Kiggavik Project

Environmental Impact Statement

Tier 3 Technical Appendix 2T

Environmental Management Plan

December 2011

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1 INTRODUCTION

1.1 OVERVIEW

This Environmental Management Plan (EMP) provides AREVA Resources Canada's (AREVA's) systematic approach to managing potentially adverse environmental effects throughout the life of the Kiggavik Project. It defines the sequence of policy, planning, implementation, monitoring, and review processes that will ensure the Kiggavik Project is run in an environmentally acceptable manner that is adaptable, and encourages continual improvement.

These processes apply to the assessments presented in Volumes 4 through Volume 10 of the project EIS.

1.2 SCOPE

The Environmental Management Plan will consider all activities at the project site throughout its lifecycle, from exploration to decommissioning. It is designed to meet both internal requirements and the requirements of regulatory agencies. The Environmental Management Plan will be delivered through an Environmental Management System (EMS).

This plan describes the process by which the Environmental Monitoring Program will be developed and implemented based on requirements determined during the Environmental Impact Assessment (EIA), and the subsequent licensing and permitting of the project.

2 BACKGROUND

2.1 POLICY

The Environmental Management Plan is based on the AREVA Environment Policy, which follows:

AREVA recognizes that continued economic and social development depend on a healthy environment and incorporates environmental considerations into all company activities to ensure sustainable development. AREVA is committed to continually improve approaches and technology to minimize the effects of its activities on the environment.

To meet this commitment, AREVA shall:

- comply with applicable legislation and other requirements to which AREVA subscribes;
- minimize adverse environmental impacts of its activities by reducing consumption of natural resources, controlling releases and optimizing waste management;
- prevent pollution by using processes, practices, materials or products that avoid, reduce or control pollution;
- deal proactively with environmental issues by identifying potential impacts and implementing mitigating actions and/or developing effective contingency plans;
- develop internal objectives and targets to continually improve environmental performance;
- measure performance against established goals;
- conduct employee training, internal assessments and periodic reviews to ensure these operations and activities are conducted in compliance with documented procedures;
- communicate environmental requirements and corporate initiatives to employees and contractors to encourage their participation and compliance; and

- involve applicable stakeholders, with particular focus on those directly impacted, in initial planning, ongoing operations and decommissioning of AREVA activities through an open and transparent public involvement program.

This policy is made available to the public.

2.2 REGULATORY INFORMATION

The main regulatory agencies involved with the Kiggavik Project EIS are:

- Nunavut Impact Review Board (NIRB)
- Aboriginal Affairs and Northern Development Canada (AANDC)
- Nunavut Water Board (NWB)
- Environment Canada (EC)
- Kivalliq Inuit Association (KIA)
- Workers' Safety & Compensation Commission (WSCC)
- Canadian Nuclear Safety Commission (CNSC)
- Fisheries and Oceans Canada (DFO)
- Transport Canada (TC)
- Health Canada (HC)

2.3 AREVA'S INTEGRATED ENVIRONMENTAL PROTECTION APPROACH

AREVA's Values Charter put into operation our commitment to the principles of sustainable development. This commitment is reflected in our operating history in northern Saskatchewan; this history also reflects our desire to continue to improve our ability to balance social responsibility, environmental protection and economic performance. Sustainable development provides the opportunity for development to take place, the opportunity to foster stakeholder and community success, and through long-term protection of the environment, the opportunity for future generations to secure their success.

