbour	Rankin Inlet	Repulse Bay	Whale Cove	
Caribou	8.1	2.3	14.8	4.8	9.3	6.8	9.3	7.6	7.0	10.3	13.1	71
Other terrestrial mammals	7.4	6.0	11.1	3.6	2.3	11.8	8.6	2.8	4.5	0.0	11.5	65
Language	6.4	7.9	0.3	13.6	7.0	5.0	6.0	6.3	9.6	7.7	4.9	56
Inuit knowledge	6.2	2.6	0.6	18.0	9.3	5.7	5.3	6.9	6.4	12.8	1.6	54
Training	5.3	9.4	3.1	4.0	7.0	6.1	2.0	5.6	8.3	2.6	1.6	46
Employment and contracting opportunities	4.9	2.6	8.4	2.4	2.3	5.4	2.6	6.3	5.7	10.3	1.6	43
Landforms and soils	4.8	6.4	1.4	8.0	0.0	7.1	4.0	4.2	2.5	2.6	8.2	42
Infrastructure and services	4.5	4.9	5.0	3.2	9.3	5.4	2.0	4.2	5.7	0.0	3.3	39
Water quality	4.3	3.0	6.1	3.2	0.0	6.4	5.3	2.8	3.2	5.1	1.6	38
Traditional harvesting	4.2	3.0	3.9	6.0	4.7	3.2	2.6	6.9	5.1	7.7	1.6	37
Marine mammals	4.1	1.5	6.7	3.2	2.3	2.5	5.3	2.8	5.1	7.7	8.2	36
Community	4.0	5.3	4.5	2.0	9.3	3.2	4.0	4.2	5.1	2.6	1.6	35

Valued Component	All responses	Grounds			Community							Total Number of Reponses
		Wellbeing	Basic needs	Traditional culture	Arviat	Baker Lake	Chesterfield Inlet	Coral Harbour	Rankin Inlet	Repulse Bay	Whale Cove	
benefits												
Birds	4.0	6.4	3.6	2.0	2.3	3.6	5.3	4.9	1.9	5.1	6.6	35
Vegetation	3.9	4.5	5.0	1.6	0.0	2.9	5.3	4.2	5.1	2.6	4.9	34
Air quality	3.8	4.9	2.2	4.8	0.0	5.4	2.6	4.2	2.5	2.6	4.9	33
Individual and family health	3.5	4.5	3.3	2.8	4.7	3.2	3.3	3.5	4.5	5.1	1.6	31
Public health and safety	3.5	2.3	5.3	2.4	4.7	2.9	4.0	4.2	4.5	2.6	1.6	31
Migration and population growth	3.2	3.0	3.6	2.8	4.7	3.6	3.3	2.1	3.8	0.0	3.3	28
Weather	3.2	4.1	1.7	4.4	2.3	2.1	3.3	4.9	3.2	2.6	4.9	28
Social services	3.0	4.9	2.2	2.0	7.0	1.8	4.6	2.8	1.9	2.6	4.9	26
Fish	2.4	1.5	3.9	1.2	4.7	2.1	1.3	3.5	1.9	5.1	1.6	21
Noise	2.1	3.8	0.6	2.4	4.7	1.1	2.6	2.1	2.5	0.0	3.3	18
Other aquatic attributes	1.8	2.6	1.4	1.6	0.0	1.4	6.0	0.7	0.0	2.6	1.6	16
Water flow	1.4	2.6	1.4	0.0	2.3	1.4	1.3	2.8	0.0	0.0	1.6	12
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**na**
Sample size (no.)	**875**	**266**	**359**	**250**	**43**	**280**	**151**	**144**	**157**	**39**	**61**	**875**
Environmental (VECs)	51.3	49.6	59.9	40.8	30.2	54.6	60.3	47.2	39.5	46.2	72.1	na
Socio-economic (VSECs)	48.7	50.4	40.1	59.2	69.8	45.4	39.7	52.8	60.5	53.8	27.9	na

Source: Derived from review of AREVA's records of the results of the 2010 VC inquiry
Notes: Blue text = valued environmental component (VEC); red text = valued socio-economic component (VSEC); na= not applicable; orange = greater than 10% of responses; yellow = 5% to 10%; green = 3% to 4.9% and white less than 3%.

With regard to the potential for socio-economics effects specifically:

- Caribou and other land mammals were the most often associated of all VCs. However, these were more often associated with basic need (largely food) grounds than with traditional culture grounds. People hunt because they need to. Fish on the other hand did not draw a lot of associations.
- Inuit knowledge and language were the next most often associated VCs, in all communities, much more so than traditional harvesting as an activity. However, as the bullet above notes, there is a need to harvest to supplement household food supply and this is in part reflected in the associations for each of the caribou and other land mammals VCs.
- There was high inconsistency on the results for the VSEC of employment and business opportunities across communities and people generally seemed somewhat more likely to associate training than they were to associate employment and contracting opportunities with a ground.
- There was no clear differentiation in terms of associations between valued environmental components (VECs) as a group and VSECs as a group. People clearly see their overall quality of life determined both by socio-economic and by environmental conditions. The frequent associations between VECs and basic needs (as opposed to traditional culture) suggest, again, important dependence on environmental resources for livelihoods.
- There are some differences between communities. For example, Chesterfield Inlet did not have many associations for employment and contracting opportunities and had more associations for VECs than VSECs as compared to other communities. Baker Lake has many more associations for land mammals than coastal communities, more in fact than for caribou. In Rankin Inlet, most associations were with VSECs. In general however no clear patterns emerge from the table, suggesting that there is more diversity between individuals than between communities.

VSECs identified for purposes of this socio-economic assessment are in Table 4.3-2, listed by major socio-economic component and in the order of presentation in the assessment of effects sections, Sections 8 to 13 below. The list is somewhat longer than the list of VSECs in Table 4.3-1 above for a number of reasons, including contents of NIRB's final EIS guidelines.

Table 4.3-2 Valued Socio-Economic Components

Major Socio-Economic Component	Valued Socio-Economic Components
Community economies	• employment • education and training • contracting opportunities • economic growth and diversification • incomes • population change
Traditional culture	• harvesting • food security • language • values and knowledge • cultural heritage sites
Individual, family and community wellbeing	• health • family function • savings • public security • public health and safety • social cohesion and participation
Public infrastructure and services	• social infrastructure and services • policing • housing • other infrastructure and services • institutional capacity and governance
Non-traditional land use and land use planning	• mining • commercial harvesting • tourism • land use in Baker Lake
Economy of Nunavut	• economic effects • fiscal effects

It is emphasized that the VSECs are not organized to reflect relative importance to communities, but in an effort to provide a narrative framework of cause and effect that does not require excessive length, cross referencing or repetition. As an example, community economies are addressed first because the take up of employment, education and training and contracting opportunities offered by the Project is expected to have many consequent effects. For example, expected economic benefits are part of the context for the discussion of potential Project effects on traditional culture and people's wellbeing.

With regard to Table 4.3-2, it is noted that elements not specifically identified are not unimportant. On the contrary, all elements of economic, social and cultural life integrate and contribute to overall individual, family and community quality of life, and most in fact are subsumed (and will be discussed) within broader VSECs as these are listed above. As well, the diversity of human experience and the range of responses to a project have the result that every component of the socio-economic environment is important to at least some people. A significant effect on a component valued by even a limited number of individuals or families can be important to consider.

Finally, there are a number of themes that cut across most or all VSECs, themes that deserve consideration but are not easily framed as discrete VSECs. These include, as examples, gender, self-reliance (broadly defined here as reliance on one's own efforts to achieve quality of life goals), vulnerability to change and sustainability.

Finally, it is noted that there are complex linkages between the VSECs listed in Table 4.3-2. To the extent that the Project has an effect on one VSEC, it may also affect other VSECs as a consequence. A Project effect on one VSEC, because of such linkages, i) can indirectly affect another VSEC (for example employment can affect harvesting levels); ii) can cascade through a number of VSECs (for example changed harvesting levels may in turn affect food security, and thus health status, including for people who are not able to hunt); and iii) can feedback (for example improved health status can lead to more availability for employment).

Table 4.3-3 is a representation of this complexity. Again, this table does not capture all elements of economic, social and cultural life. More information on linkages can be found in discussions in Sections 8 through 13, Assessment(s) of Effects on each of the major socio-economic components, and in Technical Appendix 9A, Socio-Economic Baseline. For example, sections on health include discussions on (among other health challenges) chronic and infectious disease, mental health, substance abuse and diet, explicitly linking these as relevant to (among other linkages) each other, employment and income, housing conditions, levels of country food consumption, availability of mental health services and cultural change.

The table also only presents what are considered to be the stronger or primary linkages – scenarios can be constructed that would result in filling in most of the cells that are left blank. As an example, employment can affect population growth under specific conditions, but is not considered in general to be a driver of population growth rates. Lastly, the table differentiates between largely one way and reciprocal (feedback) linkages that have implications for the assessment of Project effects.

Table 4.3-3 Primary Linkages between VSECs

	Major Socio-Economic Component	Community Economies						Traditional Culture					Individual, Family and Community Wellbeing						Public Infrastructure and Services					Non Traditional Land Use and Land Use Planning				Economy of Nunavut	
Major Socio-Economic Component	**VSEC**	**Employment**	**Education and Training**	**Contracting opportunities**	**Economic growth and diversification**	**Incomes**	**Population change**	**Harvesting**	**Food security**	**Language**	**Values and knowledge**	**Cultural sites**	**Health**	**Family function**	**Savings**	**Public security**	**Public health and safety**	**Social cohesion and participation**	**Social infrastructure and services**	**Policing**	**Housing**	**Other infrastructure and services**	**Institutional capacity and governance**	**Mining**	**Commercial harvesting**	**Tourism**	**Land use in Baker Lake**	**Economic effects**	**Fiscal effects**
Community Economies	Employment																												
	Education and Training																												
	Contracting opportunities																												
	Economic growth and diversification																												
	Incomes																												
	Population change																												
Traditional Culture	Harvesting																												
	Food security																												
	Language																												
	Values and knowledge																												
	Cultural sites																												
Individual, Family and Community Wellbeing	Health																												
	Family function																												
	Savings																												
	Public security																												
	Public health and safety																												
	Social cohesion and participation																												
Public Infrastructure and Services	Social infrastructure and services																												
	Policing																												
	Housing																												

	Major Socio-Economic Component	Community Economies						Traditional Culture					Individual, Family and Community Wellbeing						Public Infrastructure and Services					Non Traditional Land Use and Land Use Planning				Economy of Nunavut	
Major Socio-Economic Component	**VSEC**	**Employment**	**Education and Training**	**Contracting opportunities**	**Economic growth and diversification**	**Incomes**	**Population change**	**Harvesting**	**Food security**	**Language**	**Values and knowledge**	**Cultural sites**	**Health**	**Family function**	**Savings**	**Public security**	**Public health and safety**	**Social cohesion and participation**	**Social infrastructure and services**	**Policing**	**Housing**	**Other infrastructure and services**	**Institutional capacity and governance**	**Mining**	**Commercial harvesting**	**Tourism**	**Land use in Baker Lake**	**Economic effects**	**Fiscal effects**
	Other infrastructure and services																											
	Institutional capacity and governance																											
Non Traditional Land Use and Land Use Planning	Mining																											
	Commercial harvesting																											
	Tourism																											
	Land use in Baker Lake																											
Economy of Nunavut	Economic effects																											
	Fiscal effects																											

Reciprocal, or feedback, linkages, e.g. incomes affect health and health affects incomes

One way, or direct, indirect and cascading, linkages, e.g. language affects health (broadly defined) but health does not have strong effects on language

4.4 Spatial Boundaries

For purposes of socio-economic assessment, a project footprint is most often considered a study area only where there is a resident population. This is not the case for the Project so there is no Project footprint study area. The Project's local and regional socio-economic study areas are defined below. It is also noted that for some socio-economic parameters, there is some potential for transboundary effects. Whereas areas outside Nunavut are not considered to constitute an assessment study area, where there is some potential for a transboundary effect this is discussed in the relevant subsections of Sections 8 through 13, Assessment(s) of Effects.

4.4.1 Local Assessment Area

Kivalliq Region and its seven communities of Arviat, Baker Lake, Chesterfield Inlet, Coral Harbour, Repulse Bay, Rankin Inlet and Whale Cove make up the local assessment area (see Figure 1.1-1) for all VSECs listed in Table 4.3-2 above with one exception – the assessment of effects on the economy of Nunavut.

The closest community to the Project is Baker Lake, approximately 80 km east of the proposed mine site. Chesterfield Inlet is a further 190 km east, adjacent to the Project's marine transportation route from the proposed docking facilities in Baker Lake out to Hudson Bay. These two communities are closest to lands and natural resources with some potential to be affected by the Project, although some individuals in other Kivalliq communities do use, or have in the past used, potentially affected lands and resources.

In addition, economic and social benefits are expected, for all communities in Kivalliq. Such benefits will largely derive from employment, education and training and contracting opportunities. All communities will also benefit from contributions, both those negotiated in the IIBA to be signed between AREVA and the KIA and those that AREVA may make directly. There is however also potential for negative socio-economic effects on individuals and families, as well as at the community level, in each of the seven Kivalliq communities. Such effects are largely associated with the challenges of transitioning into the wage based component of the economy, and more specifically, transitioning into mining related employment with its characteristic rotational employment.

Finally, at the level of Kivalliq Region, there is some potential for the Project to affect non-traditional land use and planning in the priority economic sectors of mining and tourism, and to affect land use in Baker Lake.

4.4.2 Regional Assessment Area

Nunavut is the regional assessment area for purposes of the economy of Nunavut major socio-economic component. Effects on Nunavut are primarily related to the potential for benefit to the territory's economy. There will also be fiscal effects on the GN and on NTI, in terms both of increased revenues and also potentially of some increased costs. In addition, the potential for cumulative economic (and consequent social and cultural) effects, has implications for government and NTI policy and programs in Nunavut.

4.4.3 Temporal Boundaries

Earliest construction date at the writing of the DEIS was 2017, with operations expected for 14 years (based on current reserves) and the physical decommissioning stage lasting 10 years. The temporal boundaries for the socio-economic assessment are the years 2017 to 2039. However:

- there is some potential for the Project to experience a delay to the start of construction and the potential for the Project's operations phase to be extended by 11 years (25 year operating life)
- the EIS includes consideration of a far future scenario, focused on potential additional uranium and gold developments in western Kivalliq that do not at this time have a time frame
- given the rapid pace of socio-economic change in Nunavut, projection of potential Project effects into the years of the 2020s, 2030s and 2040s must be considered very speculative.

These three factors have the following implications for the assessment of the Project's socio-economic effects:

- the base case used is the 14 year operations phase – for socio-economic effects this is the more conservative scenario[17]
- the assessment focuses on the construction phase and the first years of operation – this is considered justifiable both on grounds of confidence in predictions but also because

[17] As the assessment concludes that there is more potential for negative effects in the early years of the Project life cycle and more potential for benefit in the later years, the 14 year operations phase results in a conservative assessment of effects – negative effects are largely captured and positive effects are limited to a 14 rather than a 25 year period.

whereas negative effects can be adaptively managed towards minimization in the short to medium term, positive effects are expected to gain momentum with time

- as closure will occur in the far future, in a year and in an economic context that is currently undetermined, the effects of closure are discussed in limited depth – in this regard it is noted that iterative closure planning will ensure that as closure approaches, more will be understood about its potential for negative socio-economic effects and how these can best be managed.

This assessment's temporal boundaries are therefore such as to suggest that conclusions reached are not necessarily predictive, but rather indicative of the potential for effects, both positive and negative. Socio-economic conditions are always evolving, in response to other projects, government initiatives, improved technologies and multiple other factors that can be unknown or unpredictable. Section 5, Summary Baseline,[18] although updated with available and relevant information, is in some respects dated, as a result of limitations on publicly available data. These baselines thus provide limited insight into what the socio-economic context for Project construction and Project operations will be.

Over the period from 2014 to construction, there will more learning about the effects of mining projects in Kivalliq and how these effects can be most effectively managed, as Meadowbank continues to operate and, as expected, the proposed Meliadine Gold Project is developed. AREVA will of course continue to review expectations of Project effects and proposed management measures in response, in the interim to construction and beyond.

4.5 Environmental Effects Criteria

The criteria for assessing potential Project-related (including transboundary) and cumulative socio-economic effects are broadly comparable to those used for biophysical effects. There are, however, some differences in the choice and/or the definition of criteria.

Direction indicates whether an effect is considered positive (a benefit) or negative. Socio-economic effects are not neutral, although some effects may have both positive and negative dimensions, or be

[18] Although the Technical Appendix has not be updated for purposes of this document, where assessment conclusions are based in some part on baseline data and more recent data are available, these data have been incorporated into Sections 5 and 8 through 13.

positive for some people and be negative for others. As well, some potentially negative effects may become positive with the implementation of socio-economic management measures.

Magnitude refers to the degree of change in a VSEC that an effect has the potential to produce. Magnitude may be negligible, low, medium, or high and is usually (but not always) qualitatively assigned. Negligible indicates no discernible effect. Low magnitude indicates a discernible effect on a VSEC but the effect is not expected to materially affect people's quality of life. Moderate magnitude indicates a noticeable and potentially detrimental or beneficial change to people's quality of life. High magnitude indicates that the effect is expected to substantially interfere with or enhance the quality of life of at least some individuals, families or communities.

One exception to the above relates to some economic effects. A very large project, such as the Project, which is developed, operated and then closed in what are very small territorial and community economies, will have economic effects that, where these are quantifiable, are necessarily of high magnitude. High magnitude criteria are individually defined for most economic VSECs in Sections 8 and 13, Assessment of Effects on Community Economies and the Economy of Nunavut respectively. Criteria for low and moderate magnitude for economic effects have not been developed because they are not used.

The second exception to the above relates to cumulative effects. Magnitude is challenging to determine given the high uncertainty over long term economic and social change in Nunavut through the Project life cycle to end of decommissioning, the mitigation and enhancement measures that will be put in place by governments, AREVA and other large project proponents, and the effectiveness of those mitigation and enhancement measures. Thus for cumulative effects, magnitude is 'undetermined'.

Geographic extent for most socio-economic effects is considered in terms of administrative units. Local effects are experienced by people closest to a proposed project, in this case people in the seven Kivalliq communities of Arviat, Baker Lake, Chesterfield Inlet, Coral Harbour, Rankin Inlet, Repulse Bay and Whale Cove. Regional effects are experienced at the level of the Territory of Nunavut. Where an effect is expected in some, but not other, communities, this is noted. As well, some effects are experienced by some, but not other, individuals within an assessment area, and may not have community level manifestations. Any potential for particularly negative effects on some individuals needs to be identified and addressed, so these are noted. Where there is potential for an effect to extend beyond Nunavut this is also noted, as a transboundary effect.

Duration refers to the length of time over which an effect occurs. In this case short refers to a period of one year or less. Medium refers to a period of up to five years. Effects that are expected to continue through the operations phase or through operations into the decommissioning phase, that is for longer than five years, are considered to be of long duration. By definition, all cumulative effects are of long duration, that is, would be expected to continue for a period of over five years.

It will be noted that these durations are not linked to Project phases – for example, a socio-economic effect that persists for 14 years (the Project's operations phase) would have to be considered long term in terms of people's experience of that effect.

Most socio-economic effects are not considered to be reversible (unlike many physical and biological effects) and trend towards being long term. Socio-economic effects are part of an ongoing process of interdependent economic, social and cultural changes extending into the future and generally cannot be reversed to return to one or all of pre project development conditions.[19] For example, although most employment will come to an end at final closure, job experience and training will have enhanced the capacity of individuals to find other employment, with lifelong implications – the employment effect will not be fully reversed. Further, since it is presumed that a project is only permitted if it is expected to bring net socio-economic benefit, a return to pre project conditions may not in fact be desirable. Thus the reversibility criterion is only used, by exception, where an effect can be considered to be fully reversible.

Also, although there are isolated exceptions, most socio-economic effects are experienced continuously by people. Thus frequency is not often a useful criterion for socio-economic assessment. Where frequency is relevant to the assessment of a specific effect, this is noted in the assessment of that effect, again by exception.

Finally, assigning likelihood can be problematical for socio-economic effects. With some exceptions, most socio-economic effects are considered highly likely (almost certainly) to affect at least some individuals even where community level effects may not be observable. In the event that an effect is considered likely, but with less certainty, this is noted in the assessment, again by exception. As for magnitude, likelihood for purposes of assessing cumulative effects, is 'undetermined' because of high uncertainty.

Table 4.5-1 presents definitions of socio-economic assessment criteria in table form.

[19] In this sense, most socio-economic effects are cumulative, as they are products not only of a given project but of the interaction of that project and its effects with the broader, continuously evolving, economic, social and cultural environment.

Table 4.5-1 Definitions of Criteria Used in the Assessment

Direction	Magnitude	Geographic Extent	Duration	Reversibility	Frequency	Likelihood	Prediction Confidence
Negative: Adverse effect on a VSEC **Positive:** Beneficial effect on a VSEC	**Negligible:** Indicates no discernible change to a VSEC **Low:** Indicates a discernible effect on a VSEC but the effect is not expected to materially affect people's quality of life **Moderate:** Indicates a noticeable and potentially detrimental or beneficial change to people's quality of life **High:** Indicates that the effect is expected to substantially interfere with or enhance people`s quality of life For quantifiable economic effects, all effects are considered of high magnitude and criteria for high are variable For cumulative effects, magnitude is undetermined	**Local/ Communities/ Kivalliq:** Effect is within Kivalliq Region and/or its seven communities **Nunavut:** Effect is within Nunavut **Individual:** Although no community level effects are expected, individuals and/or families are expected to be affected	**Short:** Effect occurs over one year or less **Medium:** Effect occurs over one to five years **Long:** Effect occurs over more than five years All cumulative effects are of long duration by definition	**Most effects are considered to be irreversible** **By exception:** **Reversible:** Effect is transient for duration outlined, beyond which conditions will return to baseline	**Most effects are considered to be continuous** **By exception:** **Periodic:** Effect occurs intermittently or may repeat over the assessment duration	**Likely:** The effect is expected to occur, but may not **High likely:** The effect will almost certainly occur for at least some individuals over the assessment duration. For cumulative effects, liklihood is undetermined	**Low:** Level of confidence in prediction of significance is low **Medium:** Level of confidence in prediction of significance is medium **High:** Level of confidence in prediction of significance is high

4.6 Determination of Significance

There are important differences in the methods used to determine significance and in the prediction confidence for socio-economic assessment as compared to biophysical assessments.

First, the significance of Project-related (including transboundary) and cumulative socio-economic effects must often be determined qualitatively. For example, it may be straightforward to conclude that an effect is not significant if it is very small, is of short duration, and affects almost no one; or to conclude that an effect is significant if it is very large, of long duration, and affects most people. However, determining significance in cases that are less well defined necessarily depends on:

- the perceptions and values of affected people and their leadership, as made evident through engagement (see Section 3, Assessment Approach);
- qualitative data and interpretation, and observations of the socio-economic reality (including for example resilience in face of change) of a project area; and
- lessons learned from other experiences.

As a result there may appear to be a stronger element of professional judgment, as opposed to the use of quantitative tools (such as decision tress or valued matrices), in reaching conclusions on significance for socio-economic effects.

Second, related to the first point above, there are not established thresholds or standards for most VSECs. Although it may be possible to set thresholds for some socio-economic effects for purposes of an EIS, it often cannot be demonstrated that there is any consensus on any specific threshold value or what such a threshold means in terms of significance of an effect. For example, it might be determined that in migration representing 5% of a community's population is a threshold for magnitude.[20] To the extent that this migration happened over a period of some years, was predominantly made up of people able to access stable employment, consisted primarily of returning family members and/or happened in a community with little natural population increase, this might be considered a benefit and a higher threshold might be warranted. Conversely, the effect might be considered negative under a different set of circumstances. This leaves aside the issue of whether or not it is possible to predict in migration with a plus or minus 5% degree of accuracy.

[20] This, and other examples of the challenges of quantifying many socio-economic effects in this section, is a constructed example for purposes of this discussion only.

Third, many socio-economic effects may not lend themselves to the assignment of criteria or determination of significance except in terms of potential, thus introducing a larger element of uncertainty into socio-economic effects assessment. There generally is the expectation that an effect brought forward for assessment will in fact occur, at least to some degree. However, it is, for example, extremely difficult to predict whether some effects will be positive, negative or both, and in what ways for whom. Socio-economic effects will result from interrelationships between:

- Project activities;
- the responses on the part of individuals, families and communities to socio-economic management measures implemented by AREVA; and
- decisions made by individuals, families and communities with regard to events and situations unrelated to the Project.

Fourth, related to the third point above, mitigation and benefit enhancement measures are put in place to create the conditions and opportunities for individuals to improve their lives, that is, to offer mechanisms to enhance the potential for benefit, or at least the avoidance of harm. However, it is not possible to ensure that everyone will necessarily take advantage of those opportunities. There are also always other forces at work outside the control of a single project, which can undermine the success of mitigation and benefit enhancement measures. Thus, while mitigation and benefit enhancement measures are developed, implemented and adjusted over time to provide positive opportunities, poor choices can be made, people may choose not to participate and/or other realities may intrude. The effectiveness of socio-economic management therefore may not always be complete, for everyone. This of course speaks to the importance of adaptive management.

Fifth, related to the fourth point above, it is generally accepted that a project will have some negative socio-economic effects on at least some people. Benefits are expected but some individuals, families and communities will experience some negative effects in a context of overall net socio-economic benefit. This is in contrast to negative biophysical effects, which are most often mitigated into insignificance over the long term, through engineering design, good practice policies and procedures, compensatory environmental improvements, reclamation or other means. Further, there are usually no to very few instances of biophysical benefits resulting from the extraction of a resource (although proponents are able to create environmental benefit where this is considered appropriate).

In summary, the challenges of quantification, thresholds, unpredictability, and effectiveness of socio-economic management measures and expectations of both negative and positive residual effects together imply that the approach to socio-economic assessment, for most effects, is more qualitative and nuanced than for biophysical assessment. In coming to conclusions on residual socio-economic effects, there is necessarily high dependence on engagement results (see Section 4.8), IQ (see Section 4.9) and comparable experiences – in this case, experience in relation to other large mining projects in northern Canada (see Section 4.10). Socio-economic assessment, particularly in the case of the Project, also must give important weight to socio-economic baseline trends, that is, not only to

current socio-economic conditions. Evolving change can be expected to interact with the Project over its life cycle.

The methodology for this EIS is to describe residual effects as either 'not significant' or 'significant', on the basis of assigned criteria. For purposes of the socio-economic assessment, each residual effect is determined to be not significant or significant on the basis of the expected result for most people and/or of the effect's manifestation at the community level. This is not to suggest that effects that may be experienced at the level of some individuals and/or families are not important, or even critical, to quality of life. Where this is the case, the effect is discussed, AREVA will implement mitigation and benefit enhancement measures in response, and the residual effect will be assigned attributes in terms of the criteria described in Section 4.5, Environmental Effects Criteria. Such effects however are determined to be not significant in terms of quality of life for most people and/or at the community level.

Finally, confidence in the prediction of whether an effect is significant or is not significant is often high, irrespective of all the uncertainties in describing the detail of that effect. This may at times seem to be a contradiction. Two examples may illustrate. Section 9, Assessment of Effects on Traditional Culture, comes to the conclusion that the Project will have a significant negative effect on the maintenance of traditional age and gender roles. This is because virtually any negative effect on traditional culture is considered important by so many people in Nunavut. Confidence in the prediction of significance is thus high, irrespective of the challenges of defining in detail how these changes will manifest. Section 13, Assessment of Effects on the Economy of Nunavut, can only provide an approximation of effects on GDP and labour income, but even in the event of large errors in the approximation, the Project`s effects on GDP and labour income will necessarily be significant.

4.7 Influence of Inuit, Government and Stakeholder Engagement on the Assessment

Socio-economic assessment is inherently consultative. Primary data collection was done solely through contact with people in Kivalliq, and the population of Kivalliq is over 90% Inuit. Although socio-economic data collection, IQ data collection and engagement are conceptually different and have different objectives, each engages affected people and all result in the expression of views on the Project, its effects, preferred mitigation and benefit enhancement measures and processes for adaptive management.

Government and stakeholder input largely comes from formal engagement events – open houses, meetings with hamlet, regional and territorial government representatives and with civil society organizations, and through the environmental assessment review process.

In addition, AREVA's website, Project office in Baker Lake, frequent senior staff presence across Kivalliq and wide dissemination of the coordinates of staff responsible for the Project have provided multiple avenues for proactive contact by Inuit, government and stakeholders with concerns, comments and questions.

Thus, in addition to the socio-economic data, both IQ and engagement results were reviewed for comments of relevance to the socio-economic assessment. The results of the various forms of engagement have influenced the socio-economic assessment by:

- guiding the development and then refinement of primary data collection program for the baseline – for example the clear concerns about potential effects on traditional culture motivated a data collection event to capture any changes in harvesting activity and associated values, as well as in consumption of country food, in Baker Lake over the last decade
- providing much of the content of the socio-economic baseline, and validating that content, through community review of the baseline
- guiding the selection of VSECs, on the basis of both identification of issues and of AREVA`s specific VSEC inquiries in 2009 and 2010 (see Section 4.3, Selection of Valued Socio-Economic Components)
- determining where emphasis lies in the discussion of the potential for Project effects – the assessment focuses on issues that the Inuit, government and stakeholders have said are important to investigate
- informing the assignment of criteria for effects and to the determination of significance for residual effects, which take into account both the relative values and the diversity of opinion that engagement has made evident – for example the discussion on potential Project effects Section 9, Assessment of Effects on Traditional Culture sets very low bars for the determination of significance because of the value people place on such VSECs as harvesting and language
- incorporating into AREVA's socio-economic management for the Project mitigation and benefit enhancement measures that have been suggested by stakeholders (see Volume 3, Technical Appendix 3C Community Involvement Plan and Technical Appendix 9C, Human Resource Development Plan)
- emphasizing the importance of ongoing engagement and incorporation of IQ as important components of AREVA's socio-economic management for the Project (see Volume 3, Technical Appendix 3C Community Involvement Plan)

AREVA considers that engagement results to date have been instrumental in guiding the content of the EIS, and ongoing engagement is expected to result in additional input of relevance, input that will be incorporated into adaptive management of Project effects throughout the life of the Project.

4.8 Integration of IQ

As described for engagement in Section 4.7 above, IQ has also been fundamental to all stages of the assessment, from developing baseline, to the identification of potential Project effects, to the development of socio-economic management measures in response, to the determination of significance of residual Project effects. IQ information is found in the results of primary socio-economic data collection, specific IQ data collection and engagement. All of these results were reviewed for IQ information of relevance to the socio-economic assessment.

Also as noted in Section 4.7, primary socio-economic data collection relies extensively on input of affected people in Kivalliq. The input from Inuit, IQ defined in its broadest sense, is the basis for the baseline's interpretation of the statistical data and its exploration of trends, challenges and opportunities related to socio-economic conditions in Kivalliq communities, and thus to the assessment of potential for Project effects.

Socio-economic management is only about achieving results – the avoidance or minimizing of negative effects and the enhancement of benefits for affected people. As such, both the assessment of effects and the development of socio-economic management take into account IQ related to past experiences, values that need to be respected, characteristic strengths and weaknesses, initiatives Inuit expect will facilitate their access to benefits and participation in the Project, and the responses of people to change.

There are two additional points to make with regard to the integration of IQ data. The first is related to language. Whereas most people in the younger generations were very able to talk in English about the land and its resources, and Inuit values and characteristics, there were important IQ data to be collected from unilingual Inuktitut speakers. Therefore care was taken during socio-economic and IQ data collection events to ensure that people were able to speak in Inuktitut where this was their choice, either directly to Inuit data collectors or through translators. Nevertheless, there are vocabulary and other translations issues that can lead to misunderstandings.

The second point is that people, including Inuit, vary widely in their perspectives. For example, there are differences in practices, knowledge and values between individuals, generations, genders and communities. This heterogeneity needs to be reflected in the discussion of the potential for effects and responded to through socio-economic management for the Project.

4.9 Consideration of Comparable Experiences

The unpredictability of socio-economic effects, irrespective of the quality of baseline data, engagement and assessment methods, suggests the value to the assessment of experiences in other (comparable) circumstances. This is somewhat challenging in northern Canada because socio-

economic change has been rapid in recent years, and operations of mining companies have substantially evolved over time in response to regulatory requirements and community concerns. Thus strictly comparable experiences are difficult to identify. However, taken overall and accounting for differences in affected populations, timing, projects, effects, mitigation and benefit enhancement measures implemented, and incompleteness of socio-economic monitoring programs, there are some documented results that are of value in assessing the Project's socio-economic effects. Of particular relevance are:

- In Nunavut: The Polaris and Nanisivik mines were developed 30 or more years ago, long before more recent best practice had been established as standard operating procedures for mines. However, there has been some thoughtful analysis of why these mines resulted in few long term benefits for their nearest communities, Resolute Bay and Arctic Bay respectively.
- In NWT: The diamond mines provide a good point of comparison in terms of being more recent and having more aggressive benefit enhancement measures in place. There has also been a sustained effort over the last decade, between the Government of NWT (GNWT), BHP Billiton, Diavik and De Beers, to monitor the socio-economic effects of these mines, at the community level. The monitoring program has not been able to capture many clear cause and effect linkages between community socio-economic change and the diamond mines, but the monitoring results are instructive nevertheless. Although the affected people are not Inuit, there are some parallels insofar as communities are aboriginal, small, remote and socio-economically challenged.
- In northern Saskatchewan: AREVA cooperates with Cameco, agencies of the Government of Saskatchewan (GoS) and communities to monitor the effects of uranium mining on quality of life. The long standing proactivity of GoS in ensuring that mining brings benefits particularly to aboriginal communities in northern Saskatchewan has ensured that best practice has been adopted over a long period by the mines and that documentation of particularly employment, training and business benefits has been good. There is also a joint community monitoring process that is in place that is instructive.
- In northern Alberta: The potential for large resource extraction projects to affect population demographics is of interest. The experience of Fort McMurry is instructive with regard to the evolution of rapid population growth and the response of project proponents and governments.

A summary of lessons learned with regard to the above is provided in Section 7, Comparable Experiences. It is noted that Meadowbank is of perhaps highest relevance to what might be expected as a result of the construction and operations of the Project. Meadowbank's effects are part of the socio-economic baseline for the Project and are reflected in engagement and IQ results. Lessons learned from Meadowbank are thus considered throughout this report rather than in Section 7 specifically.

5 Summary of Existing Environment

This section summarizes, and where relevant updates, the baseline presented in Tier 3 Technical Appendix 9A.

5.1 Baseline Methodology

This socio-economic baseline for Nunavut (the regional study area) was developed using a number of secondary sources, including census data and documents prepared by various agencies of government, academics, economic and social development consultants, and proponents of other large projects in Nunavut.

The socio-economic baseline for Kivalliq and its seven communities (the local study area) was developed on the basis of:

- consultations with people in each community, as well as with representatives of local, regional and territorial government organizations and other stakeholders, to define key issues
- literature review and secondary data collection
- identification of data gaps, and design and implementation of a primary data collection program to fill those gaps[21]
- integration of IQ and engagement event results

With regard to literature review and secondary data collection, Tier 3 Technical Appendix 9A was developed in 2011, on the basis of literature and secondary data available at that time. Subsequently, Statistics Canada has released data from the 2011 census; the Nunavut Bureau of Statistics has updated its population, economic, employment and social data to 2012 and in some cases 2013; GN has provided new data and information as part of annual reporting by various departments and as part of new government policy, strategy and monitoring documents; there is new reporting on comparable experiences by the Government of the Northwest Territories and by

[21] The primary data collection program was done under the terms of a research license from the Nunavut Research Institute (see Technical Appendix 9A, Attachment A).

Saskatchewan's Community Vitality Monitoring Partnership Process; Agnico Eagle continued to provide data and information on its evolving experiences at Meadowbank; and new environmental impact statement documents have been submitted to NIRB for the Mary River and Meliadine projects.

Where newly available data and information are of relevance to revising the narrative on socio-economic conditions and trends in Nunavut, and in Kivalliq and its seven communities, they have been included in this baseline summary. There are also additional updates of data and information in the discussions of the potential for effects in Sections 8 to 13, Assessment(s) of Effects on major socio-economic components.

With regard to primary data collection, the program was implemented over the period March 2009 to April 2010, using a mix of methods, to achieve efficiencies while allowing for triangulation[22] of data. Data collection methods were designed to be participatory and inclusive. Methods included informant interviews, focus group discussions and a household survey in Baker Lake (see Table 5.1-1 below, and Attachment A for a list of meetings, location and dates) as well as review of all available IQ and engagement event results. Subsequently, although new focus groups have not been organized and the household survey in Baker Lake has not been repeated, both AREVA and its socio-economic consultants have continued to meet with the full range of stakeholders, interview informants (in many cases by phone), and review engagement event results with a view to ensuring that any changes in socio-economic conditions since 2011 are reflected in this FEIS.