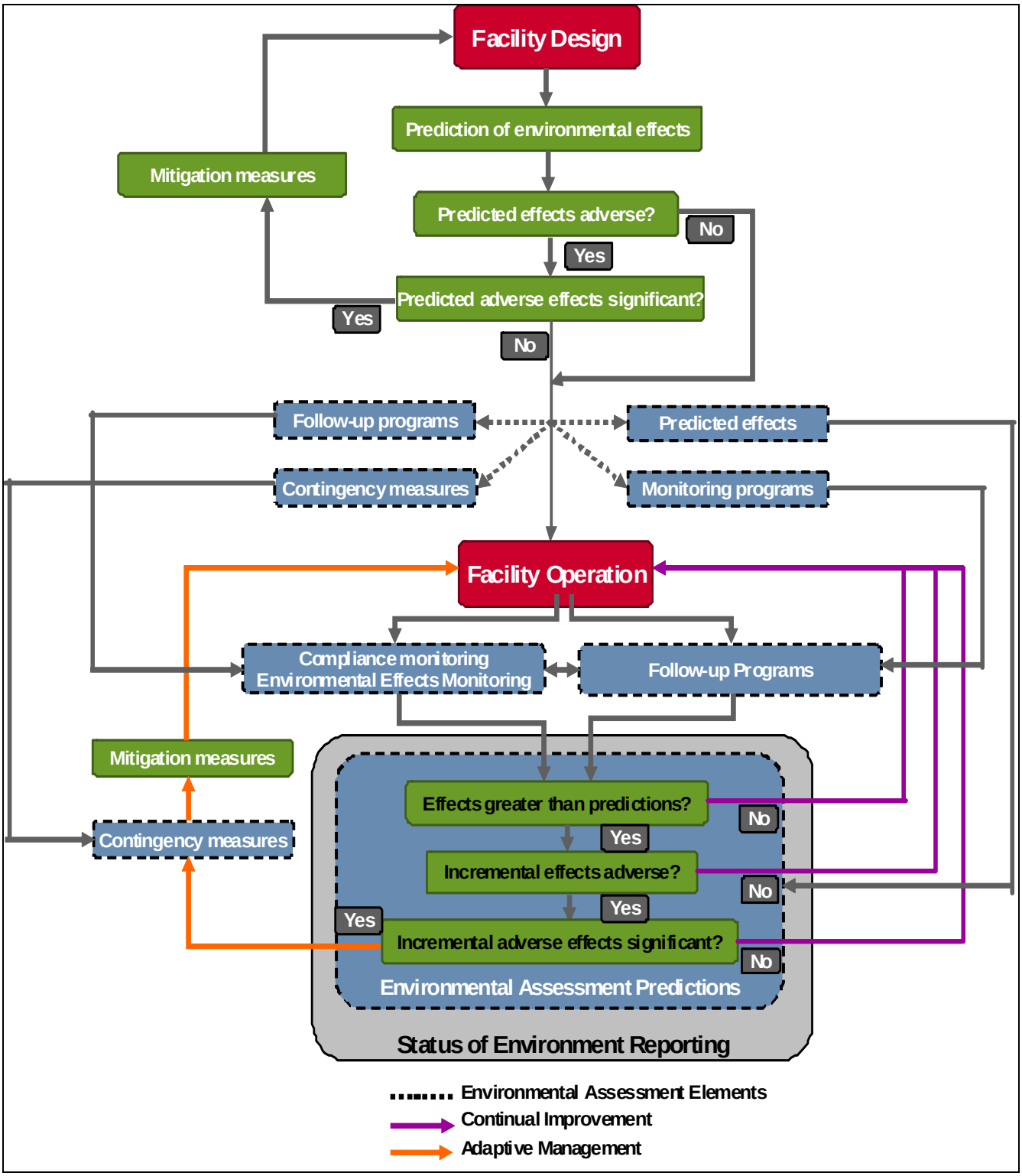
To achieve long-term sustainable development goals requires a framework which is precautionary, adaptable and identifies opportunities to continually improve performance. To ensure long-term environmental performance in support of sustainable development, AREVA has adopted a framework that embraces the principles of environmental assessment as a fundamental sustainable development tool. The framework, which is described below, ensures that the outcomes of the environmental assessment process are implemented, and that the environmental commitments and performance outlined in the environmental assessment are achieved. The framework consists of three main components: environmental assessment, continual improvement and adaptive management. Within the approach, assumptions and decisions are conservative, providing a precautionary approach which reflects the level of information available at the time decisions are made.

2.3.1 Environmental Assessment

The top half of Figure 2-1 provides a simplified flow diagram of the environmental assessment process. The environmental assessment process is a primary regulatory tool to promote sustainable development. The purpose of the environmental assessment process is to identify project environment interactions and their potential to elicit adverse environmental effects, to gauge the significance of the effects, and to identify mitigation measures if significant adverse effects are determined to be likely. The process is iterative, incorporating mitigation measures and the re-evaluation of the facility design and the potential effects of the proposed activities.

As outlined in the Project Description (Volume 2), an iterative evaluation of design alternatives was undertaken in consideration of the site-specific constraints imposed upon activities in the arctic. Key features of the alternatives analysis included environmental performance, economic viability and project operability. Project design considered environmental performance from the perspective of minimizing water and reagent use, optimizing water recycle, minimizing the project footprint, capturing and treating water that may have come in contact with operational areas and minimizing the risk of atmospheric and treated effluent emissions. The iterative evaluation process identified optimized and robust processes and infrastructure configurations which, within the context of operational and economic constraints, would minimize the residual environmental effects of the project.