[22] Triangulation refers to the integration of two or more research methodologies. Typically, quantitative data from questionnaires is combined with qualitative data from focus group discussions, key informant interviews and observation. Triangulation puts the data into perspective and gives an added measure of validity to the study.

Table 5.1-1 Data Collection Events by Community

	Arviat	Baker Lake	Chesterfield Inlet	Coral Harbour	Rankin Inlet	Repulse Bay	Whale Cove	Total
Interviews								
Elders (IQ interviews)		18	11					**29**
Health and social services	3	1	1	1	3		2	**11**
Education	2	1	1	1	3		1	**9**
Hamlet government	2		1					**3**
Police	1	1	1		1		1	**5**
SAOs/ EDOs	1	1	1		1	1	2	**7**
Other	2	1	1		3	1		**8**
Focus groups								
Rotational workers		1						**1**
Women		2	1		1			**4**
Young adults		1	1	1	1	1	1	**6**
HTOs	1	1		1	1	1		**5**
Elders	1	1	1	1	1	1	1	**7**
Total interviews	**11**	**23**	**17**	**2**	**11**	**2**	**6**	**72**
Total focus groups	**2**	**6**	**3**	**3**	**4**	**3**	**2**	**23**
Household survey (Baker Lake)		89						89

Informant interviews: These were done, and have continued to be done, across Kivalliq communities, with representatives of governments, and with the private sector. Informants are people with specific sector and/or geographic expertise, including people employed in the delivery of government services, people with experience related to mining activity, religious leaders, artists and others.

Focus group discussions: Focus groups, usually of six to eight participants, were primarily directed towards people who may not be as well represented to a mining project proponent as others. Women and youth would be examples of people who may experience Kiggavik differently than potential employees or suppliers, but who are not always full participants in formal engagement events. Focus groups also were directed at groups of people with specialized knowledge, for example hunters and elders. In addition, the experiences of Meadowbank rotational workers and their families were considered of particular interest.

Household survey: Baker Lake, as the closest community to Meadowbank, has seen changes in employment levels and business activity in association with first construction and then operations of Meadowbank. Baker Lake thus offers an opportunity to investigate some socio-economic changes

that might be attributed to that project. Informant interviews and focus group discussion results provide some qualitative information on the experience of Meadowbank in Baker Lake. However, given the concerns about the relationships between formal sector employment and traditional activity, AREVA undertook a household survey to get some quantitative data in two specific areas: i) consumption of country foods; and ii) hunting and fishing patterns and associated values.

The results of interviews and focus group discussions done in 2009 and 2010 are presented in Technical Appendix 9A, Attachment C, organized by community, as well as by various population subgroups (such as elders, hunters and youth).[23] The method of presentation of these results was selected on the basis of the need to protect confidentiality.

Maintaining confidentiality is a fundamental principle of ethical research;[24] was a condition of the research license granted to undertake the work by the Nunavut Research Institute (see Technical Appendix 9A, Attachment A); was promised to each interview informant and focus group participant (as well as each household questionnaire respondent); and is generally acknowledged to contribute to (but not assure) data quality – with an explicit undertaking of confidentiality, a respondent is more likely first to participate and secondly to give honest and valid answers to questions.

Confidentiality is a particular challenge in small communities. People can not only be identified by name, but by other means, such as unique turns of phrase, or triangulation of information – as a made up example of the latter, a female heavy equipment operator currently working for a mining company who lives in Rankin Inlet might be identified (correctly or incorrectly). Therefore AREVA's socio-economic consultants did not record interviews or focus group discussion, did not note who provided what input in focus group discussions, and attempted in taking notes to capture ideas people were communicating rather than exact language.

[23] The results of the household survey are in Technical Appendix 9A, Section 4.2.7.3., the discussion on employment and traditional activity in Baker Lake.

[24] See the Tri-Council Ethics Statement at http://www.yorku.ca/igreene/tricoun.htm. The three councils are the three major public research funding bodies in Canada -- the Social Sciences and Humanities Research Council (SSHRC), the Medical Research Council (MRC), and the Natural Sciences and Engineering Research Council (NSERC). The Respect for Privacy and Confidentiality statements is: 'Respect for human dignity also implies the principles of respect for privacy and confidentiality. Privacy and confidentiality are considered fundamental to human dignity. Thus, standards of privacy and confidentiality protect the access, control and dissemination of personal information. In doing so, such standards help to protect mental or psychological integrity.'

With regard to integration of IQ and engagement results, although socio-economic data collection, IQ data collection and engagement are conceptually different and have different objectives, each engages affected people and all result in the expression of views about issues, descriptions of lives lived and experiences. Accordingly, in addition to the socio-economic data, both IQ and engagement results, including updates since 2011, were reviewed for comments of relevance to the socio-economic baseline and impact assessment (see Volume 3, Public Engagement and IQ for details on this input).

5.2 Nunavut

5.2.1 Government

Nunavut was formally created in April 1, 1999, and promptly set about a consultative process to set priorities and strategies for the economic and social development of the new territory. The work took into consideration a number of unique features of the economy and population, including the importance of the mixed economy, a requirement to use renewable and nonrenewable resources in sustainable ways that benefit the population, the value of IQ to planning and implementing government initiatives, consultative processes to give communities control of their own development, a need to develop self-reliance in face of overdependence on federal transfers, and a very young and rapidly growing population.

It was also recognized that there are significant challenges to improving the wellbeing of people. With a commitment to developing a more diversified economy, the government is faced with a need to address a broad range of constraints, from poor health and educational status of people, to lack of transportation and communications infrastructure, to limited information and data to be used for planning purposes, to uncertainties around the future role and contributions of the federal government.

The guiding document for government is Tamapta 2009-2013 (GN, 2009). The document describes the vision for Nunavut to the year 2030, and notes that the vision is to be reached on the basis of Inuit values. The vision is that:

- `Nunavummiut will continue to have a highly valued quality of life and a much better standard of living for those most in need
- individuals and families will all be active, healthy and happy
- communities will be self-reliant, based on Inuit societal values, with reduced dependence on government
- Nunavut will be recognized for our unique culture, our ability to help one another and for our useful contributions to Canadian and global issues.' (GN, 2009)

Nunavut's economic (and social) development plans focus on the economic sectors that can provide the most growth and employment, without undue harm to the environment. These sectors are mining, tourism (and arts and crafts) and commercial fishing. To achieve growth in these sectors, investments are needed in education, small business development, transportation, energy and telecommunications. Most investment and employment growth is expected to come from the mining sector over the medium term – as of 2012 there were 44 active exploration and mineral developments in Nunavut (AANDC et al, undated). These include Meadowbank (now producing gold), Mary River (iron ore mine under construction) and at least four other large mining projects are moving through the formal environmental review process, including the Project. Technical Appendix 1E provides a table of exploration activity in the Kivalliq and Nunavut over the last 10 years.

5.2.2 Economy

Nunavut's economy is mixed, combining land and wage based components – land based components include subsistence activity (harvesting animals and fish for household consumption, for example) as well as activity that generates income (trapping to sell pelts, production of arts and craft for sale, and guiding as examples). Most Inuit engage, or aspire to engage, in both land and wage based economic activities.

There are no good estimates of the value of the land based economy. In 2001 the Conference Board of Canada suggested a figure, based on a 'consensus of key informants', of $40 to $60 million as the value of the part of the land based component of the economy that did not involve a financial transaction. The figure could be substantially higher by now. Estimates of the GNDoF (2008) are that food harvesting alone has a value of about $30 million annually in Nunavut. However the EIS for the Mary River Project put an estimated value of $20 million annually for harvested food, for only five communities on the north part of Baffin Island, communities with only about 18% of the territorial population (Baffinland, 2012).

Land based activities that do involve financial transactions are additional – these would include pelt sales, tourism, sales of arts and crafts, the commercial fishery, environmental monitoring and communications (CBoC, 2001). Although none of these sectors is large, in aggregate the economic contribution is likely significant – tourism was estimated to have contributed more than $40 million to the economy in 2011 (GNED&T, undated) and the commercial fishery over $80 million in that year (GNDoF, 2012). Arts and crafts contribute about $33 million annually (GNED&T, 2010). It can

be concluded therefore that in addition to social and cultural value, the land based economy plays a much more significant economic role than any available data suggest.

There is better data on the formal economy – that part of the economy that includes financial transactions.[25] In 2013, Nunavut's gross domestic product (GDP) is expected to be $2,193 billion in current dollars (CBoC 2013). Annual GDP real growth rates have been highly variable over time. For example the rate was negative 7.3% in 2009 and positive 16.6% in 2010. The swings are largely attributable to the small size of the economy and the consequent large effects of the economic shock of Meadowbank.[26] Overall however, the economy had grown by almost 6% a year on average between 2007 and 2013, that is, at a considerably faster rate than in Canada and in each of its provinces and territories.

Government is responsible for much more of final domestic demand than in Canada more generally, for example, for about 40% of final domestic demand in 2008. However this does provide some stability in the economy in face of negative economic shocks. Business investment has risen rapidly, by over 300% between 2002 and 2011 (and spiked to 500% of 2002 levels at the peak of Meadowbank construction), largely attributable to investment in mining. Gold production has increased Nunavut`s exports and reduced the negative trade balance. Nunavut imports more than it exports – there was a trade deficit of over $1.2 billion in 2008.

GN revenue totaled $1.64 billion in 2013. Transfers from Canada's federal government and revenues from outside third parties represented 94% of GN revenue, with only 6% coming from GN tax and other own source revenue. The contribution of own source revenue is not expected to substantially increase over the coming decade. GN revenue growth is expected to average just about 6% annually between 2011 and 2020.

GN expenditures were $1.55 billion in 2013, with about 85% for operational expenditures and the balance for capital investments. GN budgeting is vulnerable to Government of Canada (GoC) decision making on transfer payments (up for renegotiation in 2014), the high proportion of the budget that is expended on non-discretionary entitlement programs and the cost of fuel. Government spends over half of its revenue on social services, including education, health, social assistance and

[25] For the rest of this Section 5, most of the data on the formal economy come from GN`s Department of Finance (GNDoF). Most of the data on the social context are from the GN's Bureau of Statistics (GNBS), Statistics Canada (Statscan) and Public Health Agency Canada (PHAC). Exceptions are noted. Full references are in Technical Appendix 9A, Socio-Economic Baseline.

[26] Construction activity at Meadowbank peaked in 2008 and the Project became operational in 2010.

social housing – only in part as a result of the challenging education, health, employment and housing status of the population. High costs for labour, construction, utilities and transportation (including between Nunavut and the rest of Canada), result in higher unit costs for government services (as well as for personal and business goods and services). Per capita GN spending is thus about three times that of Canada as a whole.

5.2.3 Social Context

Nunavut's population is over 35,000 as at mid-2013, of which about 82% are Inuit, distributed in 26 communities. The population growth rate averaged almost 2.1% annually between 2006 and 2013, more than twice the rate for Canada as a whole. While Nunavut's population growth had been forecast to slow dramatically to 1.3% annually from 2009 forward (NBS, 2011a), average growth has in fact averaged 2.2% annually between 2009 and 2013 (NBS, 2014a). Nunavut had a fertility rate, of at least 2.97 children per woman between 2007 and 2011, again almost twice Canada's average rate of 1.65 over the same period (Statcan, 2014a). The high birth rate has had the result that the population is much younger than Canada's population – in 2011 the median age in Nunavut was 24.1 years as compared to 40.6 years in Canada. On third of Nunavut population is under the age of 15. Single parent (male and female) families were more common in Nunavut, at 28.2%, than in Canada, at 16.4% in 2011 (Statcan, 2013a).

Nunavummiut are somewhat less mobile than Canadians in general – 85% lived in the same community over the five years previous to 2011 as compared to 82% of Canadians. The figures would be higher for Inuit – the 15% of the population that is non Inuit has very high mobility. Inuit would appear to be leaving the territory in larger numbers than they may be returning. Despite high birth rates, Nunavut was home to a smaller percentage of Inuit in Canada in 2011 (45.5%) than in 2006 (49.4%), and in 2006 than in 2001 (Statcan 2013a, 2008).

Although there is some limited evidence of some erosion in traditional activity levels, Inuit culture remains very strong. In 2011, 88.7% of Inuit 15 years and over had knowledge of Inuktitut, and 60.7% spoke Inuktitut in the home (Statcan, 2013a). As of 2006, over 70% hunted and fished, and 80% lived in households that shared harvested foods (Statcan, 2008).[27]

[27] As at the time of writing, Statcan had not yet reported the results of the 2012 Aboriginal People's Survey on levels of traditional activity.

Adult education levels are low, well below Canadian averages. In 2011, 56% of the population 15 years and over had not graduated from high school and only 9% had a university degree. Available data suggest education levels are lowest in the younger adult age groups, however there are recent signs that this may be changing – high school graduation rates had increased from 149 in 2000 to 239 in 2012 – growth of over 60% (NBS, 2014b).

The unemployment rate in late 2013 was 14.6% (NBS, 2014c). Despite some job creation, unemployment is expected to remain high as large numbers of the young grow old enough to enter the labour force.[28] The participation rate has increased from under 60% to almost 66% in recent years, suggesting that discouraged workers are reentering the labour force. To the extent that these additional workers do not find jobs, this also contributes to high unemployment rates. The employment numbers for Nunavut disguise the much higher unemployment rates for Inuit (over 20%) and the young (almost 25%).

Average incomes of individuals were comparable to Canada, at about $43,000 in 2010 (Statcan, 2013a). Average wages at $76,316 for full year/full time work, were about 30% higher than in Canada, reflecting the much higher cost of living in Nunavut that is compensated by employers. Government transfers as a percentage of income were comparable between Nunavut and Canada, at about 12% of total income.

Health is defined as a state of complete physical, mental and social wellbeing, not merely the absence of disease or infirmity. The determinants of health are broad, and include socio-economic parameters such as income, education, environment, social support networks and culture. The poor health status in Nunavut relative to the rest of Canada is a function of the interactions of many factors, including poverty and hunger, changing diets, substance abuse, smoking, and poor housing conditions, as well as consequent domestic violence (usually associated with alcohol), suicides and crime.

Suicide, substance abuse, smoking, teenage pregnancy, sexually transmitted infections (STIs), and life expectancy statistics in Nunavut are substantially worse than in the rest of Canada. Table 5.2-1 below compares various health and wellbeing indicators for Inuit in Nunavut and Canada's total population.

[28] 'Labour force' refers to the people of working age who are either working or looking for work, as opposed to 'work force' which refers to workers of a specific project or activity.

Table 5.2-1 Health Indicators, Various Years 2007 to 2012

	Nunavut	Canada
Life expectancy at birth, males (years)	69	79
Life expectancy at birth, females (years)	75	83
Infant mortality (rate per 1,000 live births)	14.8	4.9
Body mass index, self-reported, 12 to 17 years old, overweight or obese (%)	25.2*	19.5
Body mass index, 18 years and over, overweight or obese (%)	61.7	51.4
Contact with a medical doctor in the past 12 months (%)	63.9	79.9
Has a regular medical doctor (%)	44.4	84.7
Deaths from all cancers (rate per 100,000 population)	363	178
Deaths from ischaemic heart disease (rate per 100,000 population)	34.6	74.3
Tuberculosis incidence (rate per 100,000 population)	147.3	4.9
High blood pressure, heart disease or suffering from effects of stroke (%)	11.7	19.0
Respiratory problems (%)	15.1*	10.1
Chlamydia (rate per 100,000 population)	3,937	228
One or more chronic conditions (%)	47.6	53.5
Diabetes incidence (rate per 100,000 population)	2.9*	6.0
Current smoker, daily or occasional (%)	49.0	21.1
5 or more drinks on one occasion, at least once a month in the past year (%)	27.2	17.1
Food insecurity, moderate or severe (%)	26.9	7.1
Influenza immunization, less than one year ago (%)	31.4	30.2
Perceived health, very good or excellent (%)	52.6	59.8
Perceived mental health, very good or excellent (%)	65.8	74.2
Perceived life stress, quite a lot (15 years and over, %)	18.6	22.9
Sense of belonging to local community, somewhat strong or very strong (%)	81.7	65.1

Source: Statcan 2013b, Impact Economics 2013

Note: Asterisked data are estimates.

For example, the suicide rate has been as much as twelve times the Canadian average in recent years (and much worse than this for younger males) (GN et al, 2010) and life expectancy is about ten years lower. Outbreaks of infectious disease are frequent. Deaths from cancer are more than double the Canadian rate and from accidents about four times higher. Incidence of and death rates from diabetes are rising – health workers attribute this in part to changing diets and activity levels. Thirty six per cent of households, and 57% of children, are not food secure (Tarasuk et al, 2013).

A comparison of health data by Inuit Tapiriit Kanatami (ITK) over the period 1996 to 2003 indicated that total mortality, cancer mortality and suicides rates had gone up in Nunavut and down in Canada and that life expectancy had gone down in Nunavut and up in Canada (ITK, 2010). The gaps between the health of the Inuit and that of people in the rest of Canada were in fact widening. Only

rates of infant mortality had improved in Nunavut – however they were still much higher than in the rest of Canada.

Public Health Agency Canada (PHAC, 2012) now reports annual mortality and morbidity data for the period 2000 to 2009 and annual health survey (self-reported) data for the period 2003 to 2012. These data suggest that while there may have been some improvements in some health indicators (cardiovascular disease has gone down for example), many health indicators are getting relatively worse in Nunavut as compared to Canada (overall mortality, cancer deaths, suicides, and self-reported poor mental health are examples).

Crime statistics are likely largely a reflection of health (particularly alcohol abuse) and economic challenges. Nunavut has a particularly high rate of violent crime relative to the rest of Canada. Crime figures suggest that whereas rates of both violent and non-violent crime have decreased in Canada, they have increased in Nunavut between 2000 and 2012. The violent crime rate in Nunavut in 2012 was more than eight times that of Canada, yet the non-violent crime is increasing three times as fast as violent crime. (NBS, 2014d).

Government is responsible to provide affordable (social) housing to Inuit in cases of need. As of the time of the most recent Nunavut Housing Survey in 2009, 51% percent of houses were social housing, 22% of houses were privately owned and almost all of the balance was staff housing provided by public and private sector employers. Housing conditions are challenging and many of Nunavut's education, health and wellbeing weaknesses are attributed at least in part to poor housing conditions – 49% of houses were overcrowded and/or in need of major repair. GN estimated unmet demand for housing at over 3,500 units, equivalent to almost 40% of housing stock (NBS, 2011b).

There are no roads connecting any of the 26 communities in Nunavut, nor any roads or railways connecting the territory to the rest of Canada. For many years, there has been discussion of constructing a road between Winnipeg and Rankin Inlet however costs would be very high. Aside from travel on the land and sea, usually by all-terrain vehicles and small boats, travel is almost exclusively by air for passengers and some goods, and by summer sealift for most goods. All Nunavut communities have scheduled flights and there is service through regional hubs to points in southern Canada

5.3 Kivalliq Region and Communities

One of three regions in Nunavut, Kivalliq shares many of the socio-economic characteristics of Nunavut as described above, but has historically been somewhat disadvantaged relative to the territory as a whole. Baseline information for Kivalliq and its seven communities comes from:

- socio-economic and IQ studies done in all communities in Kivalliq, between 2009 and 2011 – including 23 discussions with groups of women, elders, hunters, rotational workers and others, 72 interviews with individual health and education workers, social counsellors, hamlet government representatives and others, and a survey using questionnaires at 89 households in Baker Lake, on traditional harvesting, associated values and consumption of country food (see Attachment A)
- the result of hundreds of consultations on the Project done by AREVA over the years of Project development, to early 2014
- statistics and reports prepared by the governments of Nunavut and of Canada, mining companies, consultants and researchers in Nunavut

5.3.1 Economy

As for Nunavut, the economy of Kivalliq is mixed, combining both land and wage based components. Although the land based economy is not well captured statistically, it continues to provide economic, social and cultural benefits. Country foods represent an important element in the diets and livelihood strategies of about two thirds of the population. There are also significant cultural dimensions to land based economic activities – the harvesting, distribution, processing and consumption of traditional resources affirm identity and social relationships among the Inuit.

Most individuals are active in both the land and wage based components of the economy. There is a continuum, along which harvesting, arts and crafts, guiding and wage based employment lie, and along which individuals operate as they engage in a range of economic activities. It is in this sense that the economy is mixed, and distinguished insofar as the goals of economic activity are nuanced – earning money is not always the only objective of economic activity, but rather people also seek to maintain traditional activity and associated social and cultural benefits towards individual and community identity and wellbeing. *Young people indicated that traditional skills are being adapted into modern wage-based employment (IQ BLYA 2009). Rotational workers note that having employment means that they can afford hunting gear, such as ATVs or snowmobiles. They also note that, combined with a two week on and two week off rotation, they can go on the land and hunt more often than prior to being employed (IQ BLRW 2009).*

AREVA data from the household survey done in Baker Lake indicate that despite concerns about the relationship between wage employment and levels of land based economic activity, there is no

evidence that the latter has declined in Baker Lake over the last decade as a result of Meadowbank. Land based economic activity remains highly valued and the number of hunters is stable as compared to the pre Meadowbank years.

Narwal tusks are sold for carving material (IQ RB01 2009[29]), seal furs are sold for clothing (IQ RBH 2011[30]; ARVJ 2011; CHE 2009[31]) and wolf and grizzly pelts are sold to the local HTO (IQ RBYA 2009; BLHT 2011[32]). In addition to making kamiks (books), bearded seal skins are used to teach people how to make clothes (IQ ARVJ 2011). Arctic fox is trapped in the Coral Harbour region, with some pelts sold for auction in the south or sold privately (IQ Riewe 1992; CHW 2009[33])

Consumption levels of caribou and fish remain unchanged, and there is some evidence of increased diversity, in small amounts, of consumption of other traditional foods. Results disaggregated between people employed for more than six months and people employed for six months or less show some evidence of increased participation in traditional activity by the more employed. The more employed have the cash needed to fund land based economic activity and workforce management ensures that people also have the time they need to go out on the land.

With regard to wage based economic activity, government is the largest employer. Government regards mining and tourism as the two sectors of most potential to contribute to economic development in Kivalliq and, critically, employment. Kivalliq's land use plan emphasizes that development is to be achieved in a context of balancing increased opportunities for wage labour, particularly for youth, with environmental protection and maintenance of cultural integrity.

Statistics Canada groups type of employment into ten industries: 'Agriculture and other resources based industries' (which would include mining) is the primary sector. 'Construction' and 'manufacturing' make up the secondary sector. Seven other industries make up the tertiary (or services) sector, one of which is 'other services'. This other services category is undefined, typically

[29]IQ-RB01 2009: During Project interviews, narwhal whale hunting was described as "spectacular". People will stay out all night. People can sell the tusks for carvings, and the muktuk is a delicacy.

[30] IQ-RBH 2011: All kinds of seal are good for eating. Adult seal fur is not good in the spring and summer, but pup fur is good at this time. Furs are sold to the wildlife office for $40-$60/pelt

[31] CHE 2009: The Elders said that they make clothing and that store bought clothes are not warm enough. They depend on animals for food and clothing.

[32] BLHT 2011: The number of wolves and grizzly bears harvested has increased. Pelts are very valuable.

[33] IQ Riewe 1992; CHW 2009: In the Coral Harbour region, adjacent shore and portions of the inland area have been used for trapping Arctic fox. Arctic fox were also trapped along the west central portion of Southampton Island. Some people trap Arctic fox and send the pelts for auction in the south (Thunder Bay, Ontario). Other people sell privately and one can make a fairly good living from trapping.

accounts for about one third of total employment in Kivalliq communities and in Nunavut as a whole, and is by far the largest employer among the ten industries that make up the economy.

Table 5.3-1 describes employment by industry in Kivalliq, Nunavut and Canada for comparative purposes. Overall, manufacturing in Nunavut and Kivalliq is a smaller industry than in Canada as a whole. Conversely, educational and 'other' services employ a considerably larger portion of the labour force in Nunavut and Kivalliq thank in Canada.

Table 5.3-1 Sectoral Employment in Kivalliq, Nunavut and Canada

Industry	Kivalliq	Nunavut	Canada
	% of Labour Force		
Agriculture and other resource-based industries	4.1	4.8	5.3
Construction	6.2	6.0	6.3
Manufacturing	1.8	1.3	11.9
Wholesale trade	1.6	0.8	4.4
Retail trade	12.7	11.6	11.4
Finance and real estate	4.7	3.8	5.9
Health care and social services	10.9	9.1	10.2
Educational services	14.7	12.7	6.8
Business services	11.7	12.4	18.4
Other services	31.3	37.3	19.4

Source: Statcan, 2007a

Business is not strongly developed in most Kivalliq communities; however there is increasing capacity to supply the mining sector, primarily in the regional hub of Rankin Inlet and now in Baker Lake. This has been in response not only to the construction and operations of Meadowbank, but also to the many ongoing exploration activities. Available goods and services include logistics, camp operation, drilling, construction, fuel supply and environmental monitoring.

The Kivalliq Chamber of Commerce represents Kivalliq companies, although most of these remain small and consumer oriented. Eighty three Inuit firms in Kivalliq are registered with Nunavut Tunngavik Inc. (NTI, undated), with 58% of these located in Rankin Inlet. Business development is constrained by small local markets, remoteness and shortages of investment and skilled staff. Sakku Investment Corporation, in Rankin Inlet, is the business arm of the KIA and is owned in trust by the Inuit of Kivalliq. The corporation's mandate is to invest, often in partnership with companies based elsewhere in Canada, in viable enterprises in Kivalliq. Increasing Kivalliq's capacity to supply the mining sector is a priority, in part to create alternative employment for Inuit who are unable to access jobs with mining companies directly.

5.3.2 Social Context

Kivalliq's population is estimated to have grown from 7,944 to 10,266 people between 2001 and mid-2013, for an average annual growth rate of 2.2% (NBS 2014a). Table 5.3-2 shows the variability in population sizes and growth rates in the seven communities. Arviat, Baker Lake and Rankin Inlet are the largest communities, with populations over 2,100, while the other communities have populations under 1,100. The fastest and slowest growing communities were Repulse Bay (and secondarily Coral Harbour) and Chesterfield Inlet respectively. There had been no significant acceleration of population growth in Baker Lake in response to Meadowbank construction and population has grown more slowly than previously during Meadowbank operations in the period 2010 forward. Rankin Inlet`s population growth accelerated post 2009, although still remained slow compared to Kivalliq and to Nunavut as a whole.

Table 5.3-2 Population

	Population (no.)	Average Annual Population Growth Rate (%)		
		2002 to 2005	2006 to 2009	2010 to 2013
Arviat	2,508	1.8	2.0	2.1
Baker Lake	2,140	2.7	2.7	2.4
Chesterfield Inlet	393	-0.7	0.4	2.5
Coral Harbour	945	1.2	2.3	2.7
Rankin Inlet	2,777	1.4	1.5	2.1
Repulse Bay	1,040	4.3	4.5	4.4
Whale Cove	463	3.4	2.7	3.8
Kivalliq	10,266	1.9	2.2	2.5
Nunavut	35,591	1.9	1.9	2.3

Source: NBS, 2011b, 2014a

Although not yet evident, population growth rates are expected to slow and GN's projections are that regional rates will be 1.6% to 1.8% over the foreseeable future, still quite a bit higher than projected growth rates of 1.2% to 1.3% in Nunavut overall (NBS 2014e). The labour force will continue to grow even more rapidly than this however, as the 35% of the population below 15 years (Statcan 2013a) enters the labour force. The young will present employment challenges in the absence of job creation, however also have potential to become a driver of economic growth provided they are able to develop the skill sets needed, and have the incentives, to access economic opportunities. Table 5.3-3 provides selected data on Kivalliq and its communities, as well as on Nunavut as a whole for comparison purposes, for the years 2006 and 2011. The data are not strictly comparable as Statistics Canada used different data collection methodologies in the two years. and notes that "generally, the risk of error increases for lower levels of geography and for smaller populations. At the same time, the data sources used to evaluate these results are also less reliable at these lower levels making it difficult to certify these smaller counts." (Statcan 2013a).

Table 5.3-3 Selected Socio-economic Indicators 2006 and (2011)

	Arviat	Baker Lake	Chesterfield Inlet	Coral Harbour	Rankin Inlet	Repulse Bay	Whale Cove	Kivalliq	Nunavut
Average household size	4.5 (4.4)	3.8 (3.7)	3.2 (3.3)	3.9 (4.0)	3.6 (3.6)	5.6 (5.3)	3.9 (4.2)	4.0 (4.0)	3.8 (3.7)
Median age of the population	19.5 (20.4)	22.0 (22.8)	24.0 (24.5)	18.9 (21.8)	23.9 (25.4)	18.9 (18.2)	19.1 n/a	21.1 (22.0)	23.1 (24.1)
Dwellings requiring major repair (%)	28.6 (22.9)	26.7 (36.6)	45.0 n/a	20.5 (17.1)	13.0 (33.6)	35.7 (34.3)	38.9 (42.1)	24.8 (30.6)	20.2 (37.7)
Female lone-parent families (%)	29.1 (29.3)	29.6 (29.2)	29.4 (25.0)	26.5 (30.8)	25.7 (22.6)	20.6 (18.2)	31.3 n/a	27.1 (26.8)	20.5 (28.2)
Aboriginal identify population (%)	93.2 (95.5)	90.7 (93.6)	90.8 n/a	95.5 (95.2)	83.7 (81.7)	95.3 (97.9)	95.8 (97.5)	90.4 (91.5)	85.0 (86.3)
Inuktitut spoken most often at home (%)	88.8 (90.5)	23.5 (28.1)	51.6 (45.9)	79.2 (71.9)	41.7 (32.4)	82.7 (85.7)	87.3 n/a	59.1 (57.8)	53.9 (51.9)
Intra Nunavut 5 year mobility (5)	3.7 (3.8)	4.9 (5.2)	6.9 n/a	4.6 (5.7)	9.7 (9.7)	4.2 (3.9)	6.7 (23.9)	6.4 (6.9)	6.7 (5.9)
No certificate (including high school), diploma or degree, age 15 years and over (%)	70.9 (62.8)	66.4 (66.9)	61.0 n/a	66.3 (71.0)	53.4 (43.5)	80.9 (75.7)	77.5 (74.0)	64.5 (60.9)	57.3 (55.9)
University certificate, diploma or degree age 24 to 65 (%)	7.9 (8.4)	9.1 (8.3)	4.9 n/a	9.5 (6.3)	12.6 (15.6)	7.7 (3.1)	0.0 (0.0)	9.6 (9.9)	19.7 (13.0)
Participation rate (%)	49.8 (60.4)	59.2 (62.2)	74.4 n/a	66.7 (50.9)	71.7 (74.4)	61.1 (50.5)	47.6 (64.7)	61.7 (62.8)	65.3 (63.4)
Unemployment rate (%)	13.0 (27.9)	18.9 (19.8)	15.6 n/a	19.4 (11.1)	10.2 (14.4)	34.5 (25.0)	10.0 (21.2)	15.7 (19.7)	15.6 (17.9)
Median income, all families ($)	37,248 (67,339)	39,360 (74,655)	51,072 n/a	38,144 (63,797)	66,133 (128,531)	28,224 (57,417)	36,736 (70,755)	42,368 (80,747)	49,270 (84,332)
Median income, lone parent families ($)	17,984 (41,409)	21,312 (38,689)	21,376 n/a	21,632 (30,715)	27,296 (75,452)	10,592 (35,266)	24,384 (45,789)	21,248 (44,066)	22688 (46,330)
Government transfers, as % of total income	17.3 (18.8)	19.4 (13.5)	12.3 n/a	21.1 (22.9)	7.5 (8.2)	26.3 (29.1)	17.1 (17.5)	14.2 (14.4)	11.2 (12.9)

Source: Statcan, 2007a, 2012 and 2013a

Notes: For Chesterfield Inlet, National Housing Survey data have been suppressed by Statcan and for Whale Cove some Census data have been suppressed. n/a = not available.

The population is over 90% Inuit and almost 60% speaks Inuktitut most often in the home. It will be noted that Kivalliq's indicators often lag those in Nunavut. There is a high percentage of female headed households (at over 26%), whose incomes are about half the regional average for all families. The availability and quality of housing remain major challenges. There is significant variability between communities, particularly with regard to median incomes which are, for example,

twice as high in Rankin Inlet as in Repulse Bay. Rankin Inlet is also distinguished by the highest median age, the best educational achievement, and a large non Inuit population.

Education levels compare unfavorably to those in Nunavut as a whole. Kivalliq residents are less likely to have completed secondary or post-secondary education – 60% of the adult population has not completed high school. Variability between communities is high, and Rankin Inlet has the best performance. Detailed 2006 education statistics suggest that educational achievement is lowest in the younger age cohorts, those under 35, and that in this age group women are beginning to outperform men (Statcan does not report age disaggregated education data for the 2011 census). However, even more so than for Nunavut as a whole (see Figure 5.3-1), high school graduation rates are improving more recently – in 2012 Kivalliq had more than twice the high school graduates as compared to ten years earlier and the graduation rate had risen from less than 30% in 2002 to almost 50% in 2012. Nevertheless, there are still significant challenges in getting many children through high school, attributed to a multiplicity of causes, including, but not restricted to, overcrowded housing, teenage pregnancy, English language difficulties, a shortage of Inuit teachers and poor employment prospects.

Figure 5.3-1 High School Graduation Rates (%)

Source: StatscanNBS 2014b

Governments are increasingly reluctant to publish health data, particularly for small communities, largely on confidentiality grounds. The most recent disease incidence data are only available at the territorial level, as summarized in Section 5.1.3. Health staff in Kivalliq communities report facing the same challenges that are evident at the territorial level, with some variations.

The only community level data on perceptions of health, self-reported as part of census studies specific to aboriginal populations, are from 2006. The evidence then was that Kivalliq residents were less likely to see a doctor and but also less likely to have long term health conditions than people elsewhere in Nunavut. Despite what experts consider to be comparatively poor health status among Inuit, most people regarded their health status as good to excellent, although this may be less true more recently.

Nunavut has had some success in ensuring that education and health facilities are available in all communities. The depth of service suffers in many cases, as small populations do not create constant demand for more specialized services. Even a community as large, comparatively, as Baker Lake sees most types of health professionals, other than nurses and social workers, only on a visiting basis. This includes doctors, mental health workers and dentists. These visits are supplemented with video teleconferencing and a large percentage (20%) of the operating health budget is used to bring people to services, where local services are lacking (GNDoF, 2013 2014 Main estimates).

Cultural integrity is a very important component of individual and community wellbeing. The practice of traditional culture gives people identity and social roles, and protects more vulnerable people by providing food. It is very clear that livelihoods have changed enormously over the last 60 years. Only the oldest people in Kivalliq have experience of living as adults on the land. New technologies, including snow machines and outboard motors, are now used to harvest but have high costs, making wage labour more necessary.

Young adults remarked that they rarely hunt or fish, and are more interested in traditional activity contests rather than regular activity on the land (IQ WCYA 2009[34]). Female respondents stated that they preferred fishing to hunting (IQ RIYA 2009). Some residents have noted that reduced hunting activities are due to the high cost of hunting, time constraints, costs of snowmobile maintenance and

[34] Young adults said they rarely hunt or fish, and are more interested in traditional activity contests than regular activity on the land. They added that the problem is that they cannot afford the equipment to go hunting or fishing.

reduced interest (IQ CHW 2009; CHAH 2009; CHW 2009[35]). Snowmobiles only take a limited amount of people and if they are fully loaded, the gas costs are greater (IQ RBHT 2009; RBYA 2009[36]). Others attribute their lack of hunting to lack of snowmobiles (IQ RIYA 2009). Due to these reasons, young hunters have tended to hunt in groups, sharing the cost of gasoline or use of snowmobiles (IQ CIYA 2009). This has resulted in some Elders expressing concern that young people are not learning enough survival skills (IQ RIE 2009[37]).

Even when there are varying degrees of interest, some have expressed concern that hunting skills are not being passed down to the younger generation (CHAH 2009; CHE 2009: CHW 2009). *Project interviews conveyed that young people are turning towards technology with less interest in hunting. Additionally, young adults' working schedules are an obstacle to teaching their children how to hunt (IQ RBYW 2009; RBE 2009). Some have noted that once people have moved to Baker Lake, they did not go out on the land as much to teach their children traditional practices (IQ BL06 2008[38]).*

Traditional culture also provides guidance for people's social roles. Family and community ties are maintained through sharing of country food but also other sharing, of harvesting equipment and knowledge for example. Traditional celebrations demonstrate recognition and emotional support for people's achievements. Activity on the land keeps skills alive and reinforces Inuit values. Increasing contact with southern culture, with different values, and a perceived need on the part of many to work and learn within that culture, is forcing change. Some people may feel that their social obligations interfere with their goals for advancing in a new economic environment. People also speak about the misunderstandings between generations that has come with the introduction of southern people's values and material goods.

Traditional life also meant people had clear gender roles. These roles have begun to change. While it is typical for women to go out on the land with their husbands and remain in the hunting camp, others have learned to hunt caribou and small animals such as fox (IQ ARE 2009). Some women

[35] People don't hunt as much as they did in the past because of the high cost of hunting, time constraints, snowmobile maintenance, and reduced interest. No one in Coral Harbour has a full dog team. It is also easier to purchase food from the store.

[36] Constraints to hunting are time (members have jobs) and money. Fuel costs are the issue at present along with more expensive and complicated parts. Snowmobiles only take a couple of people and if they are really loaded up, the gas costs are greater. Predicting where animals are is important.

[37] Elders are concerned that young people are not learning enough survival skills, and are prone to spending too much time on the internet.

[38] One of the Elders suggested that the experience with the Meadowbank mine was that the mine did not affect the caribou, and that the young people will benefit from employment. The same person noted that once people moved into Baker Lake, they did not go out on the land much to teach their children traditional ways.

note that they would like to go hunting more often, but that they are busy looking after their children (IQ CIYA 2009[39]) – a task that still remains highly gendered.

High crime reduces community wellbeing. Kivalliq has lower crime rates than Nunavut as a whole (with the exception of Rankin Inlet whose crime rates are higher than the rates for Nunavut), but rates are still much higher than in Canada. Overall however Kivalliq's violent and non violent (i.e. property) crime rates appear to be increasing over the period 2004 to 2012, while Nunavut's may be stabilizing and Canada's have consistently fallen (Table 5.3-4). In Kivalliq, crime rates are lower in the smaller and/or more traditional communities as compared to Baker Lake and Rankin Inlet. With some exceptions (notably Arviat and Repulse Bay), violent crimes generally decreased in Kivalliq communities over the period 2004 to 2008, but they have subsequently increased. The increase in violent crime was particularly marked in Baker Lake (where violent crime doubled between 2008 and 2012), but each of Coral Harbour, Rankin Inlet and Repulse Bay, and Kivallliq overall, saw violent crime rates increase by about 30% to 40%.

[39] Women tend not to hunt during the coldest months (December and January). Other women said they would like to go hunting more often but are busy looking after their children.

Table 5.3-4 Violent and Non Violent Crime Rates

	Rate per 100,000 people			Change (%)		
	2004	2008	2012	2004 to 2012	2004 to 2008	2008 to 2012
Violent Crime Rate						
Arviat	2,961	5,073	5,424	83.2	71.4	6.9
Baker Lake	7,226	5,232	10,526	45.7	-27.6	101.2
Chesterfield Inlet	5,460	4,213	3,753	-31.3	-22.8	-10.9
Coral Harbour	7,801	5,476	7,727	-0.9	-29.8	41.1
Rankin Inlet	10,781	6,626	8,993	-16.6	-38.5	35.7
Repulse Bay	2,786	4,436	5,724	105.5	59.3	29.0
Whale Cove	6,799	7,254	8,665	27.4	6.7	19.5
Kivalliq	6,759	5,572	7,767	14.9	-17.6	39.4
Nunavut	9,999	9,733	10,004	0.1	-2.7	2.8
Canada	1,404	1,331	1,190	-15.2	-5.2	-10.6
Non Violent Crime Rate						
Arviat	6,447	6,186	7,329	13.7	-4.0	18.5
Baker Lake	8,800	5,933	16,742	90.3	-32.6	182.2
Chesterfield Inlet	2,874	5,899	5,630	95.9	105.3	-4.6
Coral Harbour	14,578	4,881	7,727	-47.0	-66.5	58.3
Rankin Inlet	19,432	18,101	19,946	2.6	-6.8	10.2
Repulse Bay	4,735	8,513	2,916	-38.4	79.8	-65.8
Whale Cove	3,399	6,218	2,810	-17.3	82.9	-54.8
Kivalliq	10,959	9,497	12,034	9.8	-13.3	26.7
Nunavut	16,668	15,762	16,580	-0.5	-5.4	5.2
Canada	5,123	4,249	3,414	-33.4	-17.1	-19.7

Source: NBS 2014d

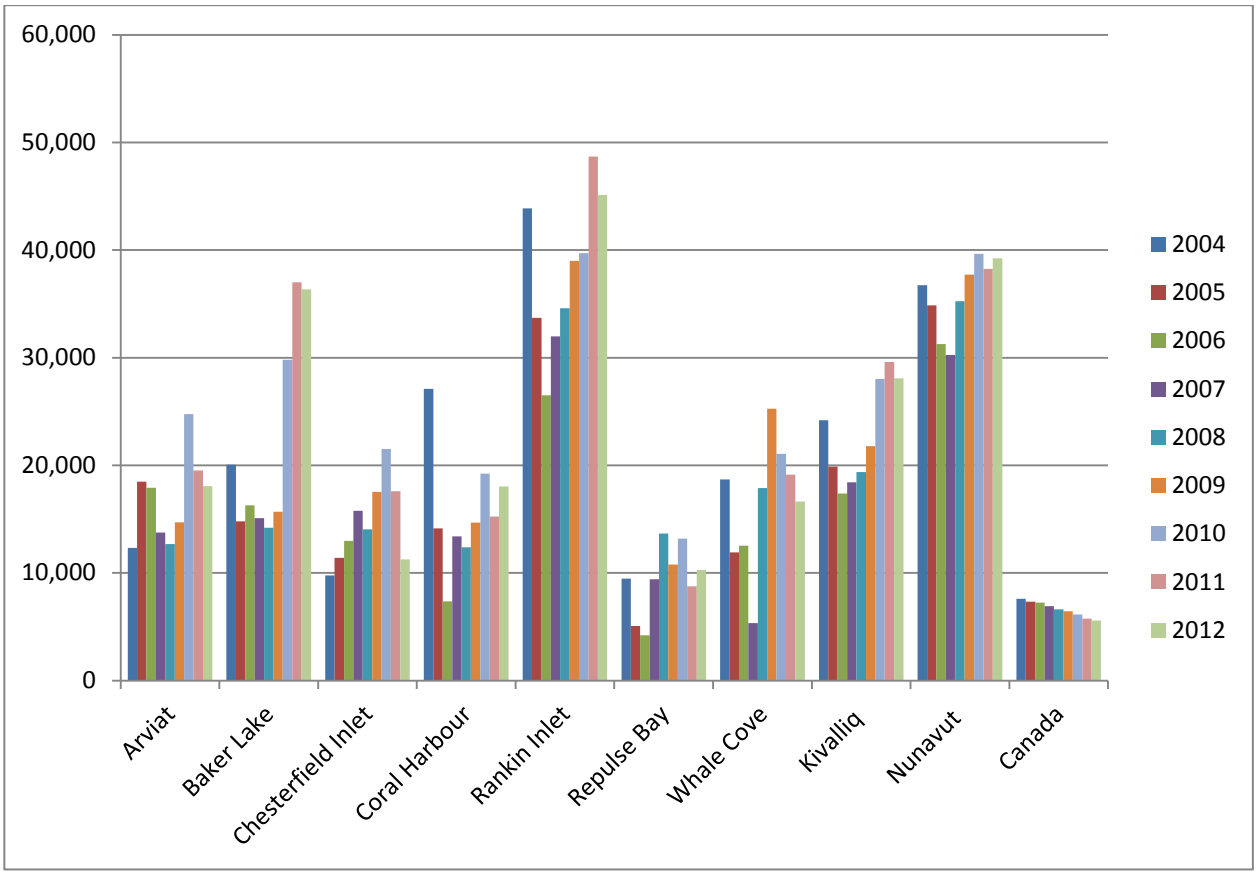
Note: The table includes only data from 2004 forward as before that year Whale Cove, Chesterfield Inlet, Repulse Bay and Whale Cove crimes were not reported separately.

Trends in non violent crime rates are not very similar. Overall, the decline over the period 2004 to 2008 was not as marked nor was the increase over the period 2008 to 2012. Non violent crimes again increased most in Baker Lake between 2008 and 2012. However, again with the exception of Baker Lake, there is little correspondence between violent and non violent crime rate trends in communities. In Repulse Bay for example violent crime has increased by 105% since 2004 while non violent crime has decreased by almost 40% while in Chesterfield Inlet, violent crime has decreased by over 30% while non violent crime has increased by almost 100%.

Figure 5.3-2 presents the data on total crime (which includes violent and non violent crime as well as other criminal code violations such as mischief, weapons charges and prostitution) on an annual

basis. In addition to the overall contrasts in the incidence of crime between Canada and Nunavut, and between Kivalliq communities, the table provides an indication of the variability in crime rates from year to year. Whereas it is straightforward to observe a change in crime rates from year to year, community level trends are less identifiable. Even in Baker Lake, which saw spikes in crime in both 2010 and 2011 saw a slightly lower total crime rate in 2012.

Figure 5.3-2 Total Crime Rates



In all Kivalliq communities, police point to alcohol abuse as the biggest contributor to violent crime. There are many explanations for increasing total crime. Poverty and substance abuse (including substance abuse made more possible by increasing disposable incomes) are important factors but it is also likely that cultural change is also part of the explanation.

GN provides most housing in Nunavut, either as social housing (about 60% of all housing) or as GN staff housing (about 10%). Social housing in particular is an ongoing challenge in Nunavut, and in fact is described as a crisis by the Nunavut Housing Corporation (NHC, 2013), particularly in Kivalliq. Although housing takes up almost one sixth of the GN's budget, waitlists for social housing are long

and expected to grow at least in the short term, about 40% of people in Kivalliq would move if they could and more than half of houses are overcrowded and/or in need of major repairs (NBS, 2011b).

Table 5.3-5 provides an indication of the recent housing challenge. NHC notes that the situations in Arviat, Repulse Bay and Whale Cove are most critical – each is amount the top five priority communities for housing in Nunavut (in addition to Iqaluit and Sanikiluaq).

Table 5.3-5 Social Housing

	No. of social housing units (2014)	Crowded and/or in need of major repair (2009, %)	Units with temporary residents (2009, %)	Waitlist (January 2014, no.)	Demand (2009, no.)	Proposed new units (2013 to 2014)		
						No.	Per cent of waitlist	Per cent of demand
Arviat	369	64	20	181	310	30	16.6	9.7
Baker Lake	389	53	24	99	220	30	30.3	13.6
Chesterfield Inlet	89	54	31	18	50	0	0.0	0.0
Coral Harbour	162	60	34	48	70	10	20.8	14.3
Rankin Inlet	310	46	37	92	220	20	21.7	9.1
Repulse Bay	145	76	31	66	100	20	30.3	20.0
Whale Cove	77	61	43	30	50	5	16.7	10.0
Kivalliq	1,541	56	30	534	1,030	115	21.5	11.2
Nunavut	5,124	49	32	1,552	3,580	210	13.5	5.9

Source: NHC, 2014; NBS, 2011b

Forecasting future social housing needs in Nunavut depends on assumptions made with regard to population growth, household size and the degree to which potential for developing a private housing market can be realized. Each of these in turn is affected by the full range of socio-economic parameters, from fertility rates, to age distribution of the population, to employment and incomes, to migration patterns, to business risk. Forecasting future social housing needs at a community level must include additional assumptions, for example on intra community migration – NHC (2012) has observed a trend of people in the smaller communities moving to larger ones.

NHC's housing strategy (2012) foresees the need to build about 100 social housing units per year over the next 25 years to both catch up with unmet demand and to meet the needs of a growing and aging population. Impact Economics (2013) foresees the need be about 175 social housing units per year over the next 20 years, under somewhat different assumptions.

For the eight year period 2006 to 2014, the federal government has provided a total of $400 million to Nunavut, an average of $50 million per year, and Nunavut has made available variable additional

capital amounts, generally in the order of $15 to $20 million. In principle, if such funding levels are continued, costs per housing unit are contained and (crucially) population growth rates decline to 1% from the greater than 2% average over the last eight years, social housing might largely meet needs by 2037 on NHC's projections. Thus, not in the near future, but potentially in the longer run, the poor housing conditions that are so detrimental to economic and social wellbeing may be alleviated for most people.

It is noted that the above does not consider costs of i) operations and maintenance, which currently account for more than 12% of the GN operations budget, will also grow rapidly as new units are built and as all housing stock ages; ii) of new infrastructure for new units; or iii) of changing housing needs of an aging population. To the extent that the need for social housing can be reduced (that is, to the extent there is a transition of some percentage of the population from social housing into private housing), the prospects are somewhat better.

Rankin Inlet is the Kivalliq hub, with scheduled air service to all other Kivalliq communities and to Iqaluit, Yellowknife, and points in southern Canada. Rankin Inlet is also a regional service centre, home to the KIA, Sakku Investment Corporation, various territorial government offices, a NAC campus and trade school, Kivalliq's only hospital, a chamber of commerce, two banks and a range of businesses.

All Kivalliq communities have schools to grade 12, health centres, police detachments, diesel generated power, docking facilities, recreational/community buildings, multiple churches and municipal services, including trucked water (only in Rankin Inlet is water piped) and sewage services. All communities have mail, phone, television, radio and internet services and there is a regional bilingual weekly newspaper. All communities have at least a Northern Store or a Coop, which sell groceries, clothing and a range of other consumer goods such as electronics, furniture and snow machines. Mental health, birthing, and elder and child care facilities are constrained in most communities and many people feel that more recreational facilities are badly needed, particularly for the young.

6 Socio-Economic Management

6.1 AREVA Corporate Standards

AREVA's corporate standards are aligned with those of its parent company, the AREVA group. The vision is that AREVA is committed to being a leader in uranium mining. For AREVA this means a long term commitment to sustainable development by balancing economic, social and environmental performance. The mission is that AREVA produces high quality uranium concentrate in an environmentally and socially responsible manner to help meet global energy needs. AREVA recognizes its obligations as a leading uranium mining company, commits to the sustainable development of its entity, and commits to all aspects of its business being managed in a safe, healthy, efficient, economical, socially and environmentally responsible manner (AREVA, 2011). Guiding AREVA documents are provided as Appendix 1C to Volume 1.

The vision, mission and commitments are reflected in AREVA's ten business principles, all of which – with the exception of customer satisfaction – have some relevance to socio-economic management:

- Governance: Carrying out responsible management of our activities in line with the Group's values, assessing and accurately reporting on our performance to our shareholders and all stakeholders.
- Continuous improvement: Implement a continuous improvement initiative based on practices shared throughout the AREVA group
- Economic performance: Ensure the group's longevity via long-term profitable growth
- Innovation: Developing and managing the most advanced technologies in order to anticipate our customers' needs and increasing our competitiveness by meeting requirements in terms of security, safety and environmental protection.
- Customer satisfaction: Being attentive to customer expectations, anticipating their needs, accompanying their development, and helping to measurably increase their satisfaction
- Commitment to employees: Increasing the professional satisfaction of our employees and monitoring the quality of their working conditions
- Risk management and prevention: Ensuring and managing the highest level of safety and security in all the group's activities in order to preserve staff health as well as that of local populations, in addition to protecting the environment.
- Environmental protection: Limit our environmental impacts by reducing our consumption of natural resources, controlling our releases and optimizing our waste management
- Dialogue and consensus building: Establishing relationships of trust with our stakeholders
- Community involvement: Taking part in the social and economic development of the places in which the AREVA operates.' (AREVA, 2011)

6.2 Approach to Socio-Economic Management

6.2.1 Objectives

The main objectives of AREVA's socio-economic management for the Project are to:

- mitigate the negative effects and enhance the benefits (creating value) of the Project for all Project affected people and other stakeholders;
- create opportunities for people in Kivalliq and Nunavut more generally to participate in the Project, thereby enhancing self-reliance, wellbeing and sustainability;
- establish a role for AREVA as an active participant in the sustainable development of communities in Kivalliq and of Nunavut more generally; and
- maintain goodwill and good relations with people and their governments.

6.2.2 Principles

The following principles guide development of socio-economic management measures and ongoing socio-economic management by AREVA, including support for economic and social development:

- Communities and people most likely to experience negative effects of the Project receive priority in the distribution of Project benefits.
- The implementation of effect mitigation and benefit enhancement measures is undertaken in partnership not only with affected people, but also with a range of organizations from government and civil society that are able to bring appropriate experience and knowledge to maximizing net socio-economic benefit while protecting the interests of more vulnerable subpopulations.
- Engagement (both consultation and participation) has been and will continue to be practiced throughout the Project life cycle to define people's priorities and to decide as necessary how effect mitigation and benefit enhancement measures will be adjusted, implemented and monitored (adaptive management).
- IQ is solicited, documented and integrated into the Project.
- Planning and implementation of effect mitigation and benefit enhancement measures take into account normal Project activities, such that synergies can be identified towards increasing the efficiency and effectiveness of socio-economic management. The strengthening of entrepreneurial skills towards developing capacity to supply the Project, and possibly other mines that might be developed nearby, is an example.
- Planning and implementation of effect mitigation and benefit enhancement measures is conducted in an environment of accountability and transparency. This implies public reporting on results of socio-economic management, as well as facilitating access to AREVA on the part of people and their governments in the event that unforeseen negative effects occur, or grievances develop.

- Sustainability criteria are incorporated in decisions on effect mitigation and benefit enhancement measures by considering:
    - demonstrated demand for the measure;
    - people's willingness to participate in the development and implementation of the measures that imply their participation;
    - people's culture, expectations, basic needs and vulnerabilities;
    - changes that will occur with closure such that measures do not depend on contributions by AREVA over the long term; and
    - consistency with government planning and programming.

6.2.3 Socio-Economic Management Components

For the Project, AREVA approaches socio-economic effect mitigation and benefit enhancement under six broad categories as follows:

- Project design choices made for particular Project components in order to reduce the potential for negative effect: Design choices for the Project are more fully described in Tier 3 Technical Appendix 2A, Alternatives Assessment.
- The implementation of good practice corporate policies and procedures that reduce the potential for negative effect and/or enhance the potential for benefit: This would include, for example, the application of traffic safety rules for drivers and workplace health and safety plans. Such good practice is characteristic of AREVA and is captured in corporate statements as well as in the environmental and socio-economic mitigation and benefit enhancement measures described throughout this EIS (e.g. Tier 3 Technical Appendix 2P Occupational Health and Safety Plan).
- The implementation of measures to address Project specific socio-economic effects that are well defined, are at least somewhat predictable in their significance and are susceptible to mitigation or enhancement by AREVA: This would include, for example, measures to prioritize Kivalliq's access to Project economic opportunities and to accommodate traditional culture in workforce management. Specific socio-economic effect mitigation and benefit enhancement measures are summarized in Section 6.3 below.[40]

[40] Fuller details on these measures are provided in Technical Appendix 3C, Community Involvement Plan and Technical Appendix 9C, Human Resources Development Plan.

- Ongoing information disclosure and engagement with people and their governments: Engagement, including the seeking out of IQ, throughout the construction, operations, final closure and post closure phases of the Project achieves multiple objectives, including contributing to the effectiveness of effect mitigation and benefit enhancement measures. The integration of engagement and IQ into socio-economic management is summarized in Section 6.4 below.[41]
- Monitoring: Monitoring contributes to demonstrating Project benefits and provides evidence of compliance with EIS undertakings. In addition, monitoring furthers the understanding of the effectiveness of effect mitigation and benefit enhancement measures and provides a mechanism to capture any unpredictable and/or evolving effects, such that socio-economic management can be adjusted. AREVA's monitoring includes significant participation in monitoring activity by communities in Kivalliq. Engagement is integral to monitoring. Monitoring is described in Section 6.5 below.
- The planning and implementation of activities in support of economic and social development: This is largely, but not exclusively, affected through the IIBA,[42] and addresses:
    - negative socio-economic effects that are difficult to completely mitigate, such as the potential effects of labour force competition on community service delivery and on businesses
    - negative socio-economic effects that are unpredictable in their significance and/or may evolve as the Project proceeds
    - socio-economic benefits that can be enhanced with some assistance directed at people such that they are better positioned to access Project and other economic opportunities over the longer term – the implementation of school based education programs is an example
    - regional economic and social development objectives

The current status of the IIBA negotiations is described in Section 6.6 below.

Finally, it is noted that the components of the socio-economic environment that the Project might be expected to affect are of interest and/or concern to governments and other organizations, which have innumerable policies, programs and projects in various stages of planning, implementation and

[41] Fuller details on these measures are provided in Technical Appendix 3C.

[42] AREVA has initiated IIBA discussions with the KIA and expects that parts of the IIBA may be available for disclosure at the time of the final hearing.

adjustment. Many of these will contribute to mitigating any negative Project effects and to enhancing Project benefits. This is briefly addressed in Section 6.7.

6.3 Mitigation and Benefit Enhancement Measures

Because socio-economic effects are so interrelated, and in some cases cascade, it is not practical to present measures specific to each effect identified in Sections 8 through 13, Assessments of Effects. As an illustration of the complexities:

- One measure can be expected to affect the outcome of a number of different effects. For example, preferential employment policies (to increase the numbers of Inuit working for the Project) can be expected to increase individual, community and territorial economic activity and incomes, but should also build capacity to participate in the wage based component of the economy over the longer term, provide resources for traditional activity, reduce demand for government services and contribute to overall community wellbeing.
- One effect can be expected to be affected by a number of different effect mitigation and benefit enhancement measures. For example, incomes can increase as a result of preferential employment, preferential contracting, training and other measures intended to enhance job performance, and over the longer term as a result of school based programs intended to keep children in school.

Effect mitigation and benefit enhancement measures are therefore discussed below by category of measure rather than by the effects they are expected to address.

6.3.1 Employment

AREVA's employment objective is preferential employment of people in Kivalliq communities, with the intent to see that Project benefits accrue not only to the Nunavut and Canadian economies, but also primarily to the people of Kivalliq. Such an objective implies that where people have little experience with the mining sector, Project specific initiatives will be required to address barriers to

employment. It is noted however that to operate effectively, efficiently and safely, AREVA's requirement, as a nuclear facility, is for a comparatively skilled workforce.[43]

It is important to segments of the population that wage employment not conflict with traditional activities and practices that are both economically and but also socially and culturally critical to livelihoods and individual, family and community wellbeing. There can be limits to people's preparedness for the challenges of rotational work. Under representation in a rotational workforce by women can be for lack of opportunity (due to family responsibilities or for other reasons) rather than lack of desire to participate. Cross cultural challenges can represent a disincentive to participation. Only a few jobs at the mine will require less than a completed high school education. There are therefore real barriers, and different ones for different people, to employment with the Project for some people in Kivalliq.

Initiatives that may be put in place to enhance employment through human resource policy and procedures are identified below. (Education and training initiatives to enhance employability are addressed in Section 6.3.3.)

- contributing to a regularly updated database of potential Kivalliq employees and preferentially hiring people from Kivalliq where qualifications and experience permit, during both construction and operations – a second priority may be people from the other regions of Nunavut – and sharing this database with contractors and other mining companies
- hiring qualified Inuit for employment on a preferential basis and including all seven Kivalliq communities as points of hire, having transport provided to and from the mine site, to enable Project employment without a need for people to move from home communities to access jobs
- providing to Kivalliq communities and the KIA full, timely and easily accessible information on workforce requirements, job descriptions, qualifications and performance criteria
- during construction, efforts to achieve and expectations for an annual Inuit employment of 10% or greater of the total workforce,[44] consistent with Project skill requirements, with job and training interests and performance, and with health and safety standards

[43] Nuclear facilities in Canada are held to high standards by the CNSC, including standards related to the education, training and safety performance of workforces.

[44] AREVA proposes modest Inuit participation rates for purposes of this DEIS as there are uncertainties about the labour market at construction and forward and this makes the assessment conservative, having the realized project likely to exceed expectations. It is noted however that 20% to 25% Inuit content has been characteristic of the construction phases of other large projects in Nunavut.

- during operations, efforts to achieve and expectations for an annual Inuit employment of 25% of the total workforce expected to grow with time to 50% or greater[45].
- reviewing educational and training requirements for certain Project positions and where appropriate conducting prior learning assessments, with a view to accepting experience in lieu of qualifications where this is acceptable within legal and regulatory frameworks for uranium mining
- enabling the use of Inuktitut at the Project site where health and safety standards permit – identifying whether there may be positions available to Inuit with limited English language skills
- designing recruitment methods, advertisements, and application procedures, in a manner that attempts to reduce artificial barriers, including language barriers
- providing informal counseling at the mine site through employment of an elder on site and/or identification and training of peer counselors, to assist workers to meet the challenges of the rotational work schedule and working conditions
- putting in place a culturally appropriate employee and family assistance program (EFAP) to address individual and family problems that threaten an individual's ability to continue working
- conducting exit interviews with a view to increasing the understanding of barriers to successful long term employment, and integrating the results into other initiatives as relevant
- providing cross cultural training to all long-term employees in order to facilitate the integration of Inuit employees into the workforce
- providing culturally appropriate services to workers, including recreational facilities, accommodation, country food storage, a worker site harvesting policy, English as a second language training, translation services(see Section 6.3.4)
- training on and enforcing policies related to personal firearm use, vehicle operation, controlled substances, alcohol and harassment, towards establishing a workforce which encourages health, safety, learning, retention and advancement of Inuit employees
- promoting a workplace where workers can express complaints or concerns, and bring to light conflicts such that grievances are addressed promptly
- maintaining a safe workplace for workers, including female workers who can face unique challenges. On a case by case basis, providing additional support to women applicants and employees to enhance the potential for employment success

[45] A Labour Force Analysis for the Kiggavik Project completed in September 2014 concluded 50% Inuit content is achievable assuming the Project turnover rates are not excessive, see attachment to this volume.

- regularly reviewing the results of such initiatives in order to identify barriers to employment for particularly women and challenged workers such that appropriate additional responses can be developed
- encourage long-term contractors to similarly prioritize and enhance Kivalliq labour and employ Inuit who are qualified for employment
- monitoring contractor performance for compliance with their commitments and using monitoring results in decisions on contract administration and management

6.3.2 Contracting

Similar to employment, AREVA's objective is to provide opportunities for businesses in Kivalliq to access opportunities to provide goods and services to the Project, again in the interest that Project benefits accrue not only to the larger national and regional economies, but also to the economy and people of Kivalliq. Such an objective implies that where local businesses have little experience with the mining sector, Project specific initiatives may be necessary to address barriers to successful bidding, awarding, and work completion of contracts.

Although there are now a growing number of exceptions, most businesses in Kivalliq, and particularly in the four smaller communities, are largely geared to meet the consumption needs of the resident population rather than the needs of large mining projects. There is thus limited experience with the management and logistics of procurement, including preparing offers of goods and/or services. Many businesses are small and do not have the breadth or the financial resources needed to bid on large contracts. They have limited experience with the exigencies of supplying large, time sensitive operations and limited experience with quality control.

It should be noted that it is not only AREVA's objective to provide opportunity but ultimately to facilitate the increased capacity and competitiveness of Inuit Firms both in the short and long term so they are able to compete and thrive beyond the Kiggavik Project. Initiatives that may be put in place to enhance opportunities for businesses to supply goods and services to the Project and create certainty and viability for both the Project and Inuit Firms are identified below.

- staffing a management position(s) devoted to business development in the region, responsibilities would focus on continual improvement in capacity, competitiveness, bid applications and other identified items

- contributing to a regularly updated database of potential Kivalliq suppliers[46] of goods and services that identifies businesses interested and with some capacity to supply the Project, noting Inuit content of the business, coordinates and contacts, goods and/or services on offer, updates on contract performance, requests for assistance to improve supply performance and any assistance extended in support – this database should be jointly owned and maintained by contractors, other mining companies, and others
- during construction, AREVA anticipates achieving 20% or more of total contracting awarded to Inuit Firms, consistent with Project goods and service requirements relative to the capacity to supply and with competitiveness and cost effectiveness considerations
- during operations, AREVA anticipates achieving 30% or more of the total contracting awarded to Inuit Firms – targets would be expected to grow with time[47]
- making publically available and providing to the KIA, business associations and the business community a list of contracts awarded in the previous year and those expected in the upcoming year so that procurement requirements are known and can be prepared for. (including for example, road construction and maintenance, accommodation, catering, janitorial services, trades work, materials handling and expediting, cross cultural and other training, light vehicle maintenance, warehousing, secretarial services, air services and/or environmental and socio-economic monitoring).
- AREVA anticipates hosting workshops to assist Inuit Firms in becoming familiar with AREVA's contracting policies and procedures to prepare them for bid.
- developing contracting procedures that take into account potential needs to break down procurement packages where practical to allow for smaller Inuit Firms to bid, or otherwise facilitate the participation of smaller businesses
- providing feedback to unsuccessful Inuit Firms with the intention to facilitate the Firm becoming increasingly capable and competitive.
- participating with the KIA and other interested parties in development and support for training programs for existing and potential entrepreneurs that will contribute to their success rates at offering goods and services to the Project and to the broader market
- identifying synergies between the Project and Kivalliq businesses and facilitating Inuit Firm growth to meet the demands of both

[46] 'Kivalliq suppliers' are expected to be defined in the IIBA as will a formula for calculating 'Inuit content'. Factors taken into account are expected to include i) location of head office; ii) degree of Inuit ownership and participation in business profits; iii) proportion of Inuit employees; iv) proportion of Inuit wages; and/or v) proportion of inputs from other Inuit firms.

[47] It is noted that in recent years, capacity of Inuit businesses to supply the mining sector has grown rapidly in response to Meadowbank and heavy exploration activity in Kivalliq. These percentages are based on NU experience at DEIS writing of what is achievable. As businesses continue to gain experience over the coming years, higher percentages are fully expected to be met. In 2012, AREVA spent over 45% of its total business with northern Saskatchewan businesses, 70% of which are owned by First Nations or Metis communities. Depending on service provided, some of these businesses have a local hire rate in excess of 75%.

- working with Kivalliq businesses as interest and opportunities warrant to facilitate forming of joint ventures with southern Canada businesses that have expertise in supplying the uranium mining industry
- including in the evaluation criteria for contractors the extent to which they commit to similarly prioritize use of Kivalliq businesses in meeting their contractual obligations and using this criterion in decisions on contract awards
- monitoring contractor performance for compliance with their commitments and using monitoring results in decisions on contract administration and management

6.3.3 Education and Training

AREVA wishes to enhance the potential on the part of people in Kivalliq to access employment and contracting opportunities created by the Project. Thus AREVA will provide Project related education and training programs. AREVA recognizes that low educational achievement contributes both to lack of economic opportunity generally and that social challenges can be linked with unemployment and poverty. While some believe the transmission of traditional knowledge to the younger generations remains accurate, there is overall concern, particularly among elders, that traditional knowledge is being lost to communities and youth.

The promotion of education and training is therefore intended to address not only Project requirements, but also to contribute to longer term participation in both the wage and traditional economies in the interests of sustainable development. Accordingly, AREVA will work with the KIA, education authorities, other mining sector companies, and other interested parties to develop and deliver multi-party training programs. Elements of the education and training strategy will build on the framework provided below:

- providing timely and accessible information to Kivalliq communities on Project related education and training opportunities
- providing and/or collaborating in the provision of pre-employment training to promising job candidates, in order to enhance the potential for success once employed, in such areas as work readiness, life skills and personal financial management
- commencing off-site education and training for Inuit at Nunavut educational institutions and at AREVA operations in Saskatchewan prior to start of production for trade and technical roles and for operational trainees. AREVA anticipates over 100 (approximately 120 total) trainees with the operational trainees potentially starting training up to four years prior to production. Possible employment categories for training include: heavy equipment operations, mill operations, apprenticeship and technician training, technology, radiation, environmental monitoring and computer and office skills
- providing orientation to AREVA operations, health and safety, English language and skills upgrading (core competency), supervision, leadership and management to enhance job performance, retention and advancement

- providing counseling as appropriate in areas such as career development, diversity and respectful behaviors, life skills, and personal financial management to support successful employment experience
- including in the job responsibilities of more senior staff the requirement to mentor more junior staff such that they may advance – training in how to coach and mentor will be provided where staff require this to meet succession planning objectives
- retraining selected construction workers for operations phase jobs and operations workers in new required skills (for example, for underground mining when this starts) to allow successful employees to continue their employment as work force needs shift
- supporting efforts on the part of employees to upgrade their education as a means towards job advancement – high school completion programs, with a qualified teacher, will be offered at the mine site is an example of such supportive efforts
- cooperating with appropriate agencies in Nunavut in entrepreneurial training programs for Inuit businesses – this training may address health and safety, business skills (finance and administration), quality control and legal/contracting issues
- cooperating with appropriate educational authorities and institutions in Nunavut in the development and implementation of high school and college courses with mining sector content
- providing summer employment programs and cooperative education opportunities at the mine site to provide job experience to youth
- working with other mining sector organizations in the region to enhance education and training strategies across the sector through sharing of best practice experience and resources
- providing and contributing to 'stay in school' initiatives that may include school based career counseling, stay in school workshops, mentoring and achievement awards – to encourage students to stay in school and to support them in this decision
- providing post-secondary scholarships – eligibility would include both high school students and Project workers
- participating with schools to contribute to youth programs intended to develop traditional skills, particularly those related to activity on the land, and to address the management of mixed economy livelihoods

6.3.4 Workforce Management

Workforce management measures are intended to ensure that Inuit employees are equitably compensated, safe and secure, and further that the workplace conditions will promote Inuit culture. Workforce management measures will include:

- staffing positions in Kivalliq communities with responsibilities to facilitate not only job applications and expressions of business interests, but also meeting workers' needs for assistance as they transition between home and work

- clearly communicating through information materials distributed by the Project and in advertisements for job openings through other media (i.e. radio and newspapers), the preferential employment policy, points of hire and terms of employment, as well as instructions to interested applicants on how to apply for jobs from their home communities to limit speculative in migration to Baker Lake
- establishing an accommodation camp at the mine site to house all workers while on rotation and providing return transportation to home communities
- providing a nurses station at the accommodation camp facilities which will meet workers' first response health needs while at site, including physical and mental health services, to limit use of Baker Lake or Rankin Inlet health facilities
- establishing fly in, fly out schedules that allow employees to travel from the mine site directly to their home communities, to minimize worker presence in Baker Lake or Rankin Inlet
- iteratively developing and implementing, in consultation with Inuit workers, human resource management policies and procedures that respond to particularly Inuit workforce challenges including for example absenteeism and unexpected resignations (and subsequent reapplications for employment)
- encouragement of appropriate and respectful behavior in communities by all employees when on work time and the establishment of a code of conduct prohibitions against illegal activity, harassment, verbal and physical abuse, negligence in driving company vehicles and other behaviors that may be identified by people in communities as offensive or problematical; and sanctions to be applied in the event of noncompliance
- cross cultural training of all long term employees to encourage mutual understanding and respect
- establishing worker harvesting policies that respect rights under the NLCA
- facilitating the use, as appropriate, of the Inuktitut language, including the translation of mining related terminology into Inuktitut such that people are able to discuss their experiences both in the workplace and at home in their own language
- payment of salaries commensurate with costs of living (taking into account changes to eligibility for assisted housing and other government benefits) and benefits packages that recognize social and cultural exigencies such as bereavement leave, support to wellbeing and imperatives to improve education
- accommodating Inuit diet preferences, through provision of storage and facilities for consumption of country foods
- providing sufficient communication services (e.g. telephone, internet and community radio) to meet the needs of employees to stay connected with their families and communities
- including in health and safety training programs a module to promote awareness of societal health issues (e.g. sexual and mental health issues, smoking, nutrition)
- policy prohibiting the use of controlled substances (i.e., drugs and alcohol) by employees while on shift

- including in the evaluation criteria for contractors the extent to which they commit to similarly manage their workforces, as relevant, in meeting their contractual obligations and using this criterion in decisions on contract awards
- monitoring of contractor performance for compliance with their commitments and using monitoring results in decisions on contract administration and management

6.3.5 Effects on Wellbeing

Negative effects on wellbeing can arise from many sources. They can be the result of the challenges of rotational work, individual choice on how additional income is spent, inequalities introduced between different segments of society, in migration, and/or changes in traditional values consequent on increased participation in the wage based component of the economy and on cross cultural contact.

None of these is directly within the control of AREVA to mitigate completely. It is however in AREVA's interests to provide support to individuals, families and communities in managing the potential for negative effects. It is also important to recall that the increased economic activity the Project represents is generally considered to be of overall benefit to wellbeing, particularly in a context of high unemployment and poverty that have in themselves significant negative effects on individual, family and community wellbeing.

Of particularly relevance to mitigating the potential for negative effects on wellbeing are:

- as part of the terms of employment, a confidential EFAP to address in a culturally sensitive and knowledgeable fashion work/life issues that can arise for an individual employee, including problems with drug and alcohol abuse, addictions including gambling, inappropriate sexual behaviours, personal financial management, adjustment to change and stress, and family relationships
- in the longer term, contribute to school based education and training initiatives for youth to enhance educational achievement and life skills in the context of participation in both the wage and land based components of the economy
- availability of elder or peer counselors and staff in communities with some competence to ease work/life balance challenges
- human resources policies and procedures that give value to IQ, including the principles of learning, sharing and cooperation, and enable traditional activities and practices
- support for community wellbeing initiatives as may be agreed in the IIBA to address community priorities towards enhanced wellbeing – substance abuse management, recreational programs for youth, and IQ retention may be examples.