Figure 2-1 AREVA's Environmental Protection Framework



Several key outcomes flow from the environmental assessment process. These elements include:

- an outline of predicted effects of the project;
- the framework for a monitoring program incorporating regulatory compliance regimes and receiving environmental effects monitoring requirements;
- a framework for a follow-up program to verify the effectiveness of mitigation measures and the accuracy of the environmental predictions; and
- possible contingency measures proposed for potential unforeseen effects.

Each of these elements developed during the EA process need to be integrated into the operation of the facility.

2.3.2 Continual Improvement and Adaptive Management

The bottom half of Figure 2.3-1 illustrates how each of the elements developed during the EA process are integrated into the construction and operation of the facility. During facility operation, compliance monitoring maintains operational performance standards. Environmental Effects Monitoring programs, completed in the receiving environment with robust study designs, provide the information necessary to determine operational effects, their geographical extent, and magnitude. The monitoring program incorporates monitoring endpoints that represent key ecosystem features, and as such, are effective at identifying unanticipated effects.

These monitoring systems provide the opportunity to examine actual effects and refine model predictions and compare these results to the effects anticipated in the EA. The evaluation is iterative through time, which allows the identification, tracking and comparison of actual effects to the predicted effects anticipated at the time of the EA. The data and tracking of actual effects provides the necessary feedback, impetus, and information to the operation to identify and implement opportunities for continual improvement in systems performance. Results which indicate unforeseen or incremental effects beyond those predicted in the EA provide a basis to determine if a trend would, over time, lead to significant adverse effects. If so, the monitoring information also provides information upon which to develop adaptive management plans, and to facilitate detailed design of alternative mitigation measures or contingency measures to mitigate the significance of the incremental adverse effects.

Follow-up programs are tailored to verify the accuracy of EA predictions and to determine the effectiveness of mitigation practices. The nature of the information generated by the follow-up program relates to refining and verifying the assumptions of the assessment methodology and thereby both validating the predicted effects and reducing uncertainties in predictions made in future EAs. The feedback from the follow-up program in refining and verifying the assumptions

of the assessment methodology also provides the basis for continual improvement in both the facility operation and the monitoring and follow-up programs themselves. Unforeseen or incremental effects beyond those predicted, which indicate the future development of significantly adverse effects, provide the information necessary to implement contingency practices to mitigate the development of these effects.

This integrated environmental protection approach which has been adopted by AREVA, features an iterative, systematic process for continual improvement of practices. The approach builds on the outcomes of EA predictions and of operational monitoring and follow-up programs to provide a robust defense against the development of significant adverse effects.

This iterative assessment of effects throughout the life of the project needs to be reviewed and communicated to stakeholders. At AREVA's operations in Saskatchewan, this communication is achieved through the publication of Status of the Environment (SOE) reports, which are issued throughout the operational and decommissioning period on a three-year basis. This provides a suitable forum for ensuring that monitoring and follow-up programs are appropriately focused. The SOE reports also ensure that results are documented, and communicated.

The framework for AREVA's integrated approach to environmental protection is based on continual improvement, incorporating the concepts of both a precautionary approach and adaptive management. Continual improvement in facility processes and operational practices are identified based on analyses of performance data. Operational performance is continually monitored to confirm acceptability of the operations, identify additional mitigation measures where needed, and to update predictions of environmental effects based on analyses of operational and environmental data. As well, environmental monitoring and follow-up programs are continually reviewed for improvement opportunities. This integrated approach allows a conservative, or precautionary approach to decision making when uncertainties are higher, as may be the case prior to the start of the operation. As time progresses, uncertainties are reduced through demonstration of the physical performance of the facility, its mitigative features, and confirmation or revision of the predictions supporting the environmental assessment and licensing approvals. The focus thus shifts from the precautionary approach initially required in the face of uncertainties to continual improvement and refinement. Optimization of performance, of monitoring, and follow-up programs is achieved through continual improvement based on experience. If necessary, additional mitigation measures can be implemented from amongst the contingency measures identified at the time of original regulatory approvals.

2.4 ENVIRONMENTAL MANAGEMENT SYSTEM FRAMEWORK

The Kiggavik Project's current EMS for exploration activities is designed to meet the requirements of certification to the ISO 14001 standard for Environmental Management Systems. The EMS currently in place will be updated to reflect the needs of each future Project phase.