6.3.6 Public Health and Safety

Worker and public health and safety risks will be managed first through the application of best health and safety practice. In addition, emergency response planning will ensure that in the event of a Project emergency, potential damages can be contained. There heightened perception of risk attributable to people's limited knowledge and experience with uranium mining. Risks related to the Project for the workforce and public are detailed in Tier 2 Volumes 8 and 10 and risk perception is addressed in Section 10.1.6 of this Volume and in Tier 3 Technical Appendix 3C Community Involvement Plan. Measures put in place to minimize risks to health and safety are detailed throughout this EIS, and include:

- comprehensive worker health and safety plans, training and enforcement (including human rights training for security staff) as detailed in Tier 3 Technical Appendix 2P, Occupational Health and Safety Plan
- comprehensive risk management and emergency response planning and training, including the provision of necessary emergency response facilities and/or equipment, and training in Baker Lake and Chesterfield Inlet as detailed in Tier 3 Technical Appendix 10C, Emergency Response Plan
- regular inspection and maintenance in good condition of i) vehicles; and ii) transportation infrastructure, including the access road, water crossings, signage, refuge stations, air strip and docking facilities as detailed in Tier 3 Technical Appendix 2M, Road Management Plan
- taking into account health and safety issues in conditions placed on potential public use of the Project access road, for example the setting of limits on speeds and on the use of firearms along and near the road
- driver training and enforcement of a driver code of conduct, to control speeds and encourage considerate driving
- ongoing communication in Baker Lake and Chesterfield Inlet of road and marine traffic schedules respectively, as well as engagement with Baker Lake residents, with regard to scheduling heavy vehicle traffic near the community to minimize risks and any potential disturbance effects
- securing all Project facilities with potential to pose public health and safety risks, including prevention of public access where necessary
- avoiding and minimizing any environmental effects that have potential to affect public health, including those that may negatively affect livelihood resources

- providing emergency assistance where the health or safety of people travelling on the land near Project facilities (mine site and access road) may be at risk
- continuing the mine visit program,[48] to provide opportunities for people to better understand uranium mining and measures put in place to protect environmental resources and worker and public health and safety. Considerations for risk perception in on-going community engagement is detailed in Tier 3 Technical Appendix 3C.
- delivering public information and education programs on Project environmental effects and risks, to contribute to people's i) understanding of uranium mining; and ii) emergency preparedness
- delivering public information and education programs, targeted to the appropriate audiences, to enable enhanced community participation in both environmental and socio-economic monitoring

6.3.7 Community Contributions

AREVA expects to continue to provide financial and in kind contributions, as has been done over the Project's development phase, to Kivalliq communities. The contributions have been made in response to community priorities, usually on the basis of requests by representative organizations. In the recent past, contributions have included the organizing of homeland visits for elders wishing to see the places they associate with past experience of living on the land and sponsorships for community events such as feasts, science fairs and sports events.

A review of requests to date indicates that community priorities for contributions include meeting the needs of elders, recreation facilities and events, keeping youth involved in traditional activities, and addressing pressing needs for child care. AREVA would expect to continue to respond to requests for contributions through the Project life cycle, including in partnerships with hamlet and regional organizations and institutions, potentially through the IIBA negotiated with the KIA, and in collaboration with other mining companies.

6.3.8 Compensation

In the course of Project development to date, including exploration at the mine site, there has not been evidence that any Project specific disturbances to wildlife have resulted in declines in traditional

[48] Currently visits are to uranium mines in Saskatchewan. As AREVA moves into operations, visits to the Project are expected.

harvesting. Given the results of the IQ studies and the environmental effect assessments in this EIS, future disturbances and loss requiring compensation outside of that negotiated with the KIA under Article 6 of the NLCA are not foreseen.

As is the case with any large project, there is some potential that a Project risk might be realized, with unforeseen consequences on traditional harvesting. The IIBA or a separate agreement with the KIA is expected meet obligations under Article 6 and include provisions for compensation for mortality of some large mammals. It is still possible however that an environmental risk could be realized with consequent effects on one or more individuals. In any such unlikely event, AREVA would ensure fair compensation to the affected individual(s), on the basis of an estimate of harm, including taking into consideration cultural loss. The compensation would of course depend on the determination of harm, but could imply a financial payment and/or an offset of some kind.

It is not expected that the Project will have any significant effects on commercial activity related to environmental resources. The Project mine site and access road proposed routes are not used for commercial harvesting or tourism, and are remote from areas, such as heritage rivers and parks, that are used with the exception of a potential access road crossing the Thelon (refer to Tier 3 Technical Appendices 2K, 2L, 2M for a discussion on road options and management and Technical Appendix 9A Attachment D for a discussion on the heritage values of the Thelon River). In the improbable event that effects on existing or expected commercial activity did occur, compensation would be negotiated with the affected individuals on the basis of demonstrable loss.

People are also concerned about compensation for any effects of the Project on human health. Standards for monitoring and protecting both worker and public health are very high for uranium mines and in the event of an unforeseen accident compensation is paid.

Any compensation provided by AREVA will be in accordance with the Nunavut Land Claims Agreement (NLCA). The NLCA addresses compensation in Article 6 Wildlife Compensation, Article 20 Inuit Water Rights Part 3: Compensation, Article 21 Entry and Access Part 8: Surface Rights Tribunal and potentially Article 26 Inuit Impact Benefit Agreements.

NLCA Article 6 Part 4 outlines the procedure for making a wildlife compensation claim. This Part includes submission of a claim to the tribunal (Article 21 part 8), should the claim not be settled by the claimant and company within 30 days, and what the tribunal can take into account and give weight to in hearing a claim. Further, NLCA 6.5.1 states that "Where an IIBA includes wildlife compensation provisions, that agreement shall preclude the need to address wildlife compensation under Articles 20 and 21."

Occupational exposure limits and environmental discharge and emission limits will be set to be protective of human and environmental health. Occupational injury or disease will be processed through the Workers Safety and Compensation Commission according to the *Workers*

Compensation Act. AREVA will investigate claims of injury or ill health to members of the public to determine the likelihood that harm could be due to site activities. Claims of impacts on human health would need to be assessed on a case by case basis, including whether or not compensation would be payable in each circumstance. Existing dispute resolution mechanisms would be followed to ensure fair resolution of any claims made. AREVA's insurers may be involved in the process.

6.3.9 Closure

The socio-economic effects of final closure are most keenly felt in the coming to an end of employment and contracting opportunities created over, in this case, a period expected to be at least 18 years, and the consequent negative social effects of an economic downturn. The challenge is to ensure that in the process of enhancing access to economic opportunities during the Project's life, consideration is always given to eventual final closure. AREVA's intent is to have, by Project final closure, increased the capacity of Kivalliq labour and business to engage in economic activity that is independent of the Project.

The measures described above for employment, contracting and education and training include a number of elements that are intended to realize this intent. In addition, the overall objective of many of the effect mitigation and benefit enhancement measures described above is to contribute to sustainable development over the longer term. Although the final closure of the Project will inevitably cause dislocation, to the extent that the following are successful this dislocation should be attenuated.

Employment: Preferential employment, training and culturally sensitive employment practices contribute to job performance, satisfaction, retention and advancement for people in Kivalliq. These, and the inclusion of preferential employment as a criterion for evaluation of bids from contractors, will build capacity to participate in the wage based component of the economy. These measures will provide the work experience that will give people a competitive edge in competing for jobs elsewhere in the economy.

Education and training: Programs that emphasize not only preparation of adults for work for the Project, but that encourage the young to value education with a view to either AREVA employment or other participation in the wage based component of the economy has implications for long term employability. But in addition, the expectation is that such programs can provide motivation to higher education in areas such as health, education, public security and business administration. The potential for gradual replacement of non Inuit (frequently rotated out) education, health and other service delivery personnel with qualified Inuit not only increases Inuit employment opportunities but strengthens community resilience to the dislocations that can occur with closure.

Contracting: Preferential contracting, assistance with the development of business expertise and including the use of Kivalliq businesses as a criterion for evaluation of bids from the Project`s supplying businesses, will build experience and capacity.

Information sharing: contributing to regional initiatives like an employment database and business inventory with AREVA's shared information with both contractors and other mining companies in Kivalliq provides a wider market for employees and supplying businesses, both during and after the Project.

Support to traditional culture: The inclusion in employment and education and training programs of consideration and support for individual to combine formal wage employment with traditional activity and practices contributes to resilience in face of economic dislocation.

IIBA and community contributions: The IIBA will be negotiated according to priority needs in Kivalliq, incorporation of sustainability principles, and the vision of both the KIA and AREVA in realizing a mutually beneficial and sustainable project for the region. Implementation of the IIBA will contribute to economic growth but also to the social and cultural wellbeing that underlies the ability of people to create and take up life opportunities. AREVA's ongoing community contributions, although modest, will have a similar effect.

In addition, AREVA will undertake a socio-economic impact assessment as final closure approaches, to detail specific measures that may mitigate, at least to some extent, the potential for negative effects. Such measures, depending on assessment conclusions, could include:

- providing employee retrenchment programs, including out placement services and counseling
- for workers to be retrenched, during the last years of operations providing voluntary after hours alternative livelihood training programs
- managing any environmental effects of closure to protect the environmental resources that people use for livelihoods, including reclamation of land as practical to accommodate expected land use after final closure (refer to Tier 3 Technical Appendix 2R for the Preliminary Decommissioning Plan)
- securing the Project site in the interests of public health and safety, and advertising these security arrangements widely, to protect people from health effects that might be caused by access to closed facilities and/or land and water that may still be exhibiting environmental effects (refer to Tier 3 Technical Appendix 2R for the Preliminary Decommissioning Plan)
- potentially turning over Project physical infrastructure, such as buildings, accommodation camp, air strip, docking facilities and/or, if built, the all-season access road, where interest warrants and agreement can be reached on terms of handover – it is noted that for purposes of this EIS, AREVA's undertaking is to remove all physical infrastructure.

There is also a possibility for temporary closure and/or premature final closure, which would occur if for any reason the Project became uneconomic and was expected to remain so over an extended period. Such closures by their natures are unplanned and therefore have more potential for negative effects. Should closure happen early in the Project's life cycle, many of the expected benefits to the capacity of labour, businesses and communities to adjust may not have fully developed, and closure mitigation measures will not have been well detailed. AREVA would intend to work with communities and government to agree on appropriate measures, including schedules, to ensure that effects of any premature closure are managed as well as possible.

The actual effects of a closure are highly dependent on (necessarily unpredictable) timing relative to other economic activity in Nunavut (equally unpredictable beyond the interim until the Project begins construction). At the extremes, early temporary closure at a time when no other large construction and/or mining activity is underway in Nunavut to provide alternative employment and business opportunities to newly experienced mine workers and suppliers could be expected to have the most negative effects; whereas temporary closure at a later date could be expected to have few negative effects if there were multiple mines in construction and/or operations in need of workers and supplies, and by which time mine workers and suppliers would have benefited over time from their experience and training with AREVA. All scenarios in between these two extremes are also possible. The unplanned nature of such closure implies that there is both i) potential for more negative impact than for planned closure and ii) potential for undercutting the momentum of benefits that accrue with time (such as capacity building).

Premature closure impacts are highly dependent on (at least) i) timing of the decision to close relative to the time of premature closure; ii) length of closure if temporary; iii) economic alternatives available to workers and businesses; iv) economic and social development in Kivalliq in the interim to premature closure (resilience); and v) decisions made by workers in the interim to premature closure, such as decisions to purchase housing or move to a different community.

The fundamental difference between closure and premature closure is one of preparedness and available alternatives. Expected effects and the range of possible mitigation measures are essentially the same for both. Effects can be expected in principle to differ in severity both because i) there may be less time to develop appropriate mitigation; and ii) effects are so dependent on the economic and social environment at the time they occur. As an extreme example, if premature closure occurred at a time of high mining sector activity as compared to closure (in 2035) at a time of little mining sector activity, premature closure could have the fewer negative effects.

It is noted that the socio-economic effects of closure will to a large extent depend on whether or not there are economic alternatives available at the time of closure, to replace the Project. This in turn is expected to largely depend on progress in developing the mining sector in Kivalliq, and Nunavut more generally.

6.4 Role of Engagement and IQ

Engagement and IQ are integral to socio-economic management implementation, monitoring and adjustment. AREVA's Community Involvement Plan has been conceived to provide people with the mechanisms they need to provide input, including IQ, such that the Project is better able to inform its decision making where decisions have potential to affect people. There are also expectations on the part of affected communities for participation in processes to monitor Project effects and to monitor AREVA's compliance with conditions under which the Project may be approved.

Information disclosure provides the information people need to engage and participate in the Project from an informed position. There is clear interest on the part of Kivalliq people for more information on the Project, its potential effects, and proposed socio-economic management measures.

The full details of AREVA's engagement are provided in Tier 3 Technical Appendix 3C, Community Involvement Plan. The parts of the plan related to engagement are summarized below. It is noted that AREVA fully acknowledges the importance to conduct meetings and provide information not only in English but also in Inuktitut, such that the input and IQ of Inuktitut speakers can be captured and used to better manage socio-economic (and environmental) effects. AREVA's engagement undertakings include:

- continuing to resource and staff the Project office in Baker Lake, to provide a place where people can easily go to ask questions, express concerns, get information on the Project, lodge grievances and/or attend meetings with Project staff
- funding and managing staff members in Kivalliq communities with responsibilities to offer similar services to people
- holding formal public meetings (open houses) at the community level at regular intervals, and at additional times as may be requested or required – such meetings will focus on updates of information on the Project's progress; discussion of the current understanding of Project effects, risks, and (environmental and) socio-economic management measures in response; and upcoming opportunities for participation in the Project
- holding meetings with:
    - the Community Liaison Committee in Baker Lake and the Regional Liaison Committee, to discuss and resolve issues of concern as these arise
    - communities and governments to develop and implement activities in support of socio-economic management measures, including for example education and training initiatives and community contributions
    - sub groups, for example with businessmen, elders and women, to discuss and resolve issues or advance opportunities that may not be of general interest
- maintaining and monitoring the content of Project websites that provide and avenue for input by any stakeholder, including the Project or company Blog, Facebook, and Twitter accounts

- cooperating as warranted with territorial, regional and hamlet authorities in meeting economic and social development goals
- distributing periodic information with appropriate content and through appropriate media on Project progress and events of interest, including current information on Project activities, effects and risks, (environmental and) socio-economic management plans, economic opportunities and community contributions
- clearly notifying in all Project information media of names and coordinates of staff with responsibility for community relations
- fostering a workplace environment with positive morale and that facilitates worker input without fear of misunderstanding or retribution
- including engagement, participation and public reporting of results in (environmental and) socio-economic monitoring programs
- implementing a guided mine visit program, including site visits for family members of Project workers
- providing cross cultural training to management and supervisory staff including communication with Inuit employees and people in communities and communication with non-Inuit employees, as well as on engagement and on the grievance mechanism (see below)
- maintaining an engagement database with the results of all the above events, including any issues raised and undertakings to resolve these issues
- regular internally reporting and by exception as necessary on the results of the engagement activities such that these results can be used as input into Project decision making
- implementing a grievance and dispute resolution mechanism, to manage any instances over the life of the Project where people feel they have, and may indeed have, grounds for complaint – this mechanism (presented in Tier 3 Technical Appendix 3C Community Involvement Plan) will include:
    - a simple and accessible process to lodge a grievance, either verbally or in writing
    - clarity on roles relative to addressing the grievance for each of the person lodging the grievance, hamlet governments, the KIA and AREVA
    - the time frame within which a response to the grievance is provided
    - an appeal process, through mediation or arbitration, that defines time frames and roles for instances where a grievance escalates into a dispute because the response is not deemed satisfactory – by the person/group lodging the grievance, government representatives, or AREVA
    - a system to record all grievances, disputes and their resolution
    - a formula on how the costs of grievance resolution are to be shared
    - means to ensure feedback for action to relevant AREVA and/or contractor staff where systematic grievances are being observed.

6.5 Monitoring

AREVA's community relations and other management staff would normally informally monitor the day to day implementation of socio-economic mitigation and enhancement measures in the course of management and administration of their relationships with Project workers, and with people in communities and their representatives. Meetings in communities with representatives of elders, youth, women, business, hamlet governments and others, are vehicles for discussion of Project related issues. Project staff resources in the seven communities also provide means for people to raise issues on a regular basis. Facilitating access of workers and people across Kivalliq to AREVA allows the identification of concerns as these evolve. There is also however a requirement for formal monitoring, and for reporting on monitoring results.

6.5.1 Objectives and Principles

6.5.1.1 Objectives

The imperative of the Project to deliver concrete economic benefits suggests that a priority for monitoring activity be the measurement of those benefits. In addition however, monitoring is necessary to establish trends in community wellbeing, such that problems, that may be related to the Project or that the Project can effectively address, can be identified.

The overall objectives of socio-economic monitoring are thus to:

- record the uptake of employment, education and training and contracting opportunities over time and analyze the trends in this uptake in relation to expected outcomes
- determine the effectiveness of socio-economic effect mitigation and benefit enhancement measures, including for example employee and family assistance programs and measures to accommodate traditional culture in the work place
- participate with people in communities and governments to evaluate the trends in economic and social development and wellbeing in Kivalliq, as well as the relationship between these and the Project

- assess the accuracy of the assessment predictions and mitigation to inform adaptive management, demonstrate compliance with those Project socio-economic management commitments that are related to ecosystemic impacts[49]

It is noted that monitoring does not solely consist of the identification of indicators and the collection of data on these indicators. It is more importantly the analysis of data collected in relation to the objectives of socio-economic management, the realities of Project implementation and the socio-economic dynamic in affected communities. Further, monitoring is only valuable insofar as it is comprehensively reported and the results used to adjust socio-economic management measures.

6.5.1.2 Principles

AREVA's principles for its monitoring are:

- Relevance: AREVA's monitoring responsibilities are limited to the monitoring necessary to establish the degree to which the Project i) is achieving its objectives in terms of benefits to Kivalliq communities; ii) may be having negative effects on individual and/or community wellbeing; and iii) is meeting company standards for performance and its EIS expectations.
- Cost-effectiveness and efficiency: There are many data that are already collected within communities by various levels of government. It is important to identify indicators that are pertinent to monitoring objectives, and that affected people themselves identify indicators. However, to the extent possible selection of such indicators should be made from data already being collected. This is in the interests of cost effectiveness and efficiency, but also of data comparability across both space and time, which facilitates data interpretation and analysis.
- Confidentiality and transparency: Much socio-economic data, individual but also community level data in small communities, needs to be treated as confidential, as of course does any analysis of that data. However, confidentiality cannot be extended to those who need the data and analysis to make decisions, adjust mitigation and benefit enhancement measures, or commit resources. There is a requirement for transparency among parties to a monitoring program such that the monitoring results can be used

[49] NLCA Sections 12.2.2 (d), 12.2.3, *Nunavut Planning and Project Assessment Act* Section 24

effectively and within the limits of confidentiality there is a requirement for transparency with regard to making monitoring results available to communities.

- Participation of affected people: AREVA recognizes that effective monitoring, with few exceptions more related to compliance than to socio-economic Project effects, is only possible with the participation of affected people.
- Synergies with other monitoring initiatives: AREVA sees potential significant overlap between obligations for reporting under the EIS, the IIBA, and expected output of its participation in the Kivalliq`s Socio-Economic Monitoring Committee (SEMC) and eventually the Nunavut General Monitoring Plan (NGMP). For many reasons, including efficiency and clarity and comparability of results, AREVA would wish to ensure no duplication of effort. This in turn implies cooperation between the various parties to these monitoring initiatives (see Section 6.5.2 below).

6.5.2 Socio-economic Monitoring Context

The last bullet above refers to other monitoring initiatives. Nunavut is a society in transition and has important economic and social challenges that need to be managed in a context of rapid change. A major force of change is expansion of the mining sector. The relationships between construction and operations of large mines and community economic and social development and cultural change remain not fully understood in Nunavut or elsewhere in northern Canada (see Section 7, Comparable Experiences).

Multiple governing agencies, with various responsibilities for economic and social development and for culture in Nunavut, have responsibilities to participate in the monitoring of community wellbeing generally, including with reference to the effects of mining and to the effects of the Project specifically:

- Currently a primary mechanism for meeting these responsibilities is joint participation of government and industry on each of three regional SEMCs, including the Kivalliq SEMC. SEMCs are led by GN, as the level of government with primary responsibility for socio-economic monitoring. The Kivalliq SEMC also has representatives from hamlets (mayors), KIA, GN departments and other agencies, NIRB, Aboriginal Affairs and Northern Development Canada (AANDC) and industry – currently Agnico Eagle and AREVA regularly attend. The SEMC monitors and reports on industry's performance regarding employment, contracting and other contributions to Kivalliq communities, as well as on regional socio-economic conditions as these evolve.

  The work of the Kivalliq SEMC is somewhat challenged, including by limited data availability. Industry representatives are able to report current data on economic opportunities offered by their projects however regional and community level data of most interest to understanding

socio-economic change, and changes that might be specific to mining effects, are generally available with a minimum of a two year lag, or are unavailable.

- Under the NLCA, there is a requirement for government, in cooperation with the Nunavut Planning Commission (NPC), to develop and implement a general plan for the monitoring of the 'long term state and health of the ecosystemic and socio-economic environment' in Nunavut (NLCA, Article 12.7.6). Accordingly, NPC, NTI, AANDC and GN are working on the development of NGMP. They are currently consulting on the plan, on VECs and VSECs to be monitored, and on the indicators to be used for monitoring, and are developing data information management systems for NGMP implementation. The NGMP is expected to support decision making through the provision of credible data. An eventual interface with SEMC monitoring is expected and the NGMP could go some way towards providing the data SEMCs need to better monitor regional socio-economic trends.

- With the negotiation and signature of an IIBA with the KIA, it is expected that AREVA will be required to provide monitoring reports to the KIA. It is also expected that the terms of the IIBA will include significant overlap with EIS socio-economic management commitments. As noted above, KIA participates in the Kivalliq SEMC.

- NIRB has monitoring responsibilities related to the implementation of approval conditions for the Project, including socio-economic management commitments.

In the event that AREVA concludes a Development Partnership Agreement with GN, there will also be reporting requirements specific to the terms of that agreement. Thus there are four, and may be five, different monitoring mechanisms that AREVA either directly, or by association, will participate in.

In this context, broadly speaking, AREVA's social monitoring plan is conceived as having two components: i) operations monitoring, to report on AREVA's internal information management system data on socio-economic management inputs and outputs; and ii) collaborative monitoring, that is participation in governments' initiatives towards monitoring of socio-economic conditions, trends and outcomes in Kivalliq communities. Operations monitoring data are of primary interest to the Kivalliq SEMC, KIA and NIRB. Collaborative monitoring data are of interest to all parties to socio-economic monitoring in Nunavut. These two types of monitoring are described in Sections 6.5.5 and 6.5.6 respectively.

6.5.3 Monitoring Issues

While it is expected that the Project will result in substantial benefits to people over its life cycle, some negative effects can be expected as well. Most of these negative effects are unpredictable in their scope – how significant they will prove to be and how many people and who exactly may be affected. In some cases there are no clear means to mitigate some of these potential negative

effects, without understanding what they actually turn out to be in detail. Uncertainty about effect outcomes means monitoring is critical to adaptive management.

However, at least in a preliminary fashion, issues that may need monitoring can be identified on the basis of concerns people and governments have about the relationship between the Project and community economic and social development and culture. Taking into consideration engagement results; community priorities for monitoring as made evident in the deliberations, for example, of the Kivalliq SEMC and work toward the NGMP; experience to date of Meadowbank`s effects; and the conclusions presented in Sections 8 to 12 below on residual Project effects on Kivalliq communities, the following issues have been preliminarily identified as of potential interest to AREVA's socio-economic monitoring for the Project. It is noted that this list is not necessarily totally coincident with priorities for the Kivalliq SEMC and NGMP, whose responsibilities for monitoring are broader than those of AREVA can be expected to be.

- uptake of Project employment, contracting and training opportunities
- personal job satisfaction and lifestyle adjustments of AREVA employees
- effectiveness of education and training initiatives, both work force training and the broader education and training initiatives
- labour markets in communities
- in and out migration levels, and consequent effects
- use of Inuktitut and traditional practices, values and knowledge
- physical and mental health
- poor personal choices with regard to use of increased income, and consequent outcomes on components of community wellbeing, including, but not limited to, the use of controlled substances
- pressures on physical and social infrastructure, specifically housing and policing.

6.5.4 Community Level Data Availability and Analysis

AREVA's information management system will provide data on Project inputs and outputs related to socio-economic management. Such information includes data that may be of some use to understanding some community level effects. For example, AREVA will have data on worker residence and can therefore track migration at least of Project workers between communities. Rates of use of on-site elder and peer counselors and of EFAP can provide a measure of job satisfaction and lifestyle adjustment challenges. Additional data are however needed, most appropriately collected through collaborative monitoring.

The baseline study has collected some data against which to measure community trends in such areas as population, educational achievement, average household size, participation and employment rates and average income. These data are periodically publicly reported by government, on the basis of household surveys or other sources of information, and are thus are fairly

straightforward to collect over time. Canadian census data are useful because of completeness however the data are only collected every five years and there is up to a two year lag in release after collection. Statistics Canada also provides data to the GNBS that is culled from tax files. These data are less complete and not always presented at a community level, but are available on an annual basis, with a one to two year lag.

In addition, education, health, social assistance and police services keep detailed data on their operations. Most of these data are not public on confidentiality grounds, but could be used to derive rates of teenage pregnancy, attempted and actual suicides, domestic violence, mental health breakdown and various types of crime as examples. Such data are often more pertinent to monitoring wellbeing indicators than the census or tax file data are. These data, in an appropriately aggregated form to respect confidentiality concerns (in some cases only at a regional level), could in principle be provided by the agencies collecting them.

Monitoring perceptions, through ongoing engagement with affected people, is also important. The extent of sharing and cooperation, the degree to which the Project workplace accommodates traditional culture, the levels of disturbance as a result of increased traffic and the legal but disruptive behaviour of out of area workforces for example of effects that are subjectively experienced. AREVA's ongoing engagement with its workers and people in communities can provide some such information, and it may be that additional purpose or issue specific engagement (through focus groups for example) could be organized.

As is evident in the NWT (see Section 7, Comparable Experiences) understanding the effects of mining, or a particular mining project, as opposed to changes in socio-economic indicators caused by other events or combinations of events, is challenging. It may be considered that collecting data from mining workers, as opposed to from a community`s population in general, could contribute to a better understanding of the effects of mining specifically. There may be an option, to be developed in consultation between the Project, its workers, various agencies responsible for monitoring, and perhaps additionally Agnico Eagle, to collect data that would enable the disaggregation of socio-economic indicators for workers from those for an entire community population.

It is acknowledge that some types of investigations that may be necessary to unravel Project effects from overall economic, social and cultural change can be particularly invasive. To understand the drivers of an unforeseen rise, for example, in teenage pregnancy requires more than evidence of coincidence of the observed rise and the mobilization of a Project. Monitoring data would need to extend to an understanding of under what circumstances the pregnancies occur to adjust socio-economic management measures in response.

Finally, although not always a data source on Kivalliq communities, monitoring and analysis of the effects of resource development projects on communities across the north is ongoing, by

governments, academics and resource extraction companies. Insights from such studies can inform the interpretation of data collected as described above.

As data from the above data collection events become available, there will be a requirement to interpret any resulting evidence of socio-economic trends in Kivalliq communities and their relation to the Project. Such interpretation is needed if the monitoring results are to be effectively used in adjusting socio-economic management on AREVA`s part. It is also noted that the analysis would also be useful to governments in planning and decision making.

6.5.5 Operations Monitoring

This is the collection, analysis and reporting of internal AREVA information related to, for example, uptake of Project employment, contracting and training opportunities, health and safety performance, engagement activity, grievances, and contributions to communities. AREVA's own records on its operations thus can provide much monitoring data on undertakings described in this EIS. In this regard, AREVA undertakes to:

- maintain full human resource records in a from that permits an annual roll-up of selection, employment, promotion, training and exit statistics on the workforce by ethnicity, residence, gender and level as a percentage of the total workforce
- maintain procurement records in a form that permits an annual roll-up of the number, value and general content of contracts for goods and services by supplier location and Inuit content, as a percentage of total procurement
- require of all contractors annual reporting on employment and procurement that provides the same information
- maintain health and safety, accident and incident, breach of worker codes of conduct and any other relevant records pertaining to events that occur in direct relation to Project activity
- flag any anomalous results of traffic, air quality, noise, water flow and quality and biological monitoring programs, in order to permit an assessment of potential for social effects
- maintain records on all public education and training events (for example, public emergency response training), including the content of and participation rates in events
- maintain records on other social effect mitigation and benefit enhancement measures and on AREVA's contributions to communities, identifying as relevant objectives, organizations in receipt of support, implementation details and number of beneficiaries
- maintain records on all engagement events with the public, government, partner organizations, the Project workforce and contractors, noting attendance, issues raised and resolutions
- maintain records on Project commitments to stakeholders and on grievances and their resolution

- maintain records of all information disclosure materials distributed by the Project
- at least on an annual basis undertake a formal review of the results of the above to determine the degree of compliance with EIS related undertakings, and to identify (and address) any specific obstacles or problem areas and any systematic successes or failures.

The above monitoring will be managed and administered solely by AREVA, insofar as it consists of the reporting of internal management information, maintained in a database that can be easily accessed for reporting purposes. AREVA will communicate the results internally to management, its workforce and its contractors as appropriate, such that the information can be used to adjust policies, procedures, and socio-economic management measures where adjustments are identified to be necessary. The results will also be annually reported in appropriate forms and discussed with communities, the Kivalliq SEMC, KIA, and NIRB, with a view to maintaining an environment of transparency and accountability, and to building confidence in AREVA's economic and social performance relative to commitments.

6.5.6 Collaborative Monitoring

Collaborative monitoring for adaptive management is intended to capture trends in local economic and social development and culture, as well as the relationship between these and the Project, such that any evolving negative social effects can be managed and any positive benefits can be learned from and enhanced. Further, irrespective of directly attributable cause and effect, it is in the interests of AREVA to understand socio-economic trends such that where the Project is able to intervene effectively, it has the information to do so. AREVA has a long term interest in healthy communities. Finally, putting in place a monitoring framework that attempts to understand cause and effect is important to both AREVA and Kivalliq, towards maintaining a constructive relationship between communities and the Project.

AREVA would intend to collaborate with communities, KIA, GN and AANDC to develop a framework for collaborative monitoring, primarily through participation with the Kivalliq SEMC. The details of this framework will be negotiated as part of the EIS process (and the IIBA), and will likely evolve over time as the relative capacities, interests, activities and responsibilities of the Kivalliq SEMC and the NGMP are further developed over the interim to construction. The rest of this section thus provides AREVA`s early thinking on its role in this collaborative monitoring and on indicators that might be considered as relevant to a better understanding of Project effects on economic and social development and culture in Kivalliq.

6.5.6.1 AREVA's Role in Collaborative Monitoring

AREVA sees it role, through participation with the Kivalliq SEMC, as:

- contributing to government monitoring processes any relevant information collected by AREVA on its day to day operations, as described in Section 6.5.5, Operations Monitoring – this reporting will include some analysis of results relative to socio-economic management desired outcomes, for example on reasons for worker terminations and barriers to worker advancement
- developing, in collaboration with the Kivalliq SEMC and other parties, a detailed monitoring plan which defines issues, appropriate indicators, methodologies for data collection and analysis, roles and responsibilities, schedules and budgets – care needs to be taken to ensure that this monitoring plan fulfills the objectives of Kivalliq SEMC monitoring, but also is as consistent and complementary as possible with monitoring requirements of the IIBA, NIRB and NGMP
- providing financial[50] and technical support to the SEMC as may be agreed, including potentially through the funding of work of technical resources to assist in the development and the implementation of parts of the detailed monitoring plan and to develop capacity within the Kivalliq SEMC
- discussing with participants in collaborative monitoring, as well as with Project workers to the extent they are implicated, options for the collection and reporting of additional data, for example on Project workers and their families, that may contribute to a better understanding of Project effects on communities
- collaborating with Agnico Eagle (or other mining related companies that may in future be implicated in socio-economic monitoring) towards some consistency in approaches for any data collection on mining sector workers, as agreed as useful in the detailed monitoring plan
- respecting confidentiality concerns of both workers and other participants in collaborative monitoring, which could extend to maintaining an arm`s length distance from data collection, analysis and reporting

As noted above, there are currently limits on the availability and usefulness of data for purposes of monitoring socio-economic effects of the Project specifically. Some of these data gaps may be addressed with time as the NGMP is rolled out. More public reporting, even aggregated at a regional level, of data currently held by government service delivery staff for example would assist the Kivalliq SEMC to monitor wellbeing.

[50] There are costs associated with the time of participants in collaborative monitoring group, data collection events, expert services, translation, and/or reporting on monitoring results to communities.

In addition, there are three potential avenues for AREVA to assist in addressing gaps. The first would be to take advantage of data that AREVA would expect to have on its workers, but would not necessarily report if currently applied reporting requirements were followed. Agnico Eagle has initiated something along these lines to an extent – for example, their reporting to the Kivalliq SEMC in 2010 included a qualitative analysis of employee turnover. Such reporting could be expanded to include, again as examples, quantitative measures of worker job satisfaction (data on worker grievances), work related family stresses (data on use of counselors and EFAP) and migratory movements between communities (worker residence data).

The second avenue that might be considered would be to agree with workers that data could be collected from them as a subpopulation of interest. If quantification of trends were an objective, this would most effectively be done using questionnaires. Questionnaires are not often used in northern Canada and there is some conviction that people may be unwilling to participate in this kind of survey. Experience suggests however that where people understand the purposes of data collection and how the data will be used, are offered the opportunity to decline to answer any specific question and are confident of confidentiality, there is willingness to participate.

The third possible approach would be similar to that in place in northern Saskatchewan, as a collaborative exercise between communities, government and mining companies. This process has been running since 1999 to look at and address issues, according to priorities communities themselves identify (see Section 7, Comparable Experiences for a fuller description of this process). Rather than regular collection and reporting of data, the process involves ongoing consultation with communities to identify and address issues communities feel are of interest. The process is thus highly responsive, and purposes specific in its activities, but does not include regular collection of indicator data.

In addition of course, some combination of any of the three avenues outlined above could be agreed.

Indicators

Socio-economic monitoring in Kivalliq is rapidly evolving, as are socio-economic conditions and learning about the effects of Meadowbank. Indicators are derived from issues and although a preliminary list of issues is presented in Section 6.5.3 above, these would need to be confirmed in order to arrive at appropriate indicators. With Project construction at least five years in the future, it is premature to predetermine indicators for collaborative monitoring. As noted above, AREVA would expect to work with the Kivalliq SEMC and other monitoring partners to develop a detailed monitoring plan before construction begins. This subsection thus simply provides some early thinking on indicators that may be of some interest and could in principle be collected on workers as a subpopulation, if it is agreed that more quantitative information on workers is a worthwhile objective for collaborative monitoring.

In principle, the selection of indicators should parallel what is being done elsewhere for purposes of comparability and shared lessons learned. Table 6.5-1 presents indicators presently used in the Northwest Territories (to monitor the effects of diamond mining) and in Nunavut (to monitor community wellbeing). These indicators are listed in columns numbered 1 to 4. (The table also includes a double column, column 5, which is explained below).

Table 6.5-1 Monitoring Indicators

	1. NWT (2010)	2. Kitikmeot (2006)	3. Doris North Plan (2007)	4. Kivalliq SEMC (2009)	5. Possible Project Worker Indicators	
					Worker	**Family/Members**
Population		population	population	population	no. of workers	family size
		population growth		population growth	community of residence	in/out migrating family members
		age and gender distribution		age and gender distribution	age, gender and ethnicity distribution of workers	same
		under 16 population				
		ethnicity				
Education	high school completion		no. of high school graduates	high school completion (age 20 to 25)	educational achievement	grade or if out of school, educational achievement
	less than grade 9			education, age 25 to 64		
			no. seeking mine-related training through the Nunavut Community Skills Inventory System	registered apprenticeships by type		no. registered in post-secondary training, by length and type of program
					no. registered in mine related training programs on/off site, by length and type of program	same (off site)
		school capacity				
		school attendance		truancy rates		
Health and wellness	injuries				health and safety data, leaves granted on wellbeing grounds, use of counsellors and EFAP, use of health facilities	incidence of injury/accident
	potential years of life lost					
	suicides	suicides				no. of suicides and attempted suicides
	communicable diseases (sexually transmitted)	sexually transmitted infections				no. and type of sexually transmitted infections
						no. and type of chronic disease conditions
						no. and type of infectious diseases
						drug/alcohol/cigarette consumption
	teen births	teen births				teen births
	single parent families	family structure				single parent families
	children receiving services	children in care	children in care			children in care
			interventions involving children			no. of social service interventions involving children
	spousal assault					(included below)
			visits to health centres by community		use of mine site health facilities	visits to health centres/hospitals
		health professionals				
Housing	crowding	household size				no. of people per dwelling/bedroom
	core need		applicants for social housing			housing quality

	1. NWT (2010)	2. Kitikmeot (2006)	3. Doris North Plan (2007)	4. Kivalliq SEMC (2009)	5. Possible Project Worker Indicators	
					Worker	Family/Members
	home ownership		new private housing units	housing by type of tenure		housing by type of tenure
						internet access
						energy use
Crime	total police reported crimes	criminal incidents by category	overall crime rate by community	reported criminal code incidents	leaves/terminations for reasons related to crime (victim or perpetrator)	victim of violent crime, domestic and other
	violent crimes					victim of property crime
	property crimes		calls by community			calls related to substance abuse
	traffic crime		calls related to youth			calls related to domestic violence
	federal statute crimes		calls related to domestic violence			calls related to substance abuse with domestic violence
			calls related to drugs			(included above)
			calls related to alcohol			
		charges by age and gender				
Traditional economy	trapping	trapping				registered trappers
	hunting and fishing	hunting and fishing				registered hunters
		made crafts				artists
	aboriginal language use (youth)					language spoken most often in the home
						voting rates
						volunteering
Non-traditional economy	average income			median household income	salaries/wages	household income
			cost of living or food price index	purchasing power		
	wage disparity					
						earnings and government transfers, % of total income
	employment rate	working age population			job category	(included above)
		employment rate by industry and job category				employment by industry and job category
		employment rate by gender and ethnicity				(included above)
		worker education				
		employment by industry				
	unemployment rate					unemployed (rate calculated from above data)
	participation rate	labour force				participation (rate calculated from above data)
	business activity		new businesses	GST filers		no. of GST filers
					worker satisfaction measures (resignations, grievances)	job satisfaction measure (resignations)

Sources: 1. GNWT, 2010; 2. Kitikmeot SEMC, 2009; 3. Miramar Hope Bay Ltd, 2007; 4. Kivalliq SEMC, 2010. Note: Miramar's monitoring plan also included a number of additional indicators related to Project inputs and outputs, rather than to community wellness outcomes.

Not only the Kivalliq SEMC, but also other regional SEMCs, have been discussing appropriate indicators for some time.[51] Currently, the Kivalliq SEMC list of indicators is quite short. However, it is noted that other issues have been raised during meetings, with thought being given to obtaining additional data. For example, as of 2010, the Kivalliq SEMC was also interested in exploring any relationships between employment and drug and alcohol abuse and between employment and activity on the land. Thus their indicator list can be considered under development.

It will be seen from the columns numbered 1 to 4 that different indicators are of interest in different jurisdictions, although there is some convergence on major themes. However there is no socio-economic monitoring standard in common use, perhaps not least because in different communities, different issues are of most importance. The availability, collectability, usefulness and relevance of indicator data tend to be specific to the realities and perceptions of a given population.

For example, if the incidence of family breakdown is agreed to be an important component of community wellbeing (as it is in NWT but is not, at least not yet, in Kivalliq), what indicator is (or what indicators are) appropriate to measure changes in incidence? In a community with adequate shelter options, the number of women and/or children in shelters may be a good indicator, but if shelters have closed, or are often operating at capacity, it is not. In some communities, the number of women in shelters may be considered too confidential to report, whereas the percentage of female headed households may not be. Because there are good data regularly (if infrequently) collected and reported on female headed households, this may be a preferred indicator for reasons of comparability with trends in other jurisdictions.

There is a challenge additional to selecting appropriate indicators and collecting data. That is to interpret the data. Data provide only a measure of change, not an explanation for that change. Some of this challenge can be addressed by the selection of indicators, but some can be addressed by the collection of data on subpopulations. For example, if an increase in family breakdown, however measured, is observed in the period after a mining project begins, why specifically has this occurred and in what proportion relative to what cause? Is this a continuing trend for reasons that have little to do with a mining project? Do increasing employment opportunities for women in the broader economy give some the financial independence to leave poor marriages? Is stress related to rotational employment a contributing factor to marriage breakdown? Without explanation, neither a

[51] As of the most recently available reports the Qikiqtaaluk SEMC was still discussing, but had not agreed on, indicators. NGMP is also in the process of establishing indicators.

project nor communities are able to frame a response to what may appear to be, but in fact may not be, a negative project related effect.

In this context, there is a gap that AREVA, potentially in partnership with other mining companies, may be able to help fill. The columns numbered 5 in Table 6.5-1 provide a notional indication of the kinds of data that it is conceivable consideration could be given to collecting from mining workers and their households and family members, for comparison with data on people in general. To the extent that there are worries about the negative effects of mining employment on, as examples, drug and alcohol abuse, traditional culture and language use, the linkages are through the choices made by mining workers and their families. Thus separating out mining workers from the rest of the population could provide more explanatory power to analyses of trends in indicators. The indicators in the table were selected to approximate indicators used in other jurisdictions, for purposes of comparability. Again, it is emphasized that the table is not a proposal, but an illustration of the kinds of data that might be collected.

It is acknowledged that there are a number of challenges to collecting data on Project workers:

- Unwillingness on the part of some workers can have implications for the representativeness of results.
- Some data that in principle could be collected is highly personal in nature. People may not want to give answers, or not provide correct answers to very personal questions, such as STI incidence or suicide attempts. This may not only be for reasons of confidentiality outside the family, but also inside the family. Parents for example do not necessarily know everything about their children.
- Even if data could be reliably collected, there are important confidentiality concerns. Who the data are collected by, and how the data are reported and to whom, are issues that would need to be resolved. It can be more appropriate for third parties to collect data and manage confidentiality concerns than either mining companies or community groups. Where incidence rates are small, within the group of workers or within communities, data may not be reportable or reportable only at a regional level.
- Some of the data that the table indicates might be available on workers is not currently available at community or regional levels. This may change, in response to the NGMP or to specific requests by the Kivalliq SEMC to, for example social service delivery staff. There is less value in collecting data from workers if comparable data are not available for the larger population.
- AREVA would only be able to collect such data on its own workers. Project effects such as indirect and induced employment, migration, or changes to social cohesion (and consequences of these) are not specific to mining workers. Thus although data on workers can provide more explanatory power, other investigations may also be necessary.

- Notionally identical processes should be put in place by others additional to AREVA – larger sample sizes both contribute to data reliability and alleviate some confidentiality concerns. This requires additional collaboration, coordination and potentially joint funding.

Thus there is much to discuss and agree to put in place a plan for collaborative monitoring of many of the potential Project socio-economic effects. It is also noted that as the Project advances, both Project effects and issues of concern to communities will evolve and monitoring plans will need to evolve in concert.

Path Forward

AREVA would expect to discuss the path forward for collaborative socio-economic monitoring as the EIS and IIBA processes advance, and as NGMP and the Kivalliq SEMC develop their approaches, indicators and capacities. This would be with a view to having at least an initial plan, likely fairly modest, in place before construction begins. In the interim, AREVA expects to continue to participate on the Kivalliq SEMC and to continue to provide the kinds of operational data it routinely collects.

AREVA wishes to maintain open dialogue, and to reach agreement on timely data sharing as appropriate, with GN departments with mandates related to Project implementation, including as examples Department of Finance (revenue flows to GN), Department of Justice (justice issues) and Department of Environment.

6.6 Inuit Impact Benefit Agreement

The NLCA sets out matters considered appropriate for Inuit benefits of projects (Schedule 26-1). Aside from contractual conditions (such as for arbitration, amendment and enforceability), and the provision that the IIBA appropriately includes any matter that the parties consider to be relevant to the needs of a project and the Inuit, the following matters as set out in the NLCA are consider appropriate to managing the socio-economic benefits of the Project:

- Inuit training at all levels
- Inuit preferential hiring
- employment rotation reflecting Inuit needs and preferences
- scholarships
- labour relations
- business opportunities for Inuit including
    - provision of expert advice
    - notification of business opportunities
    - preferential contracting practices
- housing, accommodation and recreation

- safety, health and hygiene
- language of workplace
- identification, protection and conservation of archaeological sites and specimans
- research and development
- Inuit access to facilities constructed for the Project such as airfields and roads
- particularly important Inuit environmental concerns and disruption of wildlife, including wildlife disruption compensation schemes
- Outpost camps
- information flow and interpretation, including liaison between Inuit and the proponent regarding project management and Inuit participation and concerns
- relationship to prior and subsequent agreements
- co-ordination with other developments
- arbitration and amendment provisions
- implementation and enforceability, including performance bonds and liquidated damages clauses
- obligations of subcontractors.

It will be noted that there is complete overlap of the generic matters listed above, and AREVA`s statements in this EIS. It is not expected that IIBA negotiations between AREVA and KIA will negate in any way AREVA`s current intentions for socio-economic management, however, it is expected that the IIBA will contain differences in detail. This implies that the full details of all effect mitigation and benefit enhancement measures will not be confirmed until the IIBA is negotiated.

The NLCA also requires that, unless otherwise agreed, that IIBA negotiations are to be initiated at least 180 days prior to the start-up date of a major development project (Section 26.4.1). AREVA and the KIA continue to negotiate the IIBA at the time of FEIS preparation. Both parties have agreed that it is premature to discuss IIBA terms at this time. Thus for purposes of this EIS, there is no information available on IIBA terms.

The IIBA is expected to address not only many of the details of what impact mitigation and benefit enhancement measures are to be implemented, but also details on how they will be implemented. It is noted that hamlet councils, KIA, NIRB, GN and AANDC all have legislated and regulatory responsibilities with regard to the implementation of the Project, with regard to the economic and social development and culture of people under their jurisdictions, with regard to socio-economic monitoring, and consequently with regard to the management of any effect mitigation and benefit enhancement.

6.7 Other Initiatives in Support Of Socio-Economic Development and Culture in Nunavut

AREVA expects that the Project will increase economic opportunities in Kivalliq but acknowledges that there are some challenges to managing many of the potential socio-economic effects of the Project. In very general terms, these include that the Inuit have limited educational achievement, businesses are small and inexperienced and the take up of economic opportunities should not be at the expense of traditional culture or individual and family wellbeing. Such challenges are not specific to the Project, but are of general concern to government as the economy of Nunavut continues its transition from a land based to a mixed economy.

Accordingly, there are already very many programs in place in Nunavut to address such challenges. This is the context within which AREVA expects to implement socio-economic management. There is a need to ensure that AREVA's socio-economic management measures are consistent with existing polices, plans and programs and there are opportunities for partnerships that can enhance the effectiveness of AREVA's socio-economic management. In addition, policies, plans and programs of both the public and private sectors will contribute to mitigating negative Project effects and enhancing benefits.

The list below is a very partial indication of the breadth of activities in Nunavut that are in place to strengthen community economies, and to support traditional culture and wellbeing. These and other policies, plans and programs, will contribute to the capacity of Nunavummiut to manage negative effects and access benefits of the Project.

- Nunavut Tunngavik Inc. has numerous programs for hunters and harvesters, providing financial assistance for equipment for traditional activities (including sewing), for HTOs to organize community harvests for the benefit of all community members, and for the teaching/learning of survival and other traditional skills. *HTOs will often receive funds from Economic Development to hunt for country foods to be distributed to communities (IQ WCE 2009).*
- The Government of Nunavut passed the Inuit Language Protection Act in 2009, to protect and revitalize Inuktitut, including the creation of a fund to support improving Inuktitut literacy and proficiency.
- The Department of Culture, Elders, Language and Youth is working to standardize Inuktitut terminology, supports efforts to protect, promote and preserve traditional culture and language, supports elder and youth initiatives, and has developed the Inuit Societal Values project to strengthen the role of elders in addressing social problems.
- The Department of Education has developed a bilingual education strategy for Nunavut, addressing areas such as curriculum and teaching and learning resources more specifically targeted to ensuring that students are proficient in English and Inuktitut. The

department certifies elders to be hired in schools to assist in teaching about Inuit culture, tradition and knowledge.

- Nunavut Arctic College has programs to build traditional arts and crafts skills, including the business skills needed to successfully market products. The college has succeeded in developing training programs wholly within Nunavut for teacher and nurse certification and has recently opened a trade school in Rankin Inlet.
- The Department of Health and Social Services implements a range of public health education and disease prevention programs, and works with Health Canada on drug treatment programs, specifically with at risk Inuit youth in areas of substance abuse and mental health.
- The Department of Economic Development and Transportation has developed a strategy for growth in the arts and crafts sector, funds programs to implement the strategy, and has a small business support program.
- Aboriginal Affairs and Northern Development Canada provides funding for postsecondary training, community infrastructure, and support to business development.
- Regional Inuit Associations work to provide youth with accessible, community-based, culturally relevant support for economic, social and personal development, in areas such as education, skills development, life skills, parenting and recreation.
- The Kivalliq Mine Training Society is working with Agnico Eagle to train youth specifically for employment opportunities as Meadowbank.
- The Nunavut Business Credit Corporation provides financing to businesses based in Nunavut.
- The Nunavut Research Institute promotes IQ, science and research as a resource for the wellbeing of Nunavummiut

7 Comparable Experiences

As noted in Section 4, Scope and Broad Methodology of the Assessment, where experiences of other northern communities in proximity to large mining projects are documented, these have value in the assessment of potential Project effects on Kivalliq communities. Although there are no strictly comparable other experiences, there are lessons to be learned from elsewhere that may be judiciously applied to Kivalliq. Of primary interest in this regard are experiences in Nunavut with the Polaris and Nanisivik mines, in NWT with the diamond mines, and in northern Saskatchewan with uranium mining.

The section does not focus overly on employment and contracting results for such mining projects. For Polaris and Nanisivik and for the diamond mines in NWT, figures for Inuit or Aboriginal employment have been disappointing and there has been limited development of business, outside Yellowknife. The history of employment and contracting in northern Saskatchewan, and by Meadowbank, are more informative on the AREVA and Kivalliq experiences specifically, and are presented in the discussion for the potential for effects on community economies (see Section 8).

Additionally, given the GN's concerns about unexpected population growth and associated pressures on government service and infrastructure delivery, this section includes some information on the northern Alberta experience with the rapid development of the oil sands. The situation in northern Alberta is not comparable to anything expected in Nunavut as a result of Kiggavik. In migration into Fort McMurray from elsewhere in Alberta, Canada and the rest of the world has been in response not to one, but to dozens of new large developments and has largely occurred since the late 1990s (i.e. 30 years after the initiation of oil sands development). Further, various oil sands project environmental assessments continually underestimated population increases – increases were consistently higher over the 2000s than the 'maximum' growth scenarios projected in these environmental assessments – leaving Fort McMurray in particular unprepared for the unexpected population increases that did occur.

Nevertheless there are lessons to be learned about the management of social and physical services and infrastructure challenges from this quite extreme example. These centre on the expectations that i) supply and demand resolve themselves over time (there can be an issue of timeliness of supply, that may not exactly match developing demand) as governments plan and implement the delivery of services and infrastructure as needed; and ii) governments have the resources to do this as a result of the economic and fiscal benefits brought about by large projects.

7.1 Nunavut

The Polaris and Nanisivik mines both closed, after 20 and 25 years of operation respectively, in 2002. The case of Nanisivik (near Arctic Bay) is better documented. The project involved a decision to build a town adjacent to the mine site – despite the presence of Arctic Bay less than 30 kms away – with the consequent challenges of how to dispose of the town when the mine closed. After 25 years of operation, Inuit employment had never exceeded 30% of a comparatively small workforce, equivalent to about 60 jobs. A study (cited in Cumberland, 2006) by the then named Baffin Region Inuit Association looked specifically at employment effects. Anecdotal opinion differed on the project's effects on employees, their families and the economy of Arctic Bay.

Subsequently, Brubacher and Associates (2002) qualitatively investigated the project`s socio-economic effects in Arctic Bay, in preparation for the mine's closure. Overall, qualitative information obtained during interviews with people in Arctic Bay was more positive than negative. The study concluded that the Nanisivik mine had positive direct, indirect and induced economic benefits and that the primary negative effects (aside from closure) were related to the abuse of alcohol and associated behaviours. With regard to other potential socio-economic effects (such as effects on traditional activities, family function, intergenerational relations and capacity building) different individuals reported different responses to the mine, some positive and some negative. With regard to the last conclusion however, overall there appeared to be no net measureable effects that could be disaggregated in cause from other ongoing forces of change.

On the subject of closure, the study noted that negative effects included loss of income to individuals and businesses, loss of services and `uncertainty` with respect to the disposition of physical plant that represented a heavy investment on the part of the GN (equivalent to $45 million in 2002 dollars). Loss of income was considered significant; however the study noted that comparatively few people and businesses depended on the project for most or all of their livelihoods. By closure, only 9% of Nanisivik workers was northern – most, but not all, of these were from Arctic Bay. Loss of services, particularly jet service and increased sea lifts using mine boats but also including mine site recreational facilities, was also considered a significant negative effect of closure by the people of Arctic Bay.

The study made a series of recommendations to GN, addressed to managing the effects of closure on Arctic Bay. The study also noted lessons learned, and consequent recommendations to both communities and governments with regard to future projects, all of which imply participation of a project proponent. These recommendations focus on open communication between all parties, monitoring of socio-economic effects, reporting on a project's commitments and effects, providing support staff in communities to facilitate the relationship between a project and affected people, implementing culturally appropriate mitigation and benefit enhancement measures, and providing training to better prepare Inuit for employment.

A qualitative comparison of the socio-economic effects of the Polaris (near Resolute Bay) and Nanisivik mines, on the basis of interviews on people's perceptions of impacts, was done by Bowes-Lyon et al (2009). Although the process for Polaris development was much improved over that of Nanisivik (environmental and socio-economic impact assessments were done before construction, and engagement on the potential for benefits and how to realize these was extensive), the overall conclusion was that economic benefits were not numerous at either mine and came to an end at closure. The limited economic benefits were attributed to little training of the (small) Inuit work force and few partnerships with businesses. Alcohol consumption was also thought to have increased by participants in interviews, in both Resolute Bay and Arctic Bay. However it is noted in this regard that at both mines the purchase of alcohol was 'unrestricted and unmonitored'.

The only long term socio-economic benefit identified in either community was that the education in the school at Nanisivik probably better prepared children for later employment than the school in Arctic Bay – in part because Inuit children schooled at the mine school had better English language skills. The study concluded that there were few lasting positive or negative effects as a result of either project, and no contributions to social development. The study also noted that neither project was held accountable for failures to meet commitments. Recommendations were similar to those of Brubacher, focusing on engagement and training for both employment and contracting.

Newer mines in Nunavut (Tahera, Meadowbank and the construction phase of Doris North) have not operated for long enough to permit any conclusive analysis of socio-economic effects beyond uptake of employment, business and training opportunities. Meadowbank in particular has proved successful at enhancing economic benefits to Inuit.

7.2 Northwest Territories Diamond Mines

GNWT, in partnership with BHP Billiton, Diavik and De Beers, has undertaken the only sustained quantitative effort in northern Canada to investigate and monitor mining's effects on a full range of socio-economic indicators in nearby communities. The first monitoring report, Communities and Diamonds, was published in 2002 and accumulated data have been reported in each subsequent report.

Table 7.2-1 presents in summary form the results of the Communities and Diamonds report on the year 2012 (GNWT, 2013). For purposes of the table, 'affected communities' are the seven small communities[52] in closest proximity to the mines and 'unaffected communities' are the other NWT communities excluding Yellowknife. Red cells (w) indicate a worsening trend, green cells (b) indicate a trend for the better and white cells (same) indicate no observable trend. The exception is the column headed 'trend associated to diamond mining', where it is indicated whether the observed trend is probably, possibly or not associated with mining.

Table 7.2-1 Summary of Community and Diamonds Findings

Indicator	Predicted Trend in Environmental Assessments (A)	Trend in Affected Communities (B)	Trend Associated with Diamond Mining (C)	Trend in Unaffected Communities (D)	Relative Position of Affected Communities to Unaffected Communities (E)	Relative Movement to the Positive in Affected Communities (F)
Community, Family and Individual Wellbeing						
Potential years of life lost	w	b	possible	b	b	b
Injuries	w	b	possible	b	b	same
Suicides	w	w	possible	b	w	w
Communicable diseases (sexually transmitted)	w	w	possible	w	w	same
Teen births	w	b	possible	b	w	w
Single parent families	w	w	probable	w	w	w
Children receiving services	w	w	n/a	w	b	b
Spousal assault	w	w	n/a	same	b	w
Total police reported crimes	w	w	possible	w	w	w
Violent crimes	w	w	possible	w	w	b
Property crimes	w	w	possible	w	b	same

[52] Behchokö, Gamètì, Whatì, Wekweètì, Detah, N'dilo, and Lutselk'e

Indicator	Predicted Trend in Environmental Assessments (A)	Trend in Affected Communities (B)	Trend Associated with Diamond Mining (C)	Trend in Unaffected Communities (D)	Relative Position of Affected Communities to Unaffected Communities (E)	Relative Movement to the Positive in Affected Communities (F)
Federal statute crimes (includes drugs)	w	w	possible	w	w	w
Other criminal code offences (often alcohol related)	w	w	possible	w	w	same
Home ownership	b	same	possible	b	b	w
Crowding	b	b	probable	b	w	b
Core need	b	b	probable	b	w	same
Cultural Wellbeing and Traditional Economy						
Aboriginal language use (youth)	w	w	possible	w	b	b
Trapping	w	b	possible	b	b	b
Hunting and fishing	same	b	possible	same	same	b
Country food consumption	same	b	possible	same	b	b
Nontraditional Economy						
Average income	b	b	probable	b	w	b
Wage disparity	w	b	possible	b	w	b
Income assistance cases	b	b	probable	b	w	b
Employment rate	b	b	probable	b	w	b
Unemployment rate	b	b	probable	b	w	b
Participation rate	b	b	probable	same	w	same
High school completion	b	b	probable	b	w	b
Less than grade 9	b	b	probable	b	w	b
Business activity	b	same	n/a	w	w	b
Total (worse)	**16**	**11**	**n/a**	**10**	**19**	**7**
Total (better)	**11**	**16**	**n/a**	**15**	**9**	**16**
Total (same)	**2**	**2**	**n/a**	**4**	**1**	**6**
Total	**29**	**29**	**n/a**	**29**	**29**	**29**

Source: Derived from GNWT, 2013

Note: n/a is not applicable, the report notes, because data for the indicator have only available for years subsequent to the beginning of diamond mining in 1997. ‘

There are a number of elements to note from Table 7.2-1:

- The socio-economic effects assessments for the three large diamond mines were more negative about the potential for negative impacts in affected communities than has proven to be the case over the last decade (compare columns A and B).
- With regard to the above bullet, the assessments' expected negative trends were identified to be impacts of their respective projects specifically whereas the table shows that where negative trends have been observed in affected communities, they have also been observed in unaffected communities. The single exception is the rate of suicides.[53] (Compare columns B and D.)
- Only in the case of a single negative trend (the percentage of single parent families) did the investigators conclude a 'probable' association with mining. Other trends with probable associations are all positive (see column C).
- Most probable associations relate to various employment and income indicators (see column C). The report acknowledges that particularly wellbeing and traditional economic activity indicators are affected by so many factors that a definite causal link to mining is challenging to conclude, particularly in a context where the same trends are observable in both mining affected and unaffected communities. The converse is also true – it is equally challenging to conclude the absence of a causal link.
- Prior to mine development, the affected communities were generally worse off than the unaffected communities with regard to indicators of social wellbeing and nontraditional economic activity, although they had stronger cultural indicators. Cultural indicators are yet stronger in affected communities subsequent to mine development. Although affected communities are still worse off with regard to indicators of nontraditional economic activity (see column E), in the last decade the gaps for have narrowed (affected communities are gaining ground relative to unaffected communities). However the data indicate that that performance is much more mixed for indicators for social wellbeing – of a total of 16 indicators, seven show that affected communities are falling further behind or are improving more slowly than unaffected communities (see column F).
- With regard to specific indicators, the report's findings of particular relevance to the socio-economic effects assessment for the Project are:

[53] The report notes that the data for suicide rates need to be viewed with caution because 'in some areas there may be only two or three suicides in a given three-year phase [making] it hard to judge these data and any trends they may show' (GNWT, 2013).

- The probable association between mining and the increase in the percentage of single parent families is related by investigators to the stresses placed on families of rotational work schedules.
- The downward trends for potential years of life lost and for injuries predate the beginning of mining in 1997, although the data have continued to trend downward over the last decade. Mine safety programs are thought to contribute but it is noted that GNWT also implements a range of public health and safety programs.
- With the exception of property crimes, affected communities have seen crime rates increase more quickly that unaffected communities have. However the spikes in violent, drug related and nuisance crime rates have been comparatively recent, dating from about 2009. The spikes thus would not appear to be overly strongly associated with mining, which began in 1997.
- Aboriginal language use is falling proportionately much faster in unaffected communities than in affected communities. Irrespective, English as the language of work in the mines is thought to contribute to reduced use in affected communities.
- Traditional economic activity indicators are improving in affected communities, and have stabilized, at somewhat lower levels, in unaffected communities. There is an association between mining incomes (and thus affordability of traditional activity) and increased trapping, hunting, fishing and consumption of country food.
- Despite evidence of increased employment and incomes in affected communities, and despite what is thought to be associated improvements in housing conditions, the rates of home ownership are not increasing.
- Incomes are rising across NWT, at the same rate in affected as in unaffected communities. It may be that incomes wouldn't be rising as quickly in the affected communities as they now are in the absence of mining, but this cannot be proved. Other employment and education related indicators are rising faster in affected than in unaffected communities.
- Despite fears about mining wages increasing income inequality, not only is inequality decreasing (as measured for purposes of this monitoring), it is decreasing faster in affected communities.
- There has been virtually no business development in affected communities. Affected communities may be considered to be ill suited to supplying the mining sector, being small and remote relative not only to Yellowknife but also to other NWT centres that are included in the unaffected group such as Hay River and Inuvik.

With regard to the above, it is reemphasized that the data do not demonstrate the presence or absence of causal links between mining and the movement in indicators. The Communities and Diamonds reports consistently note the challenges of disentangling socio-economic change resulting from mining specifically as opposed to from the many other forces of change.

There are consequent uncertainties in coming to firm conclusions about the effects the large diamond mines are having. Preexisting and coexisting trends, changes in data collection methodologies and government policies and programs all confound interpretation of the data. The two groups, affected and unaffected communities, are not completely comparable. The oil and gas sector is having effects on some 'unaffected communities' that are similar in some respects to the diamond mine effects on 'affected communities'. Finally, it cannot be known what would have happened in the absence of mining – where mining is unable to reverse a negative trend, it may have slowed it. For example, although there is an upward trend in the rates of children receiving services in affected communities, and there may be a plausible association with mining, the rates have increased more quickly in unaffected communities.

It is also noted that there is not complete agreement on the approach used to try to capture some of the effects of diamond mines in the Northwest Territories. Gibson (2008) for example notes that effects on communities can be more profound than the use of quantitative indicators are able to capture and that more effort is need to fully understand how people experience the diamond mines.

7.3 Northern Saskatchewan Uranium Mines

The focus of formal socio-economic monitoring in northern Saskatchewan, through a partnership between AREVA, Cameco, the Government of Saskatchewan and communities, has been on reporting on the uptake of employment and business opportunities across the uranium mining sector as a whole. Since 1999, there has also been a process in place to look at and address issues at a community level, according to priorities the communities themselves identify (the Community Vitality Monitoring Partnership Process, CVMPP).

The CVMPP was established to identify and track indicators that provide insight in community vitality such that people can use that knowledge to improve and maintain the quality of life in northern Saskatchewan. This includes providing information related to uranium mining effects on community vitality that is useful to northern community stakeholders.

The process has not involved the regular collection and reporting of data however – existing organizations and programs collect and report data on many broad socio-economic indicators for northern Saskatchewan communities. Rather, the CVMPP coordinating committee has been in ongoing consultation with communities to identify issues communities feel are of interest to better understanding wellbeing. The CVMPP then works with communities to put in place projects to respond to identified issues.

Although originally identifying five areas of focus (environment and land; health; economic/social/infrastructure; communication dynamics and relationships; and special topics – youth, outmigration and poverty), communities and CVMPP have increasingly come to focus on youth. Youth projects have included investigating challenges to getting postsecondary educations,

and examining youth and community vitality issues such as justice, health and family. CVMPP's approach, that `monitoring is a developing process of addressing issues of concern rather than simply collecting data` (CVMPP, 2010), represents a quite different approach from that in, for example, NWT.

A review of projects that have been assisted by CVMPP (CVMPP, 2010) indicates that in the event, and despite part of its original mandate being to monitor mining effects, communities are in fact more concerned about existing threats to wellbeing that are not related to any negative socio-economic effects of mining. These include, as examples, examining the reasons people stay in and leave the north, tracking the high costs of a healthy food basket in remote northern communities and investigating how better to position youth to take advantage of mining economic opportunities. This in itself is an interesting result for what was originally conceived as a program to monitor mining`s effects.

However the CVMPP has also completed two studies of interest to understanding potential effects of uranium mining in northern Saskatchewan, i) a study of the effects of rotational work on families and communities (Intergroup, 2005); and ii) a study of the social impacts of uranium mining in northern Saskatchewan (Intergroup, 2013). It is noted that in some respects the population of northern Saskatchewan is comparable to that of Nunavut. As of 2012 there were a*bout 35,000 people in northern Saskatchewan, about 85% of whom are Aboriginal. The region represents about 4% of Saskatchewan's total population, is remote and under serviced relative to the rest of the province and includes many communities experiencing important socio-economic challenges.*

The rotational work study results indicated that:

- a two week on two week off rotation was preferred – although people find the two weeks on somewhat difficult, overall they feel this is balanced by the two weeks off[54]
- spouses found rotational work more challenging to manage than workers did, and children could be negatively affected
- communication between workers and their families, including through site visits, was an important means to address rotational work challenges
- people preferred to address any work or family problems with friends rather than strangers, such as mine site counselors or EFAP staff

[54] This is a consistent finding with regard to many people who are able to manage rotational work, as evidenced by AREVA`s socio-economic data collection results and, for example, Gibson, 2008.

- more flexibility in work force management would allow people to better manage their time on the land and meet out of the ordinary family responsibilities such as emergencies
- participation in community events and volunteering were not significantly affected
- there needed to be more support in communities for wellbeing and the expectations of people were that both government and the mining companies could do more

The recommendations of the study were not to change work force management measures in any important regard but to provide 'more'. For example, more communication channels and more flexibility with regard to leave were recommended. However it was also clear that rotational work has its costs on families and more culturally appropriate support services were required in this regard.

Over time however, there was more interest in understanding the relationship between the uranium mines and communities. The CVMPP accordingly contracted for work that culminated in a report by Intergroup (2013), *The Socio-Economic Impacts of the 'Modern Era' of Uranium Mining on Northern Saskatchewan*.

Among the report's findings are:

- While educational achievement has increased 'substantially', education rates in northern Saskatchewan are still lower than in the province as a whole. Challenges originate not only at the secondary and post-secondary levels, but also at the primary level.
- While the number of employed northern people have doubled, and the numbers of northern people employed in the uranium sector have quadrupled, employment rates are lower and unemployment rates are higher in northern Saskatchewan than in the province as a whole. Although almost 50% of uranium sector employees are northern, this level was achieved about ten years ago and has not improved since. This 'plateau' is attributed to the comparatively poorer educational achievement in northern Saskatchewan, which make many skilled and professional positions out of reach for many northern people.
- Average and median household incomes had decreased between 1981 and 2006 and income inequality had increased. The former is despite comparatively high wages paid in the uranium sector and the latter may be attributable to those comparatively high wages.
- The value of business contracts awarded to northern Saskatchewan business has multiplied over 18 times although the prevalence of joint ventures means that not all the benefits have accrued to northern Saskatchewan.
- There have been additional benefits related to transportation infrastructure development, for example through cost sharing, and to community development, for example through contributions to communities to address identified issues.
- The uranium sector has had a 'significant impact' on employment, business development, education and training, transportation infrastructure and community development, but has not solved ongoing socio-economic challenges. Unemployment rates in the rapidly growing population remain high, there is leakage of increased incomes of some

individuals to large urban centres in southern Saskatchewan, the education system has not yet been able to fully address skill shortages, and many community needs (including housing) remain unaddressed.

The report concludes that '[t]he study was limited in its ability to reach firm conclusions about the relationship between uranium mining and indicators describing social and economic change in northern Saskatchewan mainly because there is a complex set of factors influencing the socio-economic indicators analyzed.' And many socio-economic indicators of changes that are often associated with the mining sector were not analyzed. As examples, the report did not attempt to quantify and explain changes in indicators related to substance abuse, family dysfunction, crime or integrity of traditional culture.

The lessons that may be of relevance to Nunavut could include:

- There have been measureable benefits in areas of employment, business development, education and training, transportation infrastructure and community development but these are not necessarily fully reflected in broad indicators such as unemployment rates educational achievement because these are affected by many more variables than simply the presence of mining.
- It is arguable that given that there are measureable benefits, continuing disparities might have been worse in the absence of uranium mining, unless that mining could be demonstrated to have displaced alternative economic developments.
- The complexity of ongoing socio-economic challenges requires a range of interventions to adequately address. Variables such as population growth rates, primary school quality, and wage rates in the non uranium sector economy are not within the ability of the uranium companies to control, or even affect substantially. There are important roles for governments, the private sector and civil society, ideally through a multi stakeholder approach.
- Research is needed if there is ever to be any adequate understanding of the relationships between mining specifically and the potential for negative effects on wellbeing. There are too many confounding drivers of change for most investigations of the impacts of mining to adequately document causes and effects.

7.3.1.1 Training at the Northern Saskatchewan Mines

Training initiatives at AREVA's northern Saskatchewan operations reflect the Inuit Qaujimajatuqangit (IQ) principles Qanuqtuurunnarniq - *being resourceful and flexible to solve problems* and Pilimmaksarniq - *maintaining and improving skills through experience and practice.* Programs evolve to accommodate and better address changing needs and priorities of i) the potential and current workforce, ii) educational organizations with growing and changing capacities, and iii) the company to best realize collective and long lasting benefits, primarily the employment and retention of a

northern workforce. AREVA training initiatives range from a job shadow program for grade 10 students that provides exposure and understanding of future employment opportunities to supervisor/manager in-training programs. The following list provides a summary of training initiatives at northern Saskatchewan mines at the time of FEIS writing to demonstrate the range of training;

- Job Shadow Program – two days of firsthand work/life experience at site for grade 10 students;
- Pre-Skills Training – three week job placement and skills training program;
- Trades Helper Program – one year program to work alongside several trades to determine which is best suited to the individual prior to commitment and training for a specific trade; this often leads to entry into apprenticeship program;
- Apprenticeships – onsite apprenticeship, largely focused on mill maintenance and services, with wages subsidized by an external training institute;
- Mill Operator – training on all aspects and requirements for successful employment as a Mill Operator;
- Mill Operator Peer Training – continued training, coaching, and mentorship for junior process operators to build confidence and possible job progression;
- Workplace Cooperative Education – on-the-job training in conjunction with education (certification and degree options); and
- Supervisor In-Training – temporary assignment as a supervisor following theoretical training to create pool of employees with potential to advance to supervisory positions.

AREVA's training programs for northern employees have evolved over three decades and, complemented by other initiatives, has produced a workforce with approximately 50% northern content with a low attrition rate. Many lessons learned in Saskatchewan can be applied to training in Nunavut. Collaboration among many parties is important[55]. Of the eight listed programs above, only two programs are solely AREVA implemented with all other programs undertaken in collaboration with other interested organizations. It is important to acknowledge and promote the importance of education and training initiatives before an individual enters the workforce and throughout his/her career to facilitate entrance into the workforce and career advancement.

The value of piloting both training programs and careers has also been demonstrated. Testing programs on a small scale focuses resources on programs proven to be successful, while new

[55] This lesson learned by AREVA in Saskatchewan is very similar to the IQ principle of *Piliriqatigiingniq/ Havakatigiiklutik* - people must work together in harmony to achieve a common purpose.

programs are developed and fine-tuned to ensure successful implementation. For individuals looking to advance their careers, piloting the possible next career stage provides a unique opportunity. The trades helper program provides exposure to several trades so that individuals can feel more confident in their selected trade if they choose to commit to an apprenticeship. The supervisor in-training program provides individuals exposure to supervisory positions and an opportunity to experience first-hand what it is like to be a supervisor to determine whether such a career progression is a good fit. This program allows the individual to either transition into a supervisory role with confidence or return to his/her old position with no consequences.

Common company and worker understanding of essential skills required for various positions further contributes to overall training success. Essential skills are primarily reading text, document use, and numeracy skills. Kivalliq residents understand and value essential skills and see these skills as critical to full participation in mining projects (WC NIRB May 2010[56], BL NPC Jun 2007[57], AR KIA Apr 2007[58]). Development of these skills is essential so that individuals can meet required skill levels necessary for entrance into specific training programs. This increases the likelihood of program completion as well as individual satisfaction and further maximizes company investment. Both the piloting of careers and essential skills training prior to more advanced training can reduce employee frustration and turnover.