The EMS of the McClean Lake Operation, which is embedded within the overall site IQMS, is

certified to the ISO 14001:2004 standard. It is the objective of the Kiggavik Project to attain this certification as well for its mining operations. The EMS provides the structure for operational control of environmental issues, both current and future. Establishment of the EMS is similar to, and follows from, the environmental assessment (EA) process in that it involves an examination of possible environmental effects as a result of interactions between the operation and the environment. Once the significant interactions are identified and grouped, appropriate environmental protection objectives are established, consistent with initially meeting, and then continuously improving on, EA predictions.

As part of the ISO 14001 certification process, a comprehensive review is undertaken of all potential environmental effects from site activities. This allows establishment of broad objectives which can then be broken down into individual measurable targets.

3 MINE DEVELOPMENT PHASES

3.1 EXPLORATION PHASE

During the current exploration/pre-development phase the Kiggavik site hosts a seasonal camp. Field activities are generally conducted from May to September. Access to the Kiggavik site is by helicopter or by means of a winter road. In the summer months AREVA employees, including local contractors, perform exploration activities; collect baseline data for the EIA; and monitor the environment, wildlife, and biodiversity.

An Environmental Management System (EMS) is in place during this phase, designed to meet the requirements of the ISO 14001 standard as well as internal requirements. Responsibilities of all Kiggavik Project personnel as related to the EMS is clearly defined in their job descriptions.

All personnel, regardless of position or employment type, are additionally responsible to:

- understand the three basic principles of the environmental policy – protect the environment, improve the system, comply with laws and licences
- understand, and work to minimize the impact of their work on the environment
- not feed wildlife.

All supervisors are additionally responsible to:

- understand, communicate with subordinates, and work towards the environmental objectives and targets applicable to their work
- report spills
- use the proper processes for transporting wastes to/from designated areas.

The Senior AREVA field personnel on site are responsible for ensuring that ARC employees and contractors perform these tasks and that maintenance / inspection records are generated as per the relevant procedures.

Any AREVA employee responsible for a contractor is responsible to ensure that:

- all activity by non-AREVA Kiggavik Project personnel is conducted with a signed contract which will identify the requirement to adhere to authorizations from regulatory agencies.

- contractors have received copies of all authorizations, AREVA's Environmental Policy, and Kiggavik Project's ECoP.

- all activity by non-AREVA Kiggavik Project personnel is conducted in accordance with conditions of authorizations and with the Kiggavik Project ECoP.

Several procedures and work instructions have been developed as part of the EMS, including procedures which define the roles, responsibilities, and authorities within the EMS. Procedures have been designed to ensure that the environmental impacts of activities at the Kiggavik site are assessed, monitored, and managed, include:

- EMS Management Review - to ensure that the EMS remains appropriate and effective by outlining the program review requirements.

- Identifying Environmental Aspects – to systematically identify environmental aspects that are under the control or influence of the Project, in order to determine those which may have a significant impact on the environment. At present the Project has identified the following aspects through its field activities:

  Operational controls for these aspects are addressed in the Environmental Code of Practice (EcoP) for the Kiggavik Project, as discussed below.

- Legal and Other Requirements - to identify environmental requirements, legal and otherwise, that may affect the Project and are applicable to the environmental aspects of the operation.

- Objectives & Targets and Environmental Management Program - describes the process for determining and documenting environmental objectives and targets for field activities, as well as the means by which they shall be achieved (i.e., the Environmental Management Programs).

- Emergency Preparedness and Response – identifies types of activities with a higher risk of spills of fuels and lubricants. This information is incorporated into the Emergency Response Manual.

- Nonconformance and Corrective and Preventative Action – outlines non-conformance identification, reporting structure, and documentation requirements. The procedure also describes the process used to track corrective and preventative actions taken reduce or eliminate an identified problem.

- Operational Control and Monitoring & Measurement - describes the steps used to establish the controls under which activities associated with significant aspects must be conducted, and outlines the process for monitoring and measuring, on a regular basis, the key characteristics of its operations and activities that can have a significant environmental impact.

The core activity of the monitoring program during this phase is to acquire data useful in assessing potential impacts of the operation, to ensure that possible impacts are detected as early as possible and mitigated where necessary.

3.2 CONSTRUCTION PHASE

Once the environmental assessment and review of the project is completed, the project will require a variety of licenses and permits prior to construction. These licensing processes will require detailed engineering and planning documentation to be presented to the regulatory agencies for review and approval. As part of these licensing activities, the project-environment interactions and potential effects of the interactions outlined in the environmental assessment will be compiled, and a systematic planning process will be used to define objectives, identify information requirements of each objective, and develop a detailed design. These objectives and their individual design elements will form the Kiggavik Project environmental monitoring plan.