The method of training and learning through hands-on or on-the-job experience is highly valued in Saskatchewan and in Nunavut (RB NIRB April 2010[59], BL OH Nov 2013[60], BL KIA Feb 2010[61]). All of the current training programs supported by AREVA in Saskatchewan include either job shadowing at site or direct on-the-job experience. Oftentimes, Saskatchewan educational institutions will partner with AREVA and other companies to provide training opportunities. Primary training partners in Saskatchewan are Northern Career Quest, Gabriel Dumont Institute, and Northlands College with other partners also participating from time to time.

[56] I am concerned that a lot of young people do not finish school and do not have the required education to work at the mine site. Would like to see the mine succeed and have the young people employed.

[57] It is important for the younger generation to be involved in the process. We need to start educating them today and to be able to provide them a baseline study to look at. After all, if it is going to be their world, whatever we decide here in our generation.

[58] I am hoping to see high school students take part in training. I am encouraging students to finish high school. Ensure students take school seriously.

[59] Inuit learn quickly when on the job training is offered.

[60] I wasn't educated at all but was trying to help out. I adjusted to the work force. I maintained the airport of the site, learned by watching. In the old days no education was needed but it's needed today. Some young people are jobless even though they have some education. Those who don't have completed education can learn by watching work, for ladies too.

[61] Our ancestors grew up with no formal education, no certificates. They learned through hands-on training and observation. So, while you may not have a certificate, you can still be smart and understand how to do the job.

In addition to collaboration, the ability to pilot programs and careers, and essential skills, other lessons learned in Saskatchewan include the importance of communication among interested parties, attendance management, and a willingness to modify programs to accommodate changing needs.

Training programs, similar to the ones carried out in Saskatchewan, could be implemented in Nunavut (CH OH May 2009[62]). ARVEA could possibly collaborate and undertaking initiatives with organizations such as the Mine Training Roundtable, or directly with its membership organizations including Arctic College, Kivalliq Partners in Development, and the Kivalliq Inuit Association. There may be opportunities to further liaise with the Kivalliq Mine Training Society or with programs and organizations that may be developed under the Community Readiness Program with the Northern Major Projects Office. Similar approaches with respect to piloting careers and building essential skills could be taken and adapted to take into consideration the different strengths and constraints in Nunavut. Training success can be influenced by site morale and individual well-being so community and work site initiatives among other benefits should be viewed as a whole.

While understanding the value of a holistic view, AREVA recognizes that training should be specific (RI KIA Jan 2010[63]), measurable, attainable, relevant, and also timely to maximize the benefit to the company and community. AREVA currently participates in the Mine Training Roundtable facilitated by the Kivalliq Mine Training Society and expects to increase its involvement during licensing of the project once a positive development decision has been made. AREVA anticipates the majority of training investment to occur in preparation of and during the operations phase of the project. Following three years of construction, mining activity will precede milling activity by about two years allowing for about five years to train mill operators. Training at the start of the project is expected to be more specific with growing over the construction and start of mining to include a more diverse set of employment and training opportunities. AREVA believes it is preferable to initiate multi-party discussions regarding project training during licensing to ensure that a sustainable workforce is secured for the critical stages of the project.

[62] We applaud the aboriginal representatives from Saskatchewan. I visited the sites in July and was impressed with the level of involvement. Not just jobs but there were people in higher jobs too. I came back and stressed training and I hope that we have the same level of involvement as Saskatchewan people.

[63] What will happen to those who take the 10-week course and are promised jobs but then don't get jobs when they are done? Response: The old training was not specific. The new training will be more job specific. We've learned from our mistakes.

Training success will be monitored and initiatives may be adjusted to ensure continuous improvement. AREVA will continue to liaise with Kivalliq communities so that communities are aware of AREVA's hiring and training programs and opportunities.

7.3.1.2 Workforce Support at Northern Saskatchewan Uranium Mines

Workforce support at AREVA's Saskatchewan operations are founded in the provision of a healthy, safe, and secure site and then expand to a variety of programs to a) create and maintain positive site morale, and b) assist individuals adjusting to rotational work or other issues experienced. AREVA strictly enforces prohibitions against illegal activity (liaising with enforcement authorities as appropriate), harassment, verbal and physical abuse, and negligence. AREVA has three particularly relevant public policies, the Health and Safety Policy, Human Resources and Training Policy, and the Social Policy. AREVA is committed to promoting work performance and also job satisfaction. Company policies include the following commitments related to workforce support:

- prevent injury and ill health of its employees and contractors (Health and Safety Policy);
- support all employees and contractors in fulfilling their health and safety responsibilities (Health and Safety Policy);
- foster a common safety culture throughout the organization (Health and Safety Policy);
- monitor, update, revise, and enhance services and processes to ensure they reflect emerging trends and best practices in human resource management (HR and Training Policy);
- recognize the value of its employees and provide opportunities for personal and professional development (HR and Training Policy);
- provide a respectful workplace that respects Human Rights, fosters diversity and is free from discrimination, violence and harassment (HR and Training Policy);
- provide quality third party assistance for employees who require support with substance abuse, family problems or other personal situations that impact them (HR and Training Policy);
- provide a healthy and safe workplace (Social Policy); and
- participate in the economic and social development of communities in which our operations have an impact (Social Policy).

AREVA values and is proud of the positive site morale at AREVA sites and we acknowledge this requires continual effort and a shared culture of respect[64]. Site morale is dynamic and the Saskatchewan operations focus on strict enforcement of the harassment policy, the requirement for each employee to attend a respectful workplace presentation each year, progressive rather than prescriptive discipline, encouraged use aboriginal and other languages when not compromising work safety, and the maintenance of a modern camp with recreational facilities and programs. Open communication, monitoring, and surveys provide feedback to guide possible changes at site and the programming to better fit the needs of workers. One example is the establishment of improved cell phone coverage following a vitality survey of rotational workers to better connect workers with family and friends while on rotation. The vitality survey of rotational workers is one of more than a dozen projects carried out since 2000 by the Community Vitality Monitoring Partnership Process, a partnership between AREVA, Cameco and provincial health authorities.

Aspects of a site that make people conformable are likely to vary between Saskatchewan and Nunavut and it will be important to implement mechanisms for open communication and feedback so that issues can be identified and positive changes made throughout operations. There is familiarity, comfort, and identity in speaking in a person's mother tongue (AR OH Nov 2012[65], RI KIA Jan 2010[66)] and AREVA anticipates the use of Inuktitut in informal settings and diverse recreation programming that includes traditional or popular Nunavut activities will be important to site morale at the Kiggavik site. The ability to connect with those in the community during rotation will be important (RB OH Nov 2012[67], WC HL Nov 2013[68]). Rotational work can be beneficial (BLRW 2009[69]) and difficult (CI OH Nov 2012[70]) and possible mitigation needs to consider the whole family (CH OH Nov 2010[71]). There are a number of current initiatives in Nunavut to better consider the families of

[64] This is consistent with the IQ principle of Aajiiqatigiingniq/Pitiakatigiiklotik, which means that people who wish to resolve important matters or any differences of interest must treat each other with respect and discuss them in a meaningful way, keeping in mind that just because a person is silent does not necessarily mean he or she agrees.

[65] I have a scar from being pushed into a brick wall for speaking Inuktitut. I am fair, but this is why I am passionate about language and the right to speak Inuktitut at the mine sites. I understand that English is needed for safety but other languages should be allowed for times when safety is not compromised.

[66] Are there any in-house regulations that would prevent Inuit workers from speaking their native language at work?

[67] I liked the two-week schedule at Meadowbank, but didn't want to stay because there was not enough phones available to call home. Diavik had a phone in every room, and a bathroom. You should provide a phone in every room.

[68] People want to work. Being away from home is a challenge.

[69] Rotational workers said that having employment means they can afford hunting gear, such as ATVs or snowmobiles, and that combined with a two week on and two week off rotation, they can go on the land and hunt more than they were able to prior to employment.

[70] Will you hire people to work in each community (community liaison officer) - someone who doesn't work on a rotational schedule? A rotational schedule will not suit my life.

[71] I am concerned about family violence after people leave for rotational shifts. Young Baker families are becoming broken because the men working rotations need support and encouragement. The mine benefits but we will have broken families.

potential workers in making the decision to accept, prepare for, and successfully cope with rotational employment. AREVA will be evaluating these programs for success and exploring other ways to support family cohesion for rotational workers.

As stated in AREVA's Human Resources and Training Policy, AREVA is committed to provide quality third party assistance for employees who require support with substance abuse, family problems or other personal situations that impact them. An Employee Family Assistance Program (EFAP) is in place for current operations and includes professional counselling, by phone or in person, and planning services for workers and their families on a 24 hour basis. The services offered in the current EFAP plan include:

- learning parenting skills, improving intimate relationships, breaking habits and addictions, getting emotional support, learning to the get the most out of individual career choices, etc.;
- receiving support for care-giving of children, people with special needs, the elderly, or anyone experiencing problems such as potential substance abuse or mood changes; and
- online resources, including health and wellness information and articles, newsletters, and online learning tools.

Informal counselling (i.e. outside of the formal EFAP program) is available at AREVA's Saskatchewan operations through an onsite Elder program. Elders have quiet office space available and provide an alternate source for guidance and advice. The relationship of this position to the occupational health nurse, human resources, and others is regularly evaluated to respect confidentiality while providing the support required and intended to workers and the elder.

There are Kivalliqmuit who recognize the occasional need and value of outside support (BL CLC Jun 2011[72], KIV OH Oct 2009[73]) and AREVA commits to providing a competitive EFAP benefit for the Kiggavik Project employees and their dependent family members, likely to be negotiated during Project licensing and described in future revisions of the Human Resources Development Plan. The plan will be modified for application in Nunavut to ensure relevance and effectiveness. Availability of the service in Inuktitut or the use of a translator and the duration of transitional services following

[72] I have lost four members of my family; you can tell who will be a victim, because they become really nice and generous just before they take their life. When young people are addicted drugs, they start to be afraid to admit or look for help, that is the time they commit suicide. They are under the darkness.

[73] Should employees have a personal problem (family, alcohol and/or drugs), will AREVA help?

closure will be negotiated with the provider at a later date but considered priority items by AREVA. The hiring of positions that may include informal counselling for the Kiggavik Project may be elders or peers, details of which may be the subject of Inuit Impact Benefit Agreement negotiations. AREVA will cooperate with stakeholders in Nunavut interested in the well-being of Nunavummiut to take advantage of synergies where they exist while respecting organizational mandates.

7.4 Northern Alberta Oil Sands

The experience in northern Alberta with the development of the oil sands is of interest primarily because it is an example of the eventual response on the part of governments and the private sector to quite unexpected rapid population growth.

The example is considered to be an extreme one. The situation in northern Alberta is not comparable to what might be expected in Kivalliq. Population growth attributable to in migration into Fort McMurray from elsewhere in Canada and the rest of the world has been in response not to one, but to dozens of new large developments and has largely occurred since the late 1990s (i.e. 30 years after the initiation of oil sands development). Further, it is noted that various oils sands project environmental assessments continually underestimated population increases – increases were consistently higher over the 2000s than the 'maximum' growth scenarios projected in these environmental assessments – leaving Fort McMurray quite unprepared for the population increases that did occur.

Challenges to government in delivering services in Fort McMurray are largely being met as follows:

- Government has been planning and implementing projects, from airport expansion, to affordable housing for seniors, to improved health care delivery, to school construction, with additional resources being made available, at least in part as a result of oil sands projects. Stickiness (supply following increased demand only after some time has passed) has clearly been evident – the population increases were quite unexpected thus addressing issues has been largely reactive rather than proactive.
- Oil sands companies had been accommodating many more of their workers, and their needs for services, in camps (AREVA will accommodate all its workers at site) and finding alternatives to their use of public services, such as building private airstrips (Kiggavik includes the construction of an air strip at the mine site).
- More recently, Fort McMurray is now looking at encouraging, while better managing, population growth. Oil sands companies are being requested to facilitate workers living in the city rather than in camps. Their primary response has been the provision of housing allowances to workers, but it is important to note that this is in lieu of, not additional to, accommodation in camps. The city has been granted land to physically expand, and is working with public and private sector partners to increase the stock of housing. Oils

sands workers in the town, as opposed to in the camps, are considered to be a major component of (controlled) desired economic growth.

Thus, while it is certainly true that Fort McMurry has struggled with population growth, resources consequent on development of the oil sands have made, and continue to make, it possible to meet demands for increased infrastructure and services. And ultimately, decisions have been made to encourage yet more, permanent in migration rather than attempt to constrain it. It is noted that Yellowknife is pursuing a somewhat similar path – mining companies are facilitating, and in some cases requiring as a term of employment, migration into Yellowknife of southern hires.

8 Assessment of Effects on Community Economies

Effects on community economies will largely be driven by opportunities the Project will create for employment and contracting. As noted in Section 6, Socio-Economic Management, AREVA will put in place measures to increase the capacity of people in Kivalliq to take advantage of these opportunities, including a range of education and training initiatives. To the extent that economic opportunities can be taken up by people in Kivalliq, there will also be economic growth and diversification in at least some communities, incomes will increase and some people can be expected to migrate.

Not all positive effects will necessarily be immediately seen in their full potential, but are expected to gain momentum with time. It is noted that the construction and now operations of Meadowbank has prepared some of the ground for growing capacity in Kivalliq region to supply labour, goods and services to the mining sector. With regard to negative effects, most of these are expected to become evident in the transition first into construction and then into operations. With time then, negative effects are expected to moderate as people and the economy adjust to the Project.

A complicating factor in the assessment of residual effects on community economies is that rapid growth in the labour force is ongoing and is expected to continue for some time, well into the Project's construction and operations phases. What now may appear to be a comparatively tight labour market, specifically for recruitment of people both willing and able to take up rotational employment, has potential to change dramatically over the interim until the Project begins construction. The degree of change will depend on job creation – to the extent that job creation does not advance as quickly as labour force growth is the extent to which the labour market can be expected to loosen. The degree of change will also depend on educational levels of new entrants to the labour market. There is evidence that high school graduation rates are increasing, thus new entrants to the labour force are expected to have increasingly higher educational achievement than has been the case in the past.

Job creation will be strongly affected by progress with the Meliadine and Mary River projects over the interim to AREVA's expected start of construction. The available information on Meliadine suggests that the project will be comparable in size to Meadowbank (AEM, 2011b). Although Mary River is in Qikiqtaaluk Region, the enormous size of that project implies very high demand for Inuit labour, goods and services, demand that has potential to spill over into Kivalliq Region. Labour market conditions in 2017 and beyond will in large part depend on whether or not either or both of these projects move into their construction phases before the Project does.

8.1 Assessment of Effects on Community Economies

8.1.1 Analytical Methods

The analysis of employment, contracting and income effects has been somewhat quantified on the basis of patterns of Inuit participation in various projects to date, the Project feasibility study data on AREVA's expected work force size and skill requirements, and baseline conditions and trends regarding population and labour force size and growth rates, participation rates and educational achievement.

Scenarios are developed to demonstrate potential residual employment effects. Table 8.1-1 shows the primary assumptions used in this scenario building. The sources of the numbers in are listed below the table.

Table 8.1-1 Values Available, Calculated or Estimated for Scenario Building

	2013	2017	2021	2025
A Population	10,266	10,997	11,787	12,590
B Population annual growth rate (%)	n/a	1.7	1.8	1.7
C Population 15 to 64 years	6,470	6,599	6,731	6,866
D Participation rate (%)	66	67	68	68
E Labour force	4,270	4,422	4,577	4,669
F Labour force annual growth rate (%)	n/a	3.5	3.5	2.0

Sources:

A Actual for 2013 (NBS 2014a) and projected for 2017 forward on the basis of 2013 population and expected growth rates (NBS, 2014e).

B Calculated from A.

C Actual for Statcan2013a (NBS, 2014a) and estimated for 2017 forward on the basis of a 2% annual growth rate for this age group.

D Actual for Statcan2013a (NBS, 2014c) and estimated for 2017 forward on the basis of an expected participation rate of 68% in 2018 (CBoC, 2013).

E Calculated from C and D.

F Calculated from E.

Contracting opportunities and expectations for Inuit access to these can be quantified; however residual effects will depend on a number of factors relevant to the capacity of business to access opportunities – including, importantly, availability of workers and developments of joint ventures. The assessments of education and training effects, indirect and induced economic effects and income effects are necessarily also largely qualitative. In migration from outside Nunavut is not considered a likely source of population growth however mining projects do create opportunities for people to move between communities, including to communities outside Kivalliq. Numbers cannot be estimated, thus the discussion of migration effects is qualitative.

Increased economic opportunities are considered in this section to largely represent benefits, in and of themselves. This is not to imply that there are no consequent negative effects, such as effects on traditional culture, community wellbeing and public infrastructure and services. Such effects are addressed in subsequent sections of this assessment.

8.1.2 Employment

8.1.2.1 Construction

The Project's direct construction phase employment is expected to be predominantly by construction contractors, of which the largest will be southern based companies with their own established, skilled work forces. Skill sets required are different at different times over the course of a large construction project, thus many skilled jobs are short term. The high financial cost of construction phases, with no return on capital investments until mine production begins, forces very tight schedules with fewer opportunities for on the job training than is characteristic of mining project operations phases.

These conditions are inherent in mine construction. The major implication of these conditions as regards the employment of people in Kivalliq is that most employment is expected to be employment of people with unspecialized skills. The advantage however is such employment – catering, security and cleaning for example – can be continuous throughout the four year construction phase.

Work force requirements for construction will vary over time, but will average about 750 and peak at about 1,200. It is conditionally estimated that in the order of 15% to 20% of these jobs will require unspecialized skills (representing up to 150 jobs on average and up to 240 at peak). Skilled workers would also of course be offered employment to the extent that such workers are available. There are experienced construction workers in Kivalliq. In 2011 690 people, about 20% of the labour force, had experience in trades, transport and equipment operations (Statcan, 2013a).

Table 8.1-2 provides data on Inuit participation in mining projects in Kivalliq to date and includes AREVA data on the northern Saskatchewan experience. In addition to the information in the table, Agnico Eagle (2014) has recently reported that between 30% and 50% of its workers at Meliadine are Inuit (employment varied from month to month through 2013). Thus the experience to date indicates that a 20% Inuit work force is a conservative estimate of what is achievable.

Table 8.1-2 Recent Employment Data

	Total employment	Local employment
Agnico Eagle, Meadowbank construction, 2007/2008		
no.	612	132
%		22
Agnico Eagle, Meadowbank operations, 2011 and 2013		
no.	1,114 and 730	270 and 226
%		24 and 31
AREVA and Cameco, various Saskatchewan construction and operations, 2011		
no.	3,723	1,746
%		47
AREVA , McClean Lake operations, 2013		
no.	256	115
%		45

Sources: AEM, 2014, 2011a and 2010; AREVA internal data.
Note: Local employment refers to Inuit employment in Nunavut and to northern Saskatchewan employment in Saskatchewan.

AREVA expects that up to 150 construction phase jobs will to be taken up by people in Kivalliq, which represents just over 20% of the about 700 unemployed in 2011 (Statcan 2013a). It is noted that not all these unemployed will necessarily be both willing and able to take up rotational work at construction.

First, on grounds of efficiency and of health and safety, there will be minimum language and education requirements to work for the Project. The work language will necessarily be English and basic literacy will be required. Given the considerable evidence that employment rates are correlated with educational achievement (for example GNBS (cited in Cumberland, 2006), which looked specifically at the correlation between education and employment in Nunavut), many of the unemployed are expected to have low to very low educational levels that may exclude them from employment with AREVA.

Secondly, Agnico Eagle's experience suggests that rotational work has proven quite challenging for many. At Meadowbank turnover rates were initially very high. This was not because of dismissals. Agnico Eagle reported to the Kivalliq SEMC (AEM, 2010) that of over 223 terminations in 2008 to 2009, only three were dismissals. A further 100 were because contracted short term work had come to an end. The balance, over 50% of all terminations, was voluntary resignation. Different reasons were given, including child care difficulties, spousal need and just not liking the work. AREVA's focus

group discussions suggest that for those who do stay employed, taking up rotational work is the trade-off they have chosen for secure employment at good wages. Long work days and isolation from family and community were reported as stressors. The seasonal pattern of Meadowbank resignations – there is a spike during the spring – also suggests that people would prefer to be on the land at least at this time of year.

Agnico Eagle has however reduced turnover rates substantially more recently, from 25% in 2011 to 16% in 2012 to 8% for the first ten months of 2013 (AEM, 2013). This is the expected adaption over the early years of operations.

Thirdly, the discussion above is general to the labour force and does not take into account that rotational mines continue to have difficulty attracting female employees. Despite efforts to attract and retain female employees, AREVA achieves only 15% female representation at McClean Lake (AREVA, internal data) and Agnico Eagle 32% at Meadowbank (AEM, 2013).

These three factors – limited educational achievement, challenges of rotational work and limited participation by women – might suggest that AREVA could have some difficulty in identifying workers from Kivalliq. However, there are at least four countervailing factors.

First, large numbers of people continue to enter the labour force. Table 8.1-3 provides an indication of potential new entrants to the labour force by 2017 (and by 2021), using population by single year age for Nunavut (see column A) as the basis for calculating population by single year for Kivalliq (see column B, calculated at an assumed 29% of Nunavut's population[74]) and new entrants to the labour force (see column C, calculated at an assumed participation rate of 65%[75]). The estimate is that there will be over 500 new entrants by 2017 (and an additional 500 by 2021).

[74] About 29% of Nunavut's population was in Kivalliq in 2010. Kivalliq's population is growing faster than Nunavut's however, thus 29% is conservative.

[75] This is the average participation rate in Nunavut since 2008. Participation rates tend to increase with increases in employment opportunities, thus 65% may be considered conservative.

Table 8.1-3 Kivalliq Labour Force Growth Rate Scenario

Age		A Nunavut	B Kivalliq	C Kivalliq New Entrants
17	18 years and over by 2017	624	181	118
16		695	202	131
15		682	198	129
14		669	194	126
Subtotal (new entrants by 2017)				*504*
13	18 years and over by 2021	665	193	125
12		686	199	129
11		680	197	128
10		713	207	134
Subtotal (new entrants 2018 to 2021)				*516*
Total (new entrants by 2021)				**1,020**

Source: Calculated from NBS, 2014e

People will also leave the labour force during these years – similar calculations indicate that about 145 workers between the ages of 61 and 64 (and 185 workers now between the ages of 57 and 60) can be expected to leave. So only about 70% of new entrants represent labour force net growth by 2017, equal to about 350 people.

There will be job creation in Kivalliq over the coming decade – not all of these people can expect to be unemployed and available for work at the Project of course. However Table 8.1-4 does confirm that the concerns of both government and people about the availability of jobs for large numbers of youth newly joining the labour force are well founded.

Secondly, people may choose to move from part time and seasonal to full time/full year work. There are no data to indicate the degree to which workers choose or must accept part time and seasonal work. However over 50% of people in the labour force in Kivallliq in 2011 did not work full time for a full year, equivalent to over 1,700 people (Statcan, 2013a). Some of those would choose to work full time/full year if they could. The time that part time and seasonal workers who want to work full time/full year, but currently do not, represents additional labour force availability.

Thirdly, there are hopeful signs that the young are responding to improved economic opportunities by completing high school – high school graduations in Kivalliq have doubled since 2000, to 94 graduates in 2012 (NBS, 2014c). These graduates represented 50% of 18 year olds in Kivalliq in 2012. If the 750 children who will reach 18 years over the coming four years graduated at a rate of

50%, this would be about 375 graduates. Not all of these graduates will enter the labour force immediately – some of will move on to postsecondary education and enter the labour force later, and some will choose not to participate in the labour force.

Fourthly, employment at good wages is expected to attract some of the more than almost 1,700 workers (in 2011) who are already fully employed. While this does not have any effect on available labour, such people are a source of workers and create opportunities for others to take up the jobs they have left.

There are also additional factors that can affect worker availability to the Project. As noted in Section 6, Socio-Economic Management, AREVA expects to investigate, as it hires Inuit, options for flexible work force management that may make it easier for people to take up, and stay with, rotational employment. As well, participation rates could rise in face of more employment options.

There are thus a host of factors that will influence the availability of labour as this develops over the interim to 2017. On balance, it is expected that AREVA should have little difficulty in achieving a 20% Inuit work force, although there is some potential for this to involve people leaving jobs to take up employment with AREVA (see Section 8.1.4 below).

As an illustration of the potential for effect on unemployment rates in communities, Table 8.1-4 develops a community level scenario. The scenario is based on 2011 census data on the labour force size and employment, the last year for which there are data available at a community level (Statcan, 2013a).

Table 8.1-4 Employment Scenario, 2011 and 2017

	Arviat	Baker Lake	Chesterfield Inlet*	Coral Harbour	Rankin Inlet	Repulse Bay	Whale Cove	Kivalliq
2011								
Labour force size	860	790	110	270	1,145	260	165	3,600
Number employed	620	640	90	240	975	195	130	2,890
Number unemployed	240	150	20	30	170	65	35	710
Unemployment rate (%)	27.9	19.0	18.2	11.1	14.8	25.0	21.2	19.7
2017								
A Labour force size	1,057	971	135	332	1,407	320	203	4,424
B Number unemployed at current unemployment rates	295	184	25	37	209	80	43	873
C AREVA employment scenario	30	30	10	20	30	20	10	150
D Number of unemployed with AREVA employment	265	154	15	17	179	60	33	723
E Unemployment rate with AREVA employment (%)	25.1	15.9	10.8	5.1	12.7	18.7	16.3	16.3
F Alternative AREVA employment scenario	21	102	3	1	20	1	2	150
G Number of unemployed with AREVA employment	274	82	22	36	189	79	41	723
H Unemployment rate with AREVA employment (%)	25.9	8.5	16.0	10.8	13.4	24.7	20.2	16.3

Sources: Statcan, 2013a for 2011 data. StatcanNote: *Statistics Canada does not report labour force characteristic data for Chesterfield Inlet, but does for each of the other communities and for Kivalliq as a whole. Data for Chesterfield Inlet are simply the Kivalliq totals minus the totals for each of the other six communities and are therefore only approximate.

Applying a 3.5% annual increase to the 2011 numbers gives labour force size estimates for 2017 (see row A). Applying the 2011 unemployment rate to the 2017 labour force numbers gives a first indication of what the number of unemployed in 2017 might be (see row B). The number for Kivalliq as a whole is 873, about 160 more unemployed than there were in 2011, an increase of over 22% in the number of unemployed people.

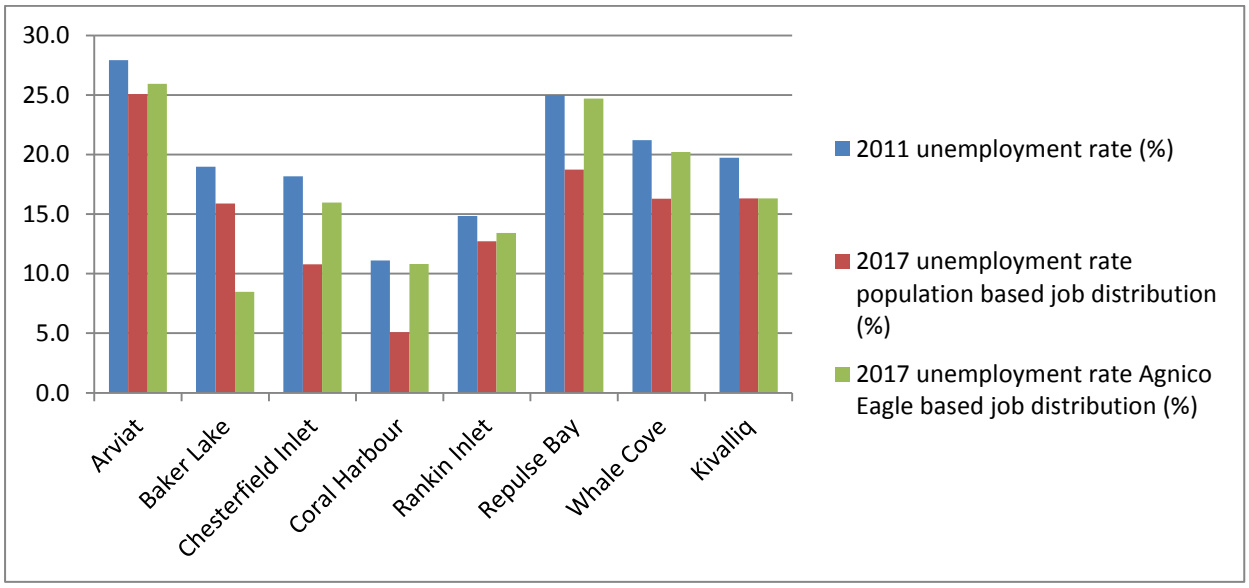
Two scenarios are presented to look at the effect of the Project on community unemployment rates. In row C, the distribution of jobs across communities is approximately reflective of population size and in row F, the distribution is approximately what Agnico Eagle has been able to achieve on Meadowbank. It is of course unknown at this point which communities AREVA's workers will come from in detail. AREVA's employment would reduce the number of unemployed (see rows D and G for the two scenarios respectively), giving unemployment rates in the order of what are in rows E and H.

Comparing the estimated unemployment rates in 2017 (see rows E and H) with those in 2011 will show that AREVA would be expected to decrease unemployment rates at the level of Kivallliq by

3.4%. Decreases in unemployment rates at the level of communities are largely dependent on how jobs are distributed (although other factors are also relevant), however it is clear from the table that important decreases can be achieved with comparatively small numbers of added jobs.

Figure 8.1-1shows the potential effects of AREVA jobs on unemployment rates more visually. The figure shows what the 2011 situation is and what could happen by 2017 if job distribution approximately reflected population size and if job distribution approximately followed the pattern of Agnico Eagle. Although for both scenarios the regional unemployment rate would decrease by 3.6%, the potential affects at community levels are variable, depending on what assumptions are made about job distribution. For all communities except Baker Lake, the more proportionate job distribution, based on population, has a greater effect on unemployment.

Figure 8.1-1 Unemployment Rates, 2011 and 2017



Source: Derived from Table 8.1-5

Although a fall of 3.6% in unemployment rates is very large (witness the importance given to falls in unemployment rates of tenths of a per cent in the rest of Canada), it is clear from the above figure that unemployment, irrespective of Kiggavik, will remain a challenge in Kivalliq. The relative fall in unemployment rates in most communities for both scenarios is not that large relative to current unemployment rates.

It is emphasized that the above is not predictive, but is only an indication of the potential for impact. Factors that affect unemployment rates, both at the regional and community levels, include the size of the labour force and the participation rates. These in turn are the result of such things as net

migration, educational achievement levels, school – particularly post-secondary school – attendance rates, and people's perceptions of the job market. As at 2011, Kivalliq's unemployment rate was 19.7%, about 4% higher than in 2006. A 3.6% reduction as a result of 150 AREVA jobs cuts the employment rate by less than a fifth. If unemployment rates fall between 2011 and 2017, the proportional effect is much greater. At an underlying 15% unemployment rate in 2017, AREVA jobs would cut the rate by a quarter, and for a 10% unemployment rate, by more than a third. Such rates are not out of the question. The Conference Board of Canada (2013) expects decreasing unemployment in Nunavut over the period to 2020, in part in response to mining sector developments, including Meliadine.

8.1.2.2 Operations

AREVA's work force requirement for the operations phase is estimated at 550, and the demand for unspecialized people for this phase will also likely approach 150. As well, AREVA will prepare for the operations phase by training up to 120 people at educational institutions in Nunavut and its mining operations in Saskatchewan, that is, up to 120 people will be trained up to at least a semi-skilled level for employment at the Project. Thus there is potential with time for total Inuit employment of about 270 people, approaching 50% of the work force.

It is expected that the same constraints, as described for the construction phase in Section 8.1.1, will apply during operations, some trainee attrition is expected and as a uranium mine, as opposed to a construction site, labour force skills will need to meet more stringent standards. So it is unlikely that a 50% Inuit work force will be achieved early in the operations phase. It is also expected that by the time operations begin in 2021 the employment situation in Kivalliq will have changed substantially in face of competing demands for mining workers not only in Kivalliq but across Nunavut.[76]

As the same constraints apply, so do the opportunities. The labour force will continue to grow, and there are expectations that so will educational achievement of new entrants. In addition, learning experience and adaption of work force management policies to Inuit needs should make it easier for people to take up and stay in rotational employment over time.

[76] Section 13, Residual Project Effects Assessment on the Economy of Nunavut, addresses future developments in the mining sector in Nunavut. The growing skill levels of both labour and business, specific to mining, in Kivalliq is expected to result in hiring in Kivalliq for other projects in Nunavut, of which there are at least six (in addition to the Project) which might be expected to be in operation by 2021.

Agnico Eagles experiences with various community and mine site based initiatives to help people prepare for, succeed at and stay with employment are particularly instructive in this regard. From early challenges, the company feels it has developed a core of long term, increasingly qualified Inuit employees. After less than four years of operation, i) Inuit make up over 30% of workers: ii) 40% of Inuit are in semi-skilled or skilled jobs: iii) turnover has decreased to about 10%: and iv) unusually for the mining industry, 30% of Inuit employees are women (AEM 2013).

Constructing community scenarios for 2021 similar to those for 2017 becomes overly speculative, however the same relationships apply – unemployment rates will decrease as a result of The Project in proportion to hiring in each community. Reference to Table 8.1-1 will suggest that the labour force in Kivalliq has potential to increase by 3.5% per year over the period 2011 to 2021, to over 5,000 people. Two hundred and fifty jobs represent 5% of the expected labour force in 2021. Thus The Project employment can be expected to reduce the unemployment rate by 5% in that year.

Secure, long term employment has both individual and community level effects. Specific comments from interviews and focus group discussions about the employment effects of Meadowbank were very positive, particularly those comments from people who have been able to access jobs. (It is noted that there are concerns in Baker Lake about a number of social effects consequent on employment. These are addressed in Sections 9, 10 and 11, Assessment(s) of Effects on Traditional Culture; Individual, Family and Community Wellbeing; and Public Infrastructure and Services respectively.

Box 8.1-1 Meadowbank Employment Effects on Baker Lake

Comments on the experience of employment:

- feel differently about ourselves from having jobs
- have been able to earn and save money and spend it wisely
- are happier and less stressed (no bills) and so are spouses and kids
- met lots of new and interesting people (including from the south)
- learning a lot on the job
- known and respected in town
- more self-confident and able to solve problems
- more independent and able to do what is right

Children have a brighter future in Baker Lake than in other Kivalliq communities.

The mine has been good for Baker Lake. Lots of people are working now, so that is very good.

Lots of Inuit are working now which is very good and a high percentage are keeping their jobs.

Workers are mostly buying equipment to go hunting. Hunting is enjoyable and provides food to households.

Being able to buy boats, cars and snowmobiles, allows people to hunt and fish more than before.

The Inuit are starting to build/buy their own homes. Baker Lake Contracting and Supplies has built 20 new houses for the private market and will continue to build new ones.

8.1.3 Contracting Opportunities

As for the labour force, the capacity to supply goods and services to the mining sector is rapidly evolving in Kivalliq. Existing businesses are expanding and new businesses and joint ventures are being formed in response to the economic opportunities offered by Meadowbank and ongoing active

exploration. This is expected to continue over the interim until AREVA's planned construction start date, as progress with Meliadine will provide additional stimulus to business development.

Historical data on expenditures on goods and services in Nunavut are provided in Table 8.1-5. The data suggest that in the recent past, between 33% and 56% of expenditures of Agnico Eagle on Meadowbank and Meliadine have been spent in Nunavut, almost all of it in Kivalliq.[77]

Table 8.1-5 Historical Expenditures on Goods and Services ($000)

	Total expenditures	Regional expenditures	Local expenditures
Meadowbank construction, 2007/2008			
$	512	171	na
%		33	na
Meadowbank construction and operations, 2007 to 2013			
$	2,317	902	373*
%		39	16
Meliadine development, 2010 to 2013			
$	186	104	94*
%		56	50
AREVA Project development, 2007 to 2013			
$	68	17	na
%		25	na
AREVA and Cameco, various Saskatchewan construction and operations, 2011			
$	1,100	814	464
%		74	43

Sources: Cumberland, 2006; AEM, 2013 and 2010; AREVA 2013 and Intergroup 2013.

Note: For Nunavut projects, regional = Nunavut and local = Kivalliq with two exceptions (*). For Meliadine, local = Rankin Inlet only and for Meadowbank local = Baker Lake only. For Saskatchewan projects, regional = Saskatchewan and local = northern Saskatchewan.

[77] AEM (2013) notes that large Nunavut based suppliers include Sakku First, Arctic Co-ops, Kivalliq Services, BLCS, NSSI, Sarliaq Holdings, Inukshuk Construction, Sakku Nunami, Boart Longyear, Orbit, Q Sana, Toromont Arctic, Arctic Fuels, Peter's Expediting, Qaaqtuq Dyno Novel, and Nolinor.

AREVA's purchases of goods and services over the period of the exploration and development phases of the Project have included fuel supply, catering, accommodations, environmental, transport and drilling services. A total of about $17 million has been paid out in Nunavut for goods and services, again most of this in Kivalliq. This total represents about 25% of the estimated $68 million in total exploration and Project development expenditures to date.

It will be noted in the above table that AREVA/Cameco purchases in Saskatchewan and northern Saskatchewan are higher than what typically has been achieved in Nunavut. Part of this, particularly the figure for northern Saskatchewan, is certainly attributable to the long history of uranium mining there and the industry`s success in motivating supplier responses to contracting opportunities. Over time, with increasing experience of business with the uranium and with benefit enhancement measures put in place by AREVA, Cameco and government, there has been upward pressure on the percentage of total expenditures in northern Saskatchewan. As mining further establishes itself in Kivalliq, there will similarly be growing capacity on the part of business to meet the needs of large mining operations.

It is to be noted that the figures in Table 8.1-6 are only for expenditures invoiced in Kivalliq and Nunavut. As such, they will be reflected in such economic statistics as business expenditures and final domestic demand, but only partially reflected in GDP growth. The Conference Board of Canada (CBoC, 2001) has pointed out and public accounts continue to confirm, that leakage is high. This means that dollars expended in Nunavut find their way outside the territory, largely through incomes spent on imports of southern goods, and business expenditures on supplies and labour to meet contractual obligations but also through federal taxation and savings. The figures in Table 8.1-6 therefore overstate the real economic boost to communities, which will largely derive from wages for Kivalliq residents that businesses hire to meet contract requirements and on business profits that are reinvested in Kivalliq. CBoC estimated leakage in Nunavut due to import expenditures in 2001 only at 53 cents on the dollar. Statistics Canada data on Nunavut's economy indicate that leakages had grown to 62 cents on the dollar by 2012, with the increase largely driven by the increased spending by businesses (Statcan, 2013).

AREVA`s total construction expenditures on contracted goods and services are expected to reach $1,200 million[78] over a four year period. If AREVA achieves at least 20% of these expenditures in Kivalliq, this represents about $240 million, or an average of about $60 million per year. Total operational expenditures on goods and services are expected to be in the order of $145 million per

[78] All AREVA spending estimates are in 2011 dollars.

year over the period 20021 to 2035. Again, if 20% of these expenditures were spent in Kivalliq, this would be about $30 million annually.

There are no data on the size of the economies in each of Nunavut's regions however an approximation can be calculated on the basis of data on average incomes, population size and savings rates (Statcan, 2013 cdn and 2013b). It is likely that the gross domestic product in Kivalliq in 2011 was in the order of $400 million and total demand in the regional economy would be about 50% higher than that. AREVA's expenditures would thus represent about 25% and 5% of total demand in 2011 for the construction and operations phases respectively, but smaller percentages in future years as the Kivalliq economy grows.

Again it is noted that these figures are indicative of potential rather than predictive. Although capacity on the part of businesses to respond to mining sector requirements is clearly expanding in Kivalliq, so is demand. Rapid expansion in face of rapidly increasing demand will require capital, workers and management systems that may take some time to develop. Response to a combination of demand from Meadowbank, The Project and Meliadine may be challenging to achieve. Although Mary River is not in Kivalliq much of Inuit capacity to supply large projects is now within Kivalliq – a drive for Inuit content from by Mary River could represent additional demand in Kivalliq. As well, business has as yet little experience with uranium mining needs specifically, which could constrain response.

With regard to distribution of contracting opportunities among communities, all indications are that most will be seen in Baker Lake and Rankin Inlet. Almost 70% of Kivalliq's NTI (undated) registered businesses are in these two hamlets, as are most non Inuit majority owned joint ventures, including those that have been most contracted to date by Agnico Eagle and by AREVA during its exploration phase. Baker Lake and Rankin Inlet are also in closest proximity to many foreseeable mining projects. Baker Lake is in closest proximity to two thirds of exploration projects in Kivalliq. Rankin Inlet is the regional hub. As supply to the mining sector becomes more competitive, Baker Lake and Rankin Inlet have cost advantages that other communities do not have.

8.1.4 Training

AREVA acknowledges that achieving the potential effects described above will, in some part, depend on labour force and business education and training. It is also noted in this regard that consultation results indicate strong Inuit interest in training, motivated both by the understanding that training will be needed to access mining jobs but also by rapidly increasing training opportunities put in place in Nunavut, as opposed to in southern Canada, by GN. Business are also eager to develop capacity in order to take advantage of contracting opportunities, as evidenced by the number of joint ventures that have been formed with southern companies. As noted in Section 6, Socio-Economic Management, AREVA's planned interventions in education and training include not only initiatives to meet the Project's work force and supplier needs, but also broader based initiatives to encourage

children to stay in school and to work with educational institutions to increase mining sector content in curricula.

It is AREVA's policy, and has been practice both in northern Saskatchewan and over the development phase of the Project, to provide on the job training to employees. Such training is intended both to improve skills towards improved job performance and promotion and towards broadening the skill base of employees such that new or strengthened skills can be applied elsewhere in the economy. Job experience and training in heavy equipment operation and maintenance, construction trades (including electrical, plumbing and carpentry training), catering, environmental studies, health and safety, computers and information technology, and accounting and clerical work – even if provided in a mining sector context – is transferable.

There is some potential for such on the job training during construction, for example for people in support positions to construction trades and equipment operation work, such as for catering and office workers. However most on the job training will take place over the operations phase, as the Project builds to a 50% Inuit permanent workforce. In addition, AREVA expects to offer training and job experience at its mine site in northern Saskatchewan to Kivalliq people during the construction phase, to prepare them to work at the Project during the operations phase.

On the job training brings multiple benefits. It enhances job performance and enables both promotion of people trained and the subsequent opening up less skilled position to new workers from communities. It is this process that allows AREVA to expect to increase the numbers of Inuit employees over the early years of operations. On the job training of Inuit supervisors is expected to enable at least some work crews to work in Inuktitut at some point, potentially both widening the pool of available labour and enhancing job satisfaction. As noted above, many mining skills developed through Project specific training are transferable – AREVA trained workers whose personal circumstances change, making rotational work less preferred, will bring skills back into communities, working better at hamlet jobs and, for example, at jobs with businesses serving the mining sector.

Beyond on the job training however, AREVA will also provide assistance to those who wish to develop the skills which can better position them for the Project employment and contracting. Such assistance would include pre-employment programs, educational institution based programs such as apprenticeship and technician programs, and training for businesses. Agnico Eagle's participation in the Kivalliq Mine Training Society (KMTS) has some potential to serve as a model although it is not known if this initiative will still be ongoing, or needed, four years from now. The specific objective of the KMTS is to enhance the capacity of the people to work for Agnico Eagle, or other mining sector employers, at levels beyond the unspecialized skilled jobs many may only be qualified for initially.

AREVA`s thinking on education and training initiatives has a second dimension. As noted above, the young of Kivalliq are struggling to stay in high school, and although graduating numbers have improved remarkably over the recent past, graduation rates are still well below Canadian averages. It

also was clear during consultations and data collection that even as some children may be moving away from interest in traditional activity some of these are not, as a counter measure, succeeding at finding a secure place in the wage based component of the economy. The fear is that some children have shrinking livelihood options.

Accordingly, education and training initiatives will be developed by AREVA, in association with governments, education authorities and communities, with a view to enhancing educational achievement levels in Kivalliq. The emphasis would be on motivational, lifestyle, curriculum[79] and financial issues related to getting children through high school and continuing on to postsecondary education. Such measures would be intended to contribute to encouraging a commitment to education on the part of youth and to provide the tools these children need to succeed at this commitment. To the extent that children stay in school and graduate, and more proceed to postsecondary education, including training as teachers and health staff, this will also contribute to GN goals of providing more services to Inuit in Inuktitut, and of increasing the representativeness of government workers.

In face of ongoing changes in both the delivery and uptake of education, the detail of such measures will necessarily depend on needs as these are identified closer to the start of construction. It is also noted that, in addition to training, simply gaining experience on the job and in contracting to meet the supply needs of the Project further enhance capacity in the labour force and in businesses. Preferential employment and contracting, and education and training, are mutually reinforcing.

8.1.5 Economic Growth and Diversification

Direct Project expenditures on goods and services will be large relative to the size of the Kivalliq economy. In addition, there will be indirect and induced economic effects. Indirect effects occur when businesses are contracted to supply the Project and require new employees to meet contractual obligations. An example from Baker Lake might be the increased activity in the hospitality sector, at least in part as a result of mining project associated visitors in the hamlet. As well, with increasing direct and indirect economic activity, individuals and business will be spending increasing incomes on goods and services. This in turn will induce more employment, and perhaps more small businesses, as people in communities organize to provide additional goods and services demanded by others with new disposable income.

[79] Curriculum issues include, as examples, learning methods, content children feel that is relevant to their adult lives and opportunities for traditional studies.

Additional income may be spent for example on renovations to housing, increased travel, new household appliances, vehicles that will require maintenance, and other consumer items. This process of direct economic effects feeding back into community economies represents both economic growth, and diversification as consumers change spending patterns. The best examples are in Baker Lake, where there is now additional demand for consumer goods and business has organized to meet that new demand; and in Rankin Inlet where its economic advantage as the regional hub has meant more goods and services are available here than, for example, in the bigger hamlet of Arviat.

Section 13, Assessment of Effects on the Economy of Nunavut, suggests that such indirect and induced effects would be large. Because the Project's employment and contracting is expected to be very predominantly in Kivalliq, most of these indirect and induced economic effects would be seen in this region. Even taking into account that many indirect jobs will have skill requirements that may not be easily met initially, a conservative interpretation of the territorial economic effects suggests that at least as many indirect and induced jobs would be created for Kivalliq residents as direct jobs during construction (150 jobs) and operations (250 jobs). That is, the employment effects described in Section 8.1.2 would be effectively doubled. Income effects (see Section 8.1.6) however are likely to be less than double, as wage rates in community economies are not expected to be as high as those paid by AREVA.

It is true however that rapid economic growth can have negative effects. Because over half of what Nunavut consumes comes from southern Canada, inflation in the prices of most goods is in large part dependent on inflation in Canada more generally. *Some Elders have observed that they consume country food, not out of "tradition", but out of need to conserve money for bills and expensive store bought food (IQ RBE 2009).* However increased demand for labour usually implies increasing wage rates for those with skills that are in short supply, which are inflationary. Inflation harms particularly people who are unable to access jobs in the expanding labour market for whatever reason. Such people would include some of the more vulnerable in communities – elders and single parents (primarily women) and their young children for example. Increased wage rates however are a benefit to those who work for those wages.

Increasing wage rates also imply additional costs to businesses and hamlet governments and, at the limit, inability to offer services in face of labour shortages. The potential for full time/full year employment, with associated opportunities for training and career advancement, will be an incentive for some workers to leave current employment (or underemployment). Employment at the Project may be preferred by some of the already employed and it is in the Project's interests to try to attract particularly the more highly skilled already employed, both to maximize Inuit employment and to effectively operate. The departure of workers from current jobs represents a further cost to employers, insofar as new employees must be trained, at some cost to productivity.

The labour market has changed in Baker Lake in response to Meadowbank. However it is noted in this regard that Meadowbank initially gave hiring preference to people in Baker Lake, as the most Project affected community, and hired substantially more people than originally envisaged (Cumberland, 2005). This contributed to a very tight labour market. Meadowbank has subsequently hired more people from other Kivalliq communities, but about two thirds of its employees still come from Baker Lake (AEM, 2013). AREVA's intent to hire more widely in Kivalliq should result in less pressure on wage rates and labour availability in any one community. However there will still be instances where employers will lose employees to the mining sector.

Thus, to the extent that the Project draws workers from other economic activity rather than from the pool of unemployed, there can be negative effects on service delivery and/or costs for both business and government. However it is important to note that such labour force adjustments have an overall positive effect. As more skilled people move into new jobs, room is left for the less skilled to become employed and learn new skills. This process represents an increase in labour force capacity overall.

Finally, it is noted that whereas the positive effects of labour force adjustment are long lasting, the negative effects will arise in response to the rapid growth represented by the introduction of the Project into the Kivalliq economy. With time, labour force conditions will adjust, and then are expected to stabilize.

8.1.6 Incomes

AREVA acknowledges the challenges of rotational work, and the potential for competition for skilled labour, in part by paying competitive wages. Current estimates are that an average wage for unspecialized skilled workers during construction would be in the order of $75,000 in 2013 dollars and for a combination of unspecialized skilled (60%) and skilled (40%) workers in the early phases of operation the average wage would be in the order of $85,000. If we assume, conservatively, that 150 construction workers will have unspecialized skills (although some will surely be skilled), the Project's payment of wages to Kivalliq residents would be over $10 million annually on average. If we assume that 60% of operations phase workers will have unspecialized skills, the Project's payment of wages to Kivalliq residents would be over $21 million annually.

In 2010, the average wage for all full time/full year workers in Kivalliq was $71,000 (Statcan, 2013a), equal to about $74,000 in 2013 dollars.[80] AREVA's expected wages for unspecialized skilled workers during construction is about equivalent to this average for all (unskilled, skilled and professional) workers. The expected wages for a combination of unspecialized and skilled workers is about 15% higher than this 2013 average.

Total wages paid in Kivalliq in 2010 were about $200 million, calculated on the basis of over 5,000 workers and an average wage of about $39,000 (Statcan, 2013a).[81] The construction and operations wages paid to Kivalliq workers would therefore represent increases in total wages paid of almost 5% and 10% respectively.

The above considers only direct employment by the Project. As noted in Section 8.1.5 above, an about equivalent number of jobs will also be created as a result of indirect and induced economic effects. It is not expected that all these jobs will pay wages comparable to those paid by AREVA, however there will be additional, substantial income effects from these jobs as well. Finally, as noted in Section 8.1.5, some pressure on wages is expected, also increasing incomes. As a conservative estimate, it is probable that new income attributable in some way to the Project would represent closer to 10% or more of current incomes during construction, and substantially more than that during operations. In this regard, it is noted that the median individual income[82] in Kivalliq between 2005 (without Meadowbank) and 2010 (with Meadowbank) increased by 29% as compared to increases of 18% and 20% in Qikiqtaaluk and Kitikmeot respectively, and the median individual income in Baker Lake increased by 43% (Statcan cen 2007a and 2013a).

Increased incomes are generally associated, overall, with increased individual, family and community wellbeing. It is this association that motivates the emphasis given in consultations, by people and governments, to employment by the Project. The economic strategies of all levels of government in Nunavut are importantly based on the creation of formal sector economic opportunities, as one primary means towards enhancing wellbeing. There is, as the major benefit of the Project, potential for improved quality of life for those individuals (and their families) who are able to find employment with the Project, with businesses that supply the Project or elsewhere in the expanding economy. However it is acknowledged, both in this document and by the people of Kivalliq, that there are

[80] This is based on an increase in the consumer price index in Iqaluit of 4.3% between 2010 and 2013 (Statcan, 2014b

[81] This is a substantially lower figure that the average wage for full time/full year work because so many people in Kivalliq work at part time and/or seasonal jobs.

[82] Statcan did not publish average income data in 2006.

potential downsides to increased income, particularly at the level of certain individuals. These are addressed in Section 10, Assessment of Effects on Individual, Family and Community Wellbeing.

8.1.7 Population

Kivalliq's population has been growing quickly, however this has been associated almost exclusively with high birth rates – death rates have not decreased substantially over the last fifteen years and net migration has overall been negative (NBS, 2014a).[83] Although population growth rates are expected to slow somewhat over the coming years they will remain high and higher in Kivalliq than in Nunavut as a whole (NBS, 2014e).

The Project is not expected to substantially affect death or birth rates, both of which are fore mostly a function of the age structure of the population. As Kivalliq's population ages, death rates can be expected to go up. Kivalliq's high birth rates are largely related to the fact that 35% of the population is under 15 and will become of child bearing age over the next 15 years. A change in either death or birth rates for other reasons could not be attributed to a single project. For example a desire for fewer children would represent a cultural shift that could not be attributed the Project alone. Improved health status as a result of government preventive and curative health services could slow the expected rise in death rates – this again would not be attributable to the Project.

Thus the primary potential linkage between the Project and population growth is through effects on migration. Potential migratory flows into Kivalliq are by:

- Project out of area workers moving into Kivalliq during construction and operations
- family members returning to Kivalliq from elsewhere in Nunavut, or Canada, in response to increased economic opportunity
- economic migrants, also drawn to Kivalliq in response to increased economic opportunity – these would also be from elsewhere in Nunavut and Canada

Further however, given the opportunities different points of hire represent and given expected rising demand for workers in particularly Baker Lake and Rankin Inlet, there is potential for both migratory movements within Kivalliq and net out migration.

[83] However, this may be changing. In both 2012 and 2013 net migration was more strongly positive than it had been for 20 years (NBS, 2013).

It is not expected that Project out of area workers will migrate into Kivalliq. Construction jobs are temporary, all work will be rotational and transport between home communities and the work sites will be provided. It is possible that isolated individuals, for personal reasons, could choose to move into Kivalliq but numbers would not be large. Although operations jobs are longer term and there again may be exceptions, these workers are not expected to move in large numbers either.

There is more potential for in migration to occur as a result of members of Kivalliq resident families returning in the expectation of employment at home. The return of family members, particularly those who left to find employment elsewhere, can be of great benefit to both in migrating individuals and their families. It can be presumed that such people will return only if they are assured of employment, with the Project or in the expanding economy. Reuniting families and the addition of well employed members to families are benefits. Such in migrants can however have negative effects, in addition to positive ones. They may compete for and get jobs that would therefore not go to present residents, place additional demands on social services, and put pressure on local supplies of goods and services, particularly housing (see Section 11, Assessment of Effects on Public Infrastructure and Services).

Economic migrants could come from both elsewhere in Nunavut and elsewhere in Canada. Speculative in migration, migration without an offer of secure employment, will be constrained by housing shortages where individuals do not have the finances to pay market rates for private accommodation. Market rates for private housing in Kivalliq are very high by Canadian standards. It is thus considered unlikely that many people with no existing support systems in Kivalliq would migrate unless they were assured of employment. But there are likely to be offers of employment to people outside Kivalliq.

Business growth, now in response to Meadowbank and multiple exploration projects, has already generated searches by Kivalliq based businesses for employees from elsewhere in Nunavut and Canada. Smaller businesses in competitive markets are less likely to contract people on a rotational basis, but to expect them to move. Some of these in migrants will come with families. This migration is expected to concentrate in Baker Lake and Rankin Inlet where most businesses servicing the mining sector are located. However there is also some potential for in migration into Arviat, where the comparatively large population and the preparedness of people for mining sector jobs may create some consumer business opportunities as well.

While mobility of the Inuit in Nunavut has been comparatively low by Canadian standards, engagement results indicate that there is some expectation that particularly the young will be more likely to migrate in the future, in search of employment. Many Nunavut communities are experiencing economic stresses and consequently comparatively high unemployment rates. Numbers of in migrants to Baker Lake and Rankin Inlet could become comparatively large.

There is also possibility of out migration from communities. Most references in the literature to mining, rotational work and migration in Canada's north are concerned with in migration of out of area workers, from the south. However there is some evidence of out migration. While people note that rotational jobs have an advantage in that it is not necessary for people to leave communities to be employed, there is some evidence that the reverse is also true – that people do not need to stay in home communities for work but have the option of moving to an alternative point of hire.

Storey and Hamilton (2003) report out migration in Alaska (Red Dog) and northern Saskatchewan (uranium mines). With one exception, the population in Yellowknife has grown faster than that in the small communities, and at twice the rate of the territory as a whole (NWTBS, 2013). Aboriginal communities in northern Ontario have seen mining workers move to Timmins. Agnico Eagle has observed some out migration from smaller communities into Rankin Inlet of some of its workers, as well as out of Kivalliq into southern Canada. People choose to move for many personal reasons, including the often better education, health care and employment opportunities for other family members that can be found in larger centres. People also say that they find moving to Baker Lake and Rankin Inlet easy, as populations are more diverse in these hamlets.

Population growth rate data are in Table 8.1-6. It is noted that the growth rates are highly variable, most so in small communities where the movement of a few families can represent large percentage changes but also in larger communities. Chesterfield Inlet for example has seen growth rates vary between -0.8% and 5.4% over the seven year period of 2007 to 2013 and Whale Cove just slightly less variability. But Rankin Inlet, a much larger community, has seen growth rates vary between 0.2% to 3.4%. This variability makes it challenging to confirm trends. 2008 was, for example, the year Baker Lake grew fastest and Rankin Inlet slowest over the seven year period, although both arguably experienced Meadowbank effects on local economies.

Table 8.1-6 Population Growth Rates, June 30 to July 1, 2006 to 2013

	Population 2013	Population Growth Rate (% increase on previous year)							Annual Average (% increase on previous year)	
		2007	2008	2009	2010	2011	2012	2013	2007 to 2013	2011 to 2013
Arviat	2,508	3.0	2.4	2.4	1.8	1.8	2.1	2.3	2.3	2.1
Baker Lake	2,140	2.2	2.4	3.1	3.1	2.1	1.4	2.9	2.4	2.2
Chesterfield Inlet	393	1.4	1.7	-0.8	-0.3	1.1	3.6	5.4	1.7	3.5
Coral Harbour	945	2.9	1.9	1.2	3.8	3.1	0.8	2.9	2.4	2.3
Rankin Inlet	2,777	1.5	0.2	1.8	0.9	2.4	1.6	3.4	1.7	2.5
Repulse Bay	1,040	6.1	2.8	3.6	2.9	5.9	2.1	5.7	4.2	4.8
Whale Cove	463	2.7	5.6	1.0	2.5	4.1	2.8	5.0	3.4	4.1
Kivalliq	10,266	2.6	1.9	2.2	2.1	2.6	1.8	3.4	2.4	2.6
Nunavut	35,591	1.9	1.6	2.2	2.3	2.5	1.5	2.6	2.1	2.2

Source: NBS, 2014a

People in Baker Lake have recently observed that population has increased since the operations of Meadowbank began in 2010. NBS data however suggest that whereas the population has grown, the growth rates have not been unusual. In Baker Lake, the highest population growth rates were seen in 2008 and 2009, but over the period 2007 to 2013 the hamlet grew at the same rate as Kivalliq as a whole (averaging 2.4% per year in both cases) and over the period 2011 to 2013 the hamlet grew at a slower rate than Kivalliq, despite the 2013 spike in population. Repulse Bay and Whale Cove have been the fastest growing communities over the period of Meadowbank's construction and operations. It may be that visibility of people in Baker Lake has substantially increased – there are certainly more visitors in town and increased disposable incomes give people the resources to go out more.

Agnico Eagle has observed some out migration from smaller communities into Rankin Inlet by some of its workers, both or either of which could account for some of Rankin Inlet's population growth over the period 2011 to 2013. However the hamlet has also seen higher than normal construction activity (for infrastructure) and the expansion of education facilities. Agnico Eagle has also reported the out migration of eight Kivalliq workers to southern Canada. While this is a small number, it is actually 3.5% of Meadowbank's Inuit workforce, not insignificant.

There is thus little evidence from population numbers in Kivalliq that there has been significant net in migration into Baker Lake or Rankin Inlet in response to Meadowbank specifically. Further, elsewhere in the north, in relation to resource extraction projects in Alaska, NWT, northern Saskatchewan and northern Ontario, the indications are that out migration from smaller communities, made possible by a range of points of hire, is the predominant concern. The loss to communities of people with stable employment is a negative effect. There is no evidence of exceptional levels of in migration to small aboriginal communities in any of these jurisdictions.

AS noted above, there is also potential for migration not only between Kivalliq communities, but also out of Kivalliq to occur. The data in Table 8.1-7 suggest that between 2006 and 20011 the Inuit population outside Inuit Nunangat increased more than four times as fast as did the population inside Nunavut.

Table 8.1-7 Inuit Population Distribution

	2006		2011		2006 to 2011 % Change
	Number	% of Total Inuit Population	Number	% of Total Inuit Population	
Nunavut	24,640	48.8	27,070	45.5	9.9
Inuvialuit Region	3,115	8.3	3,305	5.6	6.1
Nunavik	9,565	21.7	10,755	18.1	12.4
Nunatsiavut	2,160	9.3	2,325	3.9	7.6
Total Inuit Nunangat	39,480	88.1	43,460	73.1	10.1
Rest of Canada	11,000	11.9	15,980	26.9	45.3
Canada	50,480	100.0	59,435	100.0	17.7

Source: Statcan, 2007a and 2012

With regard to Nunavut specifically, the pattern of has generally been one of net out migration, averaging about 100 out migrants per year until 2012. In 2012 and 2013 however net migration was positive, with about 100 in migrants in both years (NBS 2013b). As the non Inuit population in Nunavut has increased by over 200 and over 400 people in 2012 and 2013 respectively, the evidence is that it is in migration of non Inuit that is driving the shift to positive net migration and that Inuit migration is still netting out as negative. Table 8.1-8 compares population growth rates of the Inuit and non Inuit populations in Kivalliq and Nunavut. These reached highs in 2013.

Table 8.1-8 Inuit and non Inuit Population Growth Rates (% increase on previous year)

	2007	2008	2009	2010	2011	2012	2013
Kivalliq							
Inuit	2.4	1.9	2.0	1.7	2.3	1.3	2.4
Non Inuit	4.2	1.3	4.1	5.4	5.6	6.0	11.0
Nunavut							
Inuit	1.9	1.5	1.6	1.7	1.7	1.0	1.6
Non Inuit	1.7	2.2	5.4	5.5	6.6	4.0	7.2

Source: NBS, 2014f

Points of hire in Iqaluit or elsewhere in the north and in southern Canada may offer employees an opportunity to move out of Kivalliq for the same kinds of personal reasons that would motivate people to move to Baker Lake or Rankin Inlet – Edmonton and Montreal saw their Inuit populations about double between 2006 and 2011 (Statcan 2007b and 2013b).

How all these migratory flows will net out, and when, is not possible to determine with any accuracy. Most migration decisions are not expected during the construction phase – construction jobs are

most often temporary and therefore do not provide the economic security many people need to make life altering decisions. With the settling in of the Project's operations however, for those people who find rotational work manageable, expect to be employed over the 14 year life of the project (job security) and prefer shorter commute times, migration from smaller to larger Kivalliq population centres becomes more conceivable. The element of job security may prove the most important. It is considered likely that the premature closure of Meadowbank and the reduction in scope of Mary River have brought home the degree to which mining is iffy. The broader and deeper the mining sector is in Nunavut, the more likely it may be that people will choose to move.

However it will be noted that population growth rates in Baker Lake (see Table 8.1-6) seem unrelated to Meadowbank developments. Population grew by 3.1% in 2009 (construction) and 2010 (first year of operations), slowed dramatically first in 2011 and then again in 2012 (second and third years of operations) and spiked again to 2.9% in 2013 (after Agnico Eagle had announced premature closure of the mine). On average, population growth in Baker Lake has been slower during Meadowbank operations than it had been over the project's development and construction phases, and only Arviat has seen slower population growth than Baker Lake since 2010 – all other Kivalliq communities have grown faster. Rankin Inlet by contrast saw comparatively little population growth during Meadowbank development and construction, but has seen more rapid growth since 2011. This period however has coincided with multiple other developments including the construction and now operations of large infrastructure projects, and Rankin Inlet continues to home to the bulk of companies servicing the mining sector.

Very broadly, at a regional level, it is expected that what is likely currently a small net in migration may continue for some time, not as a result of Kiggavik initially, but of other expected economic activity – this would include, notably, activity related to Meliadine.[84] Current net in migration to Kivalliq is unlikely to exceed 30 to 50 people (that is, between a third and half of net Nunavut in migration). At current projected growth rates (which have proved overly conservative to date), Kivalliq's population will approach at least 12,000 people by 2021.[85] If, as a result of the Project alone, in a given year post 2021 when operations are expected to start, there were 40 in migrants, this would raise the regional population growth rate by 0.3%. It is noted that the effect would not be expected to reoccur annually, but is likely to take place only over the early years of operations, and is

[84] The Meliadine EIS currently forsees population growth in Rankin Inlet of between about 350 and 540 people (depending on assumptions made) over a ten year period to 2026 as a result of that project, although the implication is that some of this in migration would be from other Kivalliq communities.

[85] In 2010 NBS projected Kivalliq's population at 11,531 in 2021 however since that time growth rates have been higher than projected. For example the 2010 projection for 2013 is 9,886 but NBS reports that Kivalliq in fact had 10,226 people in 2013 (3.4% higher).

well within population growth rate variability seen over the recent past (only in one of the last seven years has the population growth rate changed by less than 0.3%).

Effects at a community level could be more dramatic. As noted, normally it would be expected that most new comers to Kivalliq would settle in Baker Lake or Rankin Inlet. Potential for effects on population growth rates, at about 3% in 2013 in both these hamlets, would be greater than in the region as a whole. If, as an example, the 40 people were equally divided between the two communities, they would represent perhaps in the order of an additional 0.9% and 0.6% in Baker Lake and Rankin Inlet respectively. If there were intra community migration in addition, from smaller to larger Kivallliq communities, these percentages would be yet higher.

The bottom line is that overall, most migration is expected to happen after the start of operations, unless something strange happens. Irrespective, the numbers are not expected to be huge, at least not on an annual basis.

This final consideration, that migrants within Kivalliq are expected to come from smaller communities, has implications not only for population growth in Baker Lake and Rankin Inlet, but potentially in all communities. For example, the departure of just two workers with families from Chesterfield Inlet or Whale Cove would represent a population growth rate of about -2% on the basis of population projections for these hamlets to 2021.

Migration decisions are individual and reflect what people believe to be in their best interests under specific sets of individual circumstance. On the presumption that people are most often correct about making changes towards improving their lives, migration can overall be considered a benefit for those who migrate. The potential migration into Baker Lake and Rankin Inlet, if realized, would be a further stimulus to economic growth and has some potential to relieve any developing labour shortages and consequent pressure on wages. Population growth does however increase demand for public infrastructure and services, demand that will need to be planned for if delivery of services is not to suffer (see Section 11, Assessment of Effects on Public Infrastructure and Services). The effects on small communities that may lose workers to Baker Lake and Rankin Inlet are the reverse.

8.1.8 Closure

Final closure is inherent in the non-renewable resource extraction industry. GNDoF (2010) notes the importance of encouraging the development of multiple mining projects in order to stabilize Nunavut's economy in face of the inevitable closures of future mining projects. The economic instability that the expenditure patterns of large mining projects can bring to Nunavut's small economy has been demonstrated in the recent past by large swings in economic indicators in response to Meadowbank (see Technical Appendix 9A, Socio-Economic Baseline). The closing of the Project can be expected to have equally large, or larger, effects to the extent that other opportunities do not open up as the Project comes to its final closure. What evolves in the mining

sector in Nunavut will determine whether the result is unemployment and economic contraction, with consequent social effects, or whether new mines are taking the Project's place, and employees and businesses continue to find markets for their goods and services.

Final closure is scheduled to begin in 2035, barring discovery of additional reserves and an extended Project life to 2046 or a delay to project construction from the original schedule. Final closure activities have been estimated to cost about $160 million, however as some of this will be spent during the last years of operations on progressive reclamation, average expenditures of the four year closure phase would be about $34 million per year, only a proportion of which would be spent in Kivalliq. Final closure will employ an average of perhaps 70 people, on a seasonal basis only. Final closure thus represents a reduction, over the operations phase, in expenditures in the order of 50% or more and in employment of over 90%, with consequent reductions in all associated economic effects.

Post closure will involve, initially, at least 10 years of primarily environmental monitoring activity to ensure that final closure has achieved its environmental objectives. Expenditures will shrink further, to about $6 million per year on average, and seasonal employment to about 15 people. As most negative effects will be experienced over final closure, post closure is not expected to have important additional effects, except on a very few individuals.

As noted in Section 6, Socio-Economic Management, AREVA will remain mindful of the potential for negative effects throughout the Project life cycle, integrating sustainable development principles into socio-economic management measures in an effort to minimize to the extent possible the negative socio-economic effects of closure. Enhanced capacity of the labour force and businesses, other contributions to wellbeing, and increased government and NTI/KIA revenues are expected to position people to achieve improved socio-economic status over the life of the Project. This should have the result of improved capacity to absorb some of the negative effects of closure should there not be full replacement economic activity to transition to.

As well, as final closure approaches in 2035 (or in 2046) AREVA will undertake a socio-economic impact assessment, to detail specific measures that may mitigate at least to some extent any potential for negative effects on community economies given the economic context at that time. Employee retrenchment programs, for example, could include out placement assistance, alternative livelihood training programs, and/or counselling.

The economic context in 2035, or in 2046, cannot be predicted at this time. Actual closure effects will depend on that context. As many construction sector workers are always moving from job to job, with steady employment dependent on vitality in the construction sector as a whole, so mining sector employees can move from project to project in an economy that has an active and ongoing mining sector – as individual projects close and others open. To the extent that Nunavut's economy sees more sustained activity in the mining sector – and the signs are positive that there is potential for this

– negative closure effects from the Project would be largely be replaced by positive effects from other projects, although it is acknowledged that job transitions can cause uncertainty and stress.

There is also a possibility for temporary closure and/or premature final closure, either of which would occur if for any reason the Project becomes uneconomic and is expected to remain so over an extended period. Project viability depends most importantly on the price of uranium relative to costs of production. Should this relationship turn significantly negative over the life of the Project, temporary or premature final closure could occur.

Because temporary closure and/or premature final closure are by their natures less foreseeable, and planning horizons may not be as long as ideal, they have more potential for negative effects than planned final closure. In considering scenarios for temporary closure and/or premature final closure, there are essentially three major drivers as to how eventual effects may evolve.

- The capacity to participate in the formal economy: It is argued throughout this assessment that although the construction and the initiation of operations have potential to create various negative socio-economic effects, with time as community economies and people adapt to change, positive effects – largely related to enhanced capacity to participate in the economy – will continue to gain momentum (while negative effects will moderate or at least stabilize).
- Individual decision making: However such adaptation potentially involves people making some life altering decisions, including leaving current employment, migrating, taking on financial obligations made possible by secure wages, and investing in start up or expanding businesses as examples.
- Available alternatives: As for planned final closure to the extent that Nunavut's economy sees more sustained economic activity in the mining sector, negative closure effects from the Project could be largely be replaced by positive effects from other projects.

Thus the effects of temporary closure and/or premature final closure might be represented as a continuum, as roughly presented in Table 8.1-9.

Table 8.1-9 Temporary Closure and/or Premature Permanent Closure Effect Scenarios

	Worker and Business Capacity	Life Altering Decisions Made	Economic Alternatives	Potential for Negative Effects
Early (2017 to 2022)	low	few	few	high
			some	medium
			many	low
Mid (2023 to 2030)	medium	some	few	high
			some	high
			many	low
Late (2031 to 2035)	high	some	few	high
			some	medium
			many	low

As noted in Section 6.3.9 (Social Management) Closure, AREVA would intend to work with communities and government to agree on appropriate measures, including schedules, to ensure that expected effects of any temporary or premature final closure are managed as well as possible.

8.1.9 Residual Effects

Residual effects on community economies are mutually reinforcing, and although there is some potential for negative effects on some individuals, overall the reinforcement is towards benefit – direct employment, work force and public education and training programs and contracting by the Project will all contribute to economic growth and diversification through the indirect and induced effects that create yet more employment, labour force capacity and business development. Project extension beyond the currently planned 14 year operational phase to a 25 year operational phase would imply yet more benefits to community economies.

Such economic growth has some potential for what are expected to be largely temporary negative effects as people and economies adjust to what will be a large economic shock. In contrast, the positive effects are expected to gain momentum as capacity of Kivalliq people to participate in the Project, and in other mining projects across Nunavut, increases. There will also be challenges for hamlet and territorial governments associated with higher, largely unpredictable in size, population growth rates than are could be seen in Baker Inlet and Rankin Inlet.

Table 8.1-10 summarizes what are expected to be Project effects on community economies, and includes assignments of attributes. Employment, contracting and education and training effects are positive and significant in all Kivalliq communities, as is the capacity building that is associated with both training and job and contracting experience, a long term benefit. Quantified magnitudes in the table are based on expectations that are somewhat uncertain, however there is high confidence in the prediction that the effects will be significant. For example, decreases in unemployment rates are expected to be in full percentage points (3% to 5% at the regional level for 2017 and 2021 respectively) – normally decreases of a fraction of a percent in unemployment rates are considered important indications of economic progress.

Economic growth and diversification have some potential for negative effects in the short to medium term, but overall are positive and significant benefits. The benefits are expected primarily in Baker Lake and Rankin Inlet, and secondarily in Arviat.[86] The indirect and induced effects are expected to cluster in hamlets with the competitive advantages of geography, larger populations, and previous experience with Meadowbank and exploration companies. Expected in the event of in migration into Baker Lake and Rankin Inlet this will also contribute to economic growth and diversification. As for employment, contracting and education and training benefits, prediction confidence in the significance of economic growth and diversification is high.

Income effects are also considered positive and significant, with a high level of confidence in the prediction.

Migratory flows are complex, and are likely to result in both positive and negative effects, both within and between communities. Some combination of in migration into Baker Lake and Rankin Inlet of people from outside Kivalliq and from other Kivalliq communities is expected possible in the early years of operations, likely perhaps in numbers high enough to keep population growth rates in these two hamlets higher than currently expected. Some out migration from smaller communities is also expected possible, which for the smallest communities could make a significant difference to population growth rates. Insofar as migration is in response to offers of secure employment and migrants make the choice to move in order to meet personal goals for themselves and their families, they are expected to benefit.

[87] This also has a gender dimension insofar as women are less likely to hunt themselves (although some do) but need harvested materials to sew for their families or and/or for sale and income.

The potential for final closure to have negative effect will depend on the economic options available at the time of closure – the development of the mining sector, with its cyclical characteristics, would help to ensure that alternatives are available. Whereas temporary and/or premature final closure effects also notionally could be moderated in the event of alternative employment being available, it's their unforeseen and unplanned natures creates does create potential for highly significant negative effects at both the individual and community levels.

The emphasis in this section has been on effects on Inuit. As the socio-economic baseline in Technical Appendix 9A makes clear, non-Inuit employment is not of concern in Nunavut. The non-Inuit are essentially fully employed, and where non Inuit are not working, they generally have the educational and work experience qualifications to find employment should they decide to enter the labour force. Non-Inuit would experiences negative effects and benefits on community economies as Inuit would, but again in most cases have the resources to better manage any negative effects.

Table 8.1-10 Summary Impact Matrix, Effects on Community Economies

Effect	Project Phase	Mitigation/ Enhancement	Direction	Magnitude	Geographic Extent	Duration	Significance	Likelihood	Significance Prediction Confidence	Monitoring
Residual Project Effects, Community Economies										
Increased employment	Construction	Preferential employment, education and training, workforce management	Positive	Average of 150 jobs, 3.5% lower unemployment rate in 2017	Communities	Medium	Yes	High	High	Operations monitoring
	Operations			Average of 250 jobs, 5.8% lower unemployment rate in 2021		Long				
Contracting opportunities	Construction	Preferential contracting	Positive	Average of $60 million annually	Primarily Baker Lake, Rankin Inlet	Medium	Yes	High	High	Operations monitoring
	Operations	Preferential contracting	Positive	Average of $30 million annually		Long				
Work force and business skills training	Construction	Project related education and training programs	Positive	High	Communities	Medium	Yes	High	High	Operations monitoring
	Operations			High		Long				
Broader education and training	Construction and operations	Education initiatives	Positive	Medium	Communities	Long	Yes	High	High	Operations, collaborative monitoring
Labour and business capacity building	Construction and operations	Preferential employment, education and training, preferential contracting	Positive	High	Communities	Long	Yes	High	High	Collaborative monitoring
Economic growth and diversification	Construction	Preferential employment and contracting education and training	Positive	High	Primarily Baker Lake, Rankin Inlet and to a lesser extent Arviat	Medium	Yes	High	High	Collaborative monitoring
	Operations					Long				
Labour market pressure effects on employers	Construction	None practical	Negative	Medium	Primarily Baker Lake, Rankin Inlet	Medium	Yes	High	High	
	Operations			Low with time		Long	No	Medium	Medium	
Labour market pressure effects on employees	Construction	None required	Positive	Medium	Primarily individuals in Baker Lake, Rankin Inlet	Medium	Yes	Medium	Medium	
	Operations			Medium		Long	Yes	Medium	Medium	
Inflation	Construction	None practical	Negative	Low	Primarily individuals in Baker Lake, Rankin Inlet	Medium	Yes	Medium	Medium	
	Operations			Negligible with time		Long	No	Medium	Medium	
Increased incomes	Construction and operations	Fair wages	Positive	High	Individuals	Long	Yes	High	High	Operations monitoring for Project workers, collaborative monitoring
In migration of out of area Project workers	Construction and operations	Workforce management	Negative	Negligible	Primarily Baker lake, Rankin Inlet	Long	No	Medium	Medium	Operations monitoring for Project workers, collaborative monitoring
In migration into Kivalliq of other workers	Construction	None practical	Positive	Low	Primarily Baker lake, Rankin Inlet	Long	No	Medium	Medium	
	Operations		Positive	Medium		Long	Yes	Medium	Medium	
In migration within Kivalliq of workers	Construction	None practical	Positive	Low	Baker Lake, Rankin Inlet	Long	Yes	Medium	Medium	
	Operations			Medium		Long				
Out migration within Kivalliq of workers	Construction	None practical	Negative	Low	Primarily Chesterfield Inlet, Whale Cove	Long	Yes	Medium	Low	
	Operations			Medium		Long				
Premature closure effects	Operations	Closure planning	Negative	High	Communities	Medium/long	Yes	High	High	Collaborative monitoring
Final closure and post closure effects	Final closure	Closure planning	Negative	Low/high	Communities	Medium	Yes	Medium	Medium	

8.2 Cumulative Effects Analysis for Community Economies

Section 13.2, Cumulative Effects Analysis for the Economy of Nunavut, constructs a scenario, at the territorial level, that considers the potential for construction and then operations of eight large mining projects (including Kiggavik) over the period to 2030. The scenario is based on publicly available information at early 2014, on project development plans of Meadowbank, Hope Bay, Meliadine, Mary River, Hackett River, Back River and Izok Lake, as well as the Project – these projects are therefore considered reasonably foreseeable. The important conclusion, relevant to expectations regarding cumulative economic effects in Kivalliq and its communities, is that ongoing, sequential development of mining projects can be expected to even out the economic shocks that individual projects can have.

Cumulative economic benefits of Meadowbank, the Project and Meliadine are essentially additive – Kiggavik and Meliadine add more jobs, contracting, education and training, economic growth and diversification and incomes to baseline conditions, which include the effects of Meadowbank. The analyses in previous sections indicate that there is capacity in Kivalliq to meet many of the supply requirements of the Project. Meliadine's effects, on the presumption that the construction and operation of that project has effects approximately parallel to effects seen at Meadowbank, should also be fairly easily accommodated, given the expected closure of Meadowbank, and expected labour force growth, improving educational achievement and increasing business capacity to supply.

It will be noted that four of the reasonable foreseeable projects listed above are in Kitikmeot Region and one is in Qikiqtaaluk Region. This may be less relevant to supply and demand for Kivalliq based workers, goods and services than may be first apparent. To date, Nunavut expenditures of Meadowbank and the Project (and by presumption, Meliadine) have been over 95% in Kivalliq. The rapid growth of capacity to supply the mining sector is expected to continue, on the basis of high levels of exploration activity, ongoing experience with Meadowbank and early development of Meliadine. And in contrast to Mary River's 14% of total expenditures having taken place in Nunavut, of which 80% were spent in Iqaluit (Baffinland, 2013a), Kivalliq mining projects to date have achieved approximately 25% to 50% of total expenditures in Kivalliq region.

Kivalliq may in fact be well into developing a competitive advantage that may see, in face of imperatives to maximize project expenditures in Nunavut, more than proportional participation in mining projects in other regions.

The Mary River Project (Baffinland, 2013b), even in its reduced scope, does not expect to meet its demand for unskilled or semiskilled workers in its area of influence. The shortfall during construction is estimated at over 900 jobs and 80 jobs for unskilled and semiskilled workers respectively and during operations about 35 and 150 jobs. The Baffinland EIS concludes that "demand for labour will continue to exceed the supply capacity of the local labour markets of North Baffin and Iqaluit, at all

skill levels". In principle, potential benefits from spillover effects from multiple mining projects in Kitikmeot would be yet additional.

In the event that demand for Inuit labour cannot be met within the various projects' areas of influence, Inuit from outside these areas of influence are expected to be recruited, in order to maximize percentages of Inuit workers. With growing mining experience, Kivallliq residents are likely candidates. However, depending on how quickly each of these projects advances, it is possible that constraints in the ability to supply rapidly growing demand for labour and supply of goods and services to the mining sector will mean that Kivalliq, as well as Nunavut as a whole, is not able to fully take advantage of opportunities.

Depending on additional demand from outside Kivalliq, including for supply of goods and services which also imply increased demand for labour, it is conceivable that the potential for benefit would be less than additive, that is, a threshold could be crossed to a loss of opportunity because of an inability to supply all the labour and goods and services on demand. That is, demand could conceivably rise to a level where projects find it necessary to import from elsewhere labour, goods and services that notionally could be supplied from Kivalliq, simply because populations in communities are not large enough, or yet skilled enough, to meet all that demand.

Therefore cumulative effects would be less than might be hoped for. A shortfall in the capacity of labour and businesses to supply goods and services that would normally be considered within the capacity to supply essentially means that cumulative effects would be less than additive. Further, in a context of competition amoung mining companies to recruit Inuit labour and to contract Inuit businesses, negative effects of an excess of demand over supply could be more than additive. These would include challenges to local businesses in identifying labour, increased costs, etc.

In addition to reasonably foreseeable projects, AREVA has constructed a far future scenario that would see i) the development of Kiggavik motivate three additional uranium mines in western Kivalliq and one additional uranium mill; ii) the project life of Meadowbank extended on the basis of new finds; and iii) one gold mining project (additional to Meliadine) developed. (See Section 3, Assessment Approach.)

Such developments would of course imply yet additional demand for Kivalliq labour, goods and services, and again, all these are notionally benefits. As these far future developments are to date basically not identified as to time or place, actual effects cannot be known. The balance between benefits and inability to realize benefits will be a function of a well-planned and well positioned supply response. This in turn will be a function of experience with mining projects on the parts of both labour and business, and increases in educational achievement of Kivalliq's population.

Cumulative economic benefits are significant. Irrespective of how many of the reasonably foreseeable projects become operational over the coming years, each is large enough to ensure that

benefits will ensue. The more interesting issue however is the extent to which benefits can be maximized, as opposed to some potential benefits being foregone because of more demand than capacity to supply.

It is arguable that such cumulative effects are not the responsibility of AREVA to mitigate or monitor. Additive effects are in any case simply the effects of additional projects on baselines at the time these projects move forward with their respective EISs, and would be expected to be addressed in those EISs. Managing the economic response to a large number of new projects is a fundamental responsibility of government.

This is not to say that AREVA has no role – capacity enhancement of labour and business and cooperation with other mining companies to share information and best practice contribute to government's management of the mining sector. As noted in Section 13, Assessment of Effects on the Economy of Nunavut, the preparation of the labour force, perhaps initially focusing on technical and short term training, in the longer run should be targeting postsecondary degrees and diploma courses in mining related fields.

Table 8.2-1 presents a summary of cumulative effects. All foreseeable projects are expected to have effects similar to those of Kiggavik, thus for every impact, there are additive, usually significant, effects. However where supply constraints occur, benefits will be less positive than they might be. This is relevant to effects on employment, contracting, economic growth and diversification, capacity/skills building in the labour force and for businesses, incomes and labour force pressures on workers. The negative effects on businesses of labour force pressures would be less negative.

Although training effects are considered additive only, over time a shift to a 'well educated' population could represent a paradigm shift in socio-economic conditions. With regard to the number of migrants, Meliadine is expected to stimulate in migration into Rankin Inlet, from other Kivalliq communities and from outside Kivalliq (AEM, 2013) additional to that which could occur as a result of Kiggavik, an additive effect. Perhaps the most important cumulative effect is that in the event of closure, whether this is planned final closure, temporary closure or premature final closure, the development of other mining projects in Nunavut could almost completely mitigate negative effects.

Table 8.2-1 Summary Impact Matrix, Cumulative Effects on Community Economies

Effect	Related VSEC	Potential for Project Effects		Potential for Significant Cumulative Effects		Mitigation/ Enhancement		Criteria for More than Additive Cumulative Effects					
		Direction	Significance	Additive	More, or Less, than Additive	AREVA	Governments	Direction	Magnitude	Geographic Extent	Duration	Likelihood	Significance Prediction Confidence
Cumulative Project Effects, Community Economies													
Increased employment	Employment, incomes	Positive	Yes	Yes	Less positive, where there is constrained ability in labour force to take advantage of employment opportunities	Preferential employment, education and training, workforce management	Education and training, project sequencing	Negative (less positive)	Not determined	Communities	Long	Not determined	High
Contracting opportunities	Contracting opportunities, employment, incomes, economic growth and diversification	Positive	Yes	Yes	Less positive, where there is constrained ability to take advantage of contracting opportunities	Preferential contracting, education and training	Education and training, project sequencing						
Work force and business skills training	Education and training, employment, contracting opportunities, economic growth and diversification, incomes	Positive	Yes	Yes	Less positive, where there is constrained ability to take advantage of employment and contracting opportunities	Preferential employment and contracting, education and training	Education and training, project sequencing						
Broader education and training	Education and training, employment, incomes	Positive	Yes	Yes	No	n/a							
Labour and business capacity building	Employment, contracting opportunities, incomes	Positive	Yes	Yes	Less positive, where there is constrained ability to take advantage of employment and contracting opportunities	Preferential employment and contracting, education and training	Education and training, project sequencing	Negative (less positive)	Not determined	Communities	Long	Not determined	High
Economic growth and diversification	Economic growth and diversification, employment, contracting opportunities, incomes	Positive	Yes	Yes	Less positive, where there is constrained ability to take advantage of employment and contracting opportunities	Preferential employment and contracting, education and training	Education and training, project sequencing						
Labour market pressure effects on employers	Economic growth and diversification	Negative	Yes	Yes	Less positive, constrained ability to take advantage of employment and contracting opportunities	Education and training	Education and training, project sequencing						
Labour market pressure effects on employees	Incomes	Positive	Yes	Yes	Less positive, where there is constrained ability to take advantage of employment and contracting opportunities	Preferential employment and contracting, education and training	Education and training, project sequencing						
Inflation	Incomes	Negative	Yes	Yes	No	n/a							

Effect	Related VSEC	Potential for Project Effects		Potential for Significant Cumulative Effects		Mitigation/ Enhancement		Criteria for More than Additive Cumulative Effects					
		Direction	Significance	Additive	More, or Less, than Additive	AREVA	Governments	Direction	Magnitude	Geographic Extent	Duration	Likelihood	Significance Prediction Confidence
Increased incomes	Incomes	Positive	Yes	Yes	Less positive, where there is constrained ability to take advantage of employment and contracting opportunities	Education and training	Education and training, project sequencing	Negative (less positive)	Not determined	Communities	Long	Not determined	High
In migration of out of area Project workers	Population change	Negative	No	Yes	No	n/a							
In migration into Kivalliq of other workers	Population change	Positive	No	Yes	No	n/a							
In migration within Kivalliq of workers	Population change	Positive	Yes	Yes	No	n/a							
Out migration within Kivalliq of workers	Population change	Negative	Yes	Yes	No	n/a							
Premature closure effects	Employment, contracting opportunities, incomes	Negative	Yes	Yes	Less negative, where there is increased availability of alternative employment	None	Project sequencing	Positive (less negative)	Not determined	Communities	Long	Not determined	High
Final closure and post closure effects	Employment, contracting opportunities, incomes	Negative	Yes	Yes									

8.3 Summary of Effects on Community Economies

Economic effects on communities are expected to be benefits overall, very important benefits insofar as there are not enough economic opportunities for those who wish to take on wage employment and insofar as the numbers of people who would make that choice are expected to grow rapidly for the foreseeable future. This is not to minimize the potential for negative effect, particularly initially before some stability is achieved in work forces, capacity to supply and community populations.

If climate change facilitates resource extraction in Kivalliq, through reduced costs, the types of benefits discussed above would increase to the extent that Kivalliq has the capacity to access those benefits. Depending on the speed of any growth in extractive industry, the primary danger lies in either leakage of economic effects outside Kivalliq as workers and suppliers have to be sourced from elsewhere in Canada, or at the limit increased in migration of southern workers into Kivalliq.

No Project community level transboundary effects, including cumulative effects, are foreseen, although because the Project expects to hire workers from outside Nunavut there will be significant benefits to some individuals from elsewhere in Canada. It is conceivable that growth in the uranium sector, under the far future scenario, as a result of the Project, could eventually increase demand for experienced uranium miners from northern Saskatchewan. These workers would almost certainly be rotational workers.

9 Assessment of Effects on Traditional Culture

Effects on traditional culture will largely be driven by opportunities the Project will create for participation of people in the wage based component of the economy rather than by any significant effects on the land and its resources. Rotational work offers not only the income needed to fund activity on the land, but also lengths of time off that permit extended travel on the land. However, there are concerns about retention of traditional cultural associated with extended periods of time spent in a cross cultural context and the expansion of the wage based component of the economy.

As noted in Section 6, Socio-Economic Management, AREVA will put in place work force management policies and procedures to facilitate people's needs to the extent practical for leave in order to engage in traditional activity and to validate traditional culture in the work place. The Project will however be a contributing factor to economic and social change that is in any case ongoing and thus will be a contributing factor to changes in traditional culture.

9.1 Residual Project Effects Assessment On

9.1.1 Analytical Methods

For purposes of this EIS, Project effects on traditional culture are considered in terms of selected component parts – harvesting (primarily of caribou, marine mammals and fish), associated food security, language, values and knowledge, and sites of heritage value. This is of course an artificial breakdown as traditional culture is in fact an integrated whole made up of these, and many other, component parts.

The analysis is necessarily qualitative, and is heavily dependent on results of engagement and socio-economic and IQ data collection, as well as on reference to academic and other literature.

9.1.2 Harvesting

The centrality of harvesting to traditional culture is not debated. It is clear from what people say that even where harvesting activity may be constrained in the present for some reason, the availability of resources for future harvesting, including later generations, is a deeply held value. Harvesting also is a means by which traditional skills, values and knowledge are shared, and confirms social (including gender and intergenerational) roles and relationships. Examples of harvested plants that are eaten include Broadleaf willow, fireweed, dwarf fireweed (leaves and flowers), and Labrador lousewort (roots) (IQ RBH 2011). During the summer, Elders also eat roots and berries (IQ CHE 2009).

Harvesting provides food as well as materials for clothing[87] and arts and crafts, including carving stone. Harvesting is thus fundamental to the preservation of Inuit identity and culture.

The Project is not expected to negatively affect harvesting resources. The Project footprint does not intersect with known carving stone deposits. The environmental assessments on terrestrial, marine and aquatic animals and vegetation indicate no significant environmental effects on qualities or quantities of harvested biological resources. Loss of habitat is minimal.

Traffic related accidents are expected to be infrequent and even should an accident result in animal mortality, it could only affect one or very few individuals. A major spill could affect more animals, but such spills should be rapidly contained in a comparably small area.[88] Significant effects on changes in abundance are therefore not expected from environmental effects.

However, there is necessarily some uncertainty regarding effects on the distribution of animals and fish. Volume 6, Terrestrial Environment and Volume 8, Marine Environment, notes that there is some uncertainty about animal distribution patterns and migration routes in response to some environmental effects, such as noise and other disturbances at the mine site and docking facilities, and from both truck and marine traffic. These are related primarily to land and marine mammals, rather than fish. Marine mammal hunting has encompassed a wide range along the Hudson Bay in the past (IQ Freeman 1976). Elders have noted that caribou no longer approach near Whale Cove, possibly due to the large amount of people on snow machines and the noise level of the ATVs startling them away (IQ WCE 2009). Conversely, others have observed that the mine in Rankin has not affected caribou migration. This has been observed due to the ease of finding caribou near the town when the mine was operating (IQ RIJ 2011).

Additionally, caribou has been observed to be found anytime of the year, and hunted throughout the Chesterfield region (IQ CI03 2009; CI06 2009; CI07 2009). Rankin Inlet residents reported that they have hunted for caribou along the Hudson Bay coast from the Manitoba border to Bernheimer Bay, including Chesterfield Inlet, and as far inland as the Baker Lake area (IQ Freeman 1976). There are no restrictions on caribou hunting, although the HTO advises against killing bulls (IQ CHW 2009; CHAH 2009).

[87] This also has a gender dimension insofar as women are less likely to hunt themselves (although some do) but need harvested materials to sew for their families or and/or for sale and income.

[88] Traffic management measures should reduce the likelihood of accidents include speed controls and other safe operating procedures for both land and sea transport vehicles. Emergency response preparedness is expected to mitigate the potential for negative environmental effects of, for example, spills. Marine transport monitors will assist transport workers to avoid collisions with animals.

Interviews with interviewed HTO members found that while they were fully employed, they needed their jobs to help finance their hunting, as traditional activities do not earn as much money as they once did (IQ ARHT 2009; AR02 2009). Employment with the HTO was reported to be an important source of income, allowing them to purchase equipment (IQ RIHT 2009).

Although elders identified Judge Sissons Lake, south of the mine site, as a migration route for caribou in the past, they noted that the area was not frequently used for hunting, and was only irregularly used for fishing. Technical Appendix 3B, IQ Documentation notes that there has been little past use of the area based on interviews with Inuit and on historical references, and NWMB (2004) concluded that the area west of the Thelon River had been subject to little harvest pressure, due to low animal densities as well as it being difficult to access to the area. Interview subjects noted that the Thelon River itself provides important access to hunting areas. The river is frequently used in the summer months and is used to access lakes for both camping and hunting (in particular Beverly Lake) (IQ BLE 2011). Caribou crossings were also identified to the north west of Baker Lake, crossings potentially affected by the all-weather road. Some have expressed concern that the road may cause changes to caribou migration and limit hunter access (IQ BLHT 2011).

Chesterfield hunters have noted that they currently focus more on hunting along the coastal areas rather than inland (IQ Riewe 1992). The shore and offshore areas north of Chesterfield Inlet past Winchester Bay and south of Chesterfield Inlet to Rankin Inlet remain heavily used for hunting (IQ RIJ 2011). Figure 9.1-1 displays historical land use in the vicinity of the Project, including hunting and fishing locations. Figure 9.1-2 shows current preferred hunting areas near Chesterfield Inlet. Additional hunting and caching areas around Baker Lake are identified in Figure 9.1-3. A more full discussion of land use and relative importance of areas for Inuit land use is presented as Technical Appendix 1F to Volume 1.

The relationship between marine transport and marine mammals has been of concern in coastal Kivalliq communities for a long time (see historical references cited in Technical Appendix 3B), particularly with reference to distribution and migration patterns. This is general, but is heightened in the channel between Chesterfield Inlet and Baker Lake, important habitat for seals and whales (NPC, 2011). In Chesterfield Inlet, beluga whales are described as both abundant and the most culturally important marine species and people feel that the increase in traffic (noise and vibration) as a result of Meadowbank has had a negative effect on these whales. Figure 9.1-4displays preferred marine-based hunting areas near Chesterfield Inlet.

IQ Legend

- Travel Routes
- Campsite
- Archaeological Site
- Fishing Site

Land Use Intensity

- High
- Medium
- Low

Mine Site Legend

- All-Season Road
- Winter Road (Preferred Option)
- Meadowbank All-Season Road
- Kiggavik Site

Inuit Land Use Description

1 BL (Aberdeen) - Land use in the area north of Schultz Lake has been irregular in recent years. Arctic Fox trapping may occur from February to April. Caribou hunts depend on the movements of migrating herds in spring and fall. Domestic fishing in support of hunting or trapping occurs in the larger lakes.

2 BL (Aberdeen) - In some years, significant numbers of barren-ground caribou winter in the Whitehills-Tehek lakes area. In these years extensive caribou hunting takes place from fall through spring, especially in the vicinity of Whitehills Lake. Trapping for Arctic fox also occurs in February and March of most winters. Domestic fishing, especially in Whitehills Lake, provides food for hunters and trappers. Baker Lake residents commonly travel to Whitehills Lake in spring and summer to occupy seasonal fishing camps.

3 BL (Aberdeen) - The Aberdeen-Schultz-Baker lakes corridor is heavily used year-round by residents of Baker Lake. Seasonal camps are common, especially in summer. In summer and fall, the large numbers of migrating barren-ground caribou which pass through the area are hunted at crossing-points on the Thelon River. The wolves, which normally follow the caribou herds, are also heavily hunted. In recent years, significant numbers of wintering caribou have been killed north and east of the settlement during the winter months. Trapping for Arctic fox in this area occurs from November to April. In November and December, activity is heaviest close to the settlement, whereas in February and March trappers are usually found farther from the settlement. It is common for residents of Baker Lake to travel up the Thelon River or along the shore of Baker Lake in spring or summer to set up weekend or seasonal camps.

4a BL (Aberdeen) - This small area receives similar, but less intensive, hunting and trapping than adjacent areas to the north, east and south.

5 BL (Aberdeen) - Between Baker Lake and Pitz Lake is the most heavily-utilized part of this area. In late spring and early summer, large numbers of geese and some ducks are hunted. Eggs are also collected. Domestic fishing is also heavy at this time. Jigging is the most common means of catching fish before break-up while nets are used in the summer. Trapping for Arctic fox goes on all winter but is heaviest in November and December when the casual and weekend trappers frequent the area. Depending on the movements of the migrating herd, barren ground caribou are hunted in late summer.

6 BL (Aberdeen) - Arctic fox are trapped in this area each winter, usually in February and March, Camps are established on larger lakes and fish provide an important source of food for trappers. In some years, significant numbers of barren-ground caribou winter in the Princess Mary Lake area, and, in those years, caribou may be hunted and domestic fishing is irregular.

7a BL (Aberdeen) - The Judge Sissons Lake area is sometimes used as a travel route westwards to Aberdeen Lake. Use of the area for fox trapping, caribou hunting and domestic fishing is irregular.

7b BL (Dubwant) - In some years, small scattered groups of barren-ground caribou winter in the vicinity of Forde Lake and western Thirty Mile Lake and may be hunted in early or late winter. Depending on the availability of caribou near Baker Lake, hunting may also occur in late summer at well-known caribou crossings on the Kunwak River and at the western end of Thirty Mile Lake or at the north end of Forde Lake in late winter. Domestic fishing supports all hunting and trapping activities. Ducks and geese are hunted in this area occasionally.

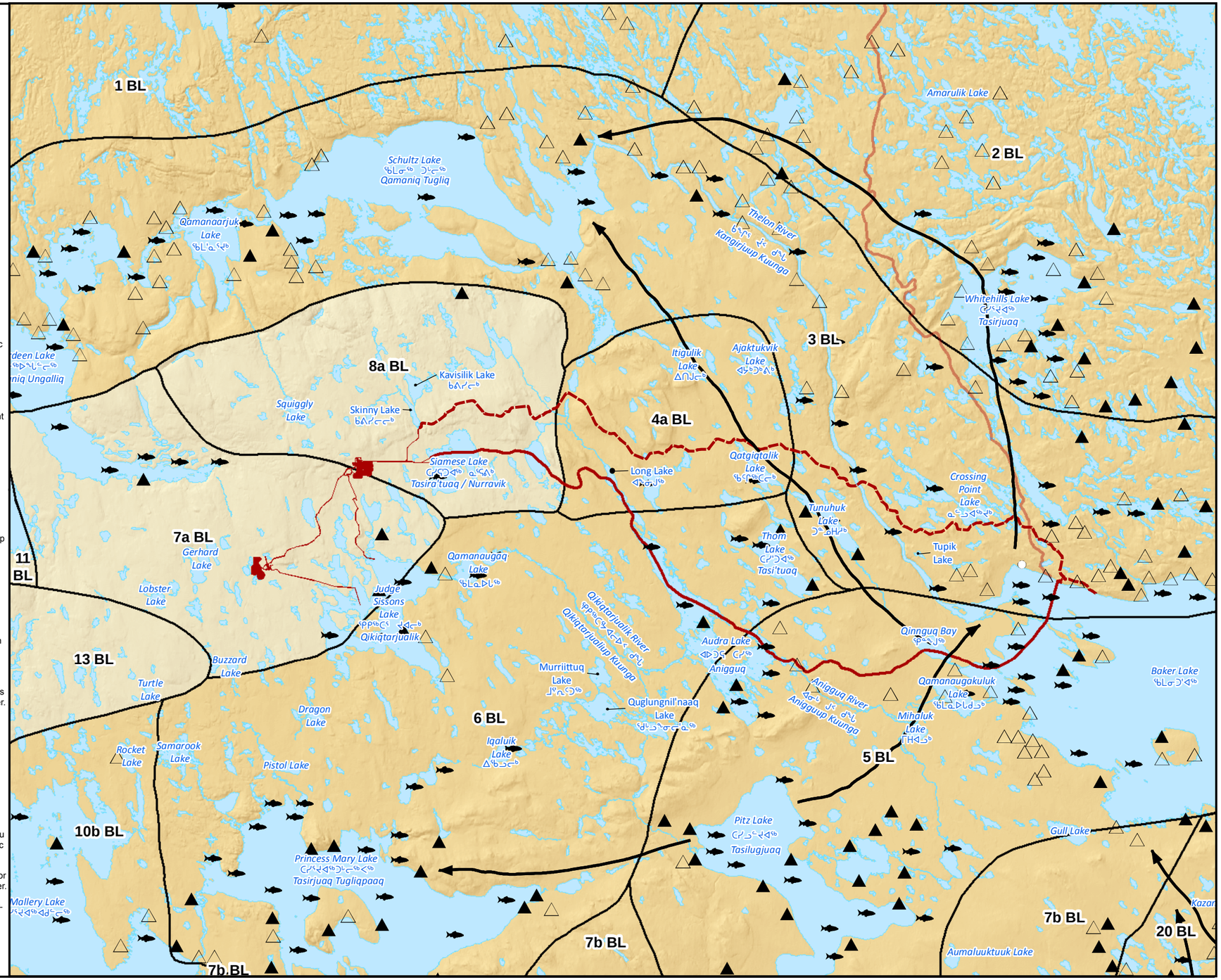
8a BL (Aberdeen) - Very little hunting or trapping activity has been reported in these areas in recent years.

10b BL (Dubwant) - In some years, small scattered groups of barren-ground caribou winter in the vicinity of Mallery Lake. In those years, they may be hunted throughout the winter months, depending on whether the caribou are available close to Baker Lake, Trapping for Arctic fox may occur in November-December or February-March. Activity in this area is usually subsidiary to that in the area to the northeast.

11 BL (Aberdeen) - The area surrounding Aberdeen Lake received less-regular use than the area 3BL. Depending on the movements of caribou, and their availability closer to the settlement, hunters or trappers may set up camps at the narrows or western end of Aberdeen Lake. In summer and fall, barren-ground caribou may be hunted when they cross the Thelon River. In February and March, Arctic fox may be trapped. Domestic fishing is carried out in support of hunting and trapping.

13 BL (Aberdeen) - Hunters occasionally travel to Beverly Lake via the Thelon River to hunt caribou in spring or summer. It is also common to hunt ducks or geese and to collect eggs on the island north of the Dubwant River.

20 BL (Chesterfield Inlet) – The area along the Kazan River and east to Bisset and Parker lakes receives year-round usage by residents of Baker Lake. Hunting is done by canoe, along the Kazan River in late summer and fall as the migrating caribou move south and westward. During the winter of some years, it is possible to hunt wintering barren-ground caribou in the vicinity of Parker Lake. Trapping for Arctic fox takes place in November and December, and in February and March, primarily along the Kazan River valley. Domestic fishing, in support of hunting and trapping activities, takes place along the Kazan River and larger lakes.



Projection: NAD 1983 UTM Zone 14N
Compiled:TL
Date: 07/09/2014 Scale: 1:500,000
Data Sources: *Rick Riewe (Editor). 1992. Nunavut Atlas. Canadian Circumpolar Institute and the Tungavik Federation of Nunavut. Edmonton, AB.Art Design Printing Inc. Natural Resources Canada, Geobase®, Nation*

FIGURE 9.1-1
LAND USE AND HUNTING INTENSITY

ENVIRONMENTAL IMPACT STATEMENT
VOLUME 9

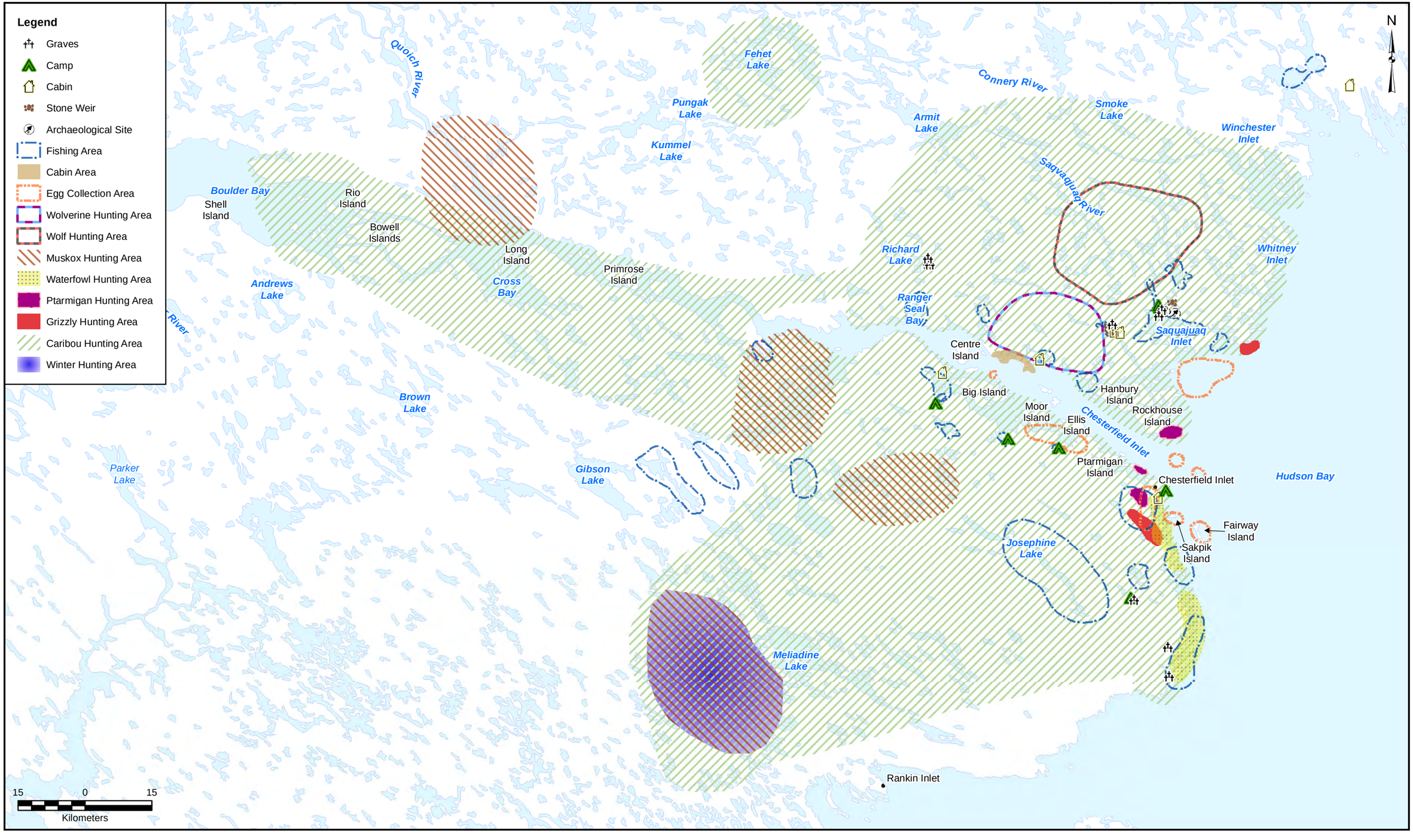
10 0 10
Kilometers

File: Q:\SHEQ\GIS\KIGGAVIK\2014\EIS\Volume 9 - SocioEconomics and Community\Volume 9 - Tier 2\Part 1 - Socio-Economic\Maps\MXD\Figure 9.1-1 Land Use and Hunting Intensity.mxd

KIGGAVIK PROJECT

AREVA

AREVA Resources Canada Inc - P.O. Box 9204 - 817 - 45th Street West - Saskatoon, SK - S7K 3X5



Projection: NAD 1983 UTM Zone 14N
Compiled: TL Drawn: TL
Date: 8/25/2014 Scale: 1:800,000
Data Sources: *Natural Resources Canada, Geobase®,Elder Focus Groups, Nation Topographic Database, AREVA Resources Canada Inc.*

FIGURE 9.1-2
PREFERRED LAND-BASED HUNTING AREAS

ENVIRONMENTAL IMPACT STATEMENT
VOLUME 9

File:Q:\SHEQ\GIS\KIGGAVIK\2014\EIS\Volume 9 - SocioEconomics and Community\Volume 9 - Tier 2\Part 1 - Socio-Economic\Maps\MXD\Figure 9.1-2 Preferred Land-Based Hunting Areas.mxd

KIGGAVIK PROJECT

AREVA

AREVA Resources Canada Inc - P.O. Box 9204 - 817 - 45th Street West - Saskatoon, SK - S7K 3X5