When the Kiggavik Project moves into the construction phase most of the requirements and practices in the ECoP and EMS currently in effect, as per Section 3.1 above, will continue. Any new activities, as well as the change in scale of activities, will be considered for potential environmental impacts. New activities are expected to include:

- building an access road
- transportation of materials to site by road
- installation of pipelines
- quarrying rock
- pouring concrete pads

Most activities related to construction will not be new to the site (for eg.,storing and handling materials, housing personnel, disposing of waste, heavy equipment use) but will occur on a much larger scale. As a result, the site will experience increases in:

- volumes of hazardous materials stored & handled

- volumes of industrial and domestic waste
- noise
- water consumption and discharge
- fumes/emissions from vehicles and other equipment
- dust from vehicles
- site footprint.

Each of these activities will be managed either by a monitoring and mitigation plan, or through operational controls. Hazardous materials will be handled as per the risk management and spill contingency plans; landfills will be developed for disposal of domestic and industrial waste, and operated as per the Technical Appendix 2S (Waste Management Plan), Technical Appendix 4F (Noise Abatement Plan) will deal with noise disturbances. Emissions from vehicles will be minimized through regular preventative maintenance and good operating practices implemented in work instructions; road dust suppression will also be incorporated into work instructions. Expansion of the site footprint will be carefully planned to minimize impacts on vegetation and water resources in the area.

A formal Environmental Monitoring Program will be initiated during this phase that will expand on the sampling performed during the Exploration phase, based on the results of the baseline data collection and analysis. The preliminary recommendations for the environmental monitoring program are included in the site-specific environmental mitigation and monitoring plans. These are provided as appendices to the relevant Tier 2 assessment reports. The environmental mitigation and monitoring plans include:

Air Quality Monitoring Plan (Technical Appendix 4C)

Noise Abatement Plan (Technical Appendix 4F)

Aquatic Effects Monitoring Plan (Technical Appendix 5M)

Wildlife Monitoring And Mitigation Plan (Technical Appendix 6D)

Archaeological Mitigation Plan (Technical Appendix 9D)

Surface water bodies and the sub-permafrost groundwater regime will be sampled on a routine basis, including both control and exposure locations. Samples will be analyzed for constituents of potential concern, including heavy metals and radionuclides. Other nutrients and general chemistry parameters will also be analyzed.

Streamflow metering will be performed to ensure that water is discharged from the site at a rate that does not cause erosion issues or degrade water quality downstream.

Additionally, air quality monitoring stations will be set up at strategic locations to monitor ambient suphur dioxide, ambient levels of particulate, $PM_{2.5}$, NOx, and ambient levels of radon 222.

The main goal of the environmental monitoring program during the construction phase will be to provide data to confirm environmental impact predictions, to monitor changes in the surrounding environment, and to ensure that any unexpected impacts are noted in a timely manner so that mitigation measures can be implemented.

4 MANAGEMENT PLAN (OPERATIONAL PHASE)

During the operational phase of the Kiggavik the Environmental Monitoring Program will be expanded and operational monitoring will be implemented. The key elements of the Environmental Management Plan during this phase will include the ECoP, the Environmental Monitoring Program, the Preliminary Decommissioning Plan, monitoring and mitigation plans and EMS.

4.1 ENVIRONMENTAL CODE OF PRACTICE

When the operational phase begins at Kiggavik the ECoP will be updated to derive controls to ensure environmental protection for key components of the Kiggavik Project, and to prescribe actions to be taken in response to situations ranging from a deviation from normal operating conditions through to a loss of operational control.

4.1.1 Methodology

The controls will include action levels and administrative levels. Action levels are intended to indicate an actual or potential loss of control of an aspect of the operation, as it pertains to environmental protection, in the short or long term. Administrative levels are meant to indicate a deviation from normal or expected operating conditions, and are intended to prevent a loss of control from occurring. As such, reaching an administrative level does not imply a loss of control.

In general, the method of developing controls is summarised as follows:

The key components of the Kiggavik Project, pertaining to environmental protection, have been determined. This encompasses all sources of potential or observed significant contaminant releases to the environment. Examples of key components include tailings preparation and water treatment.

Appropriate indicator parameters will be determined for each key component that would indicate potential environmental effects. Indicator parameters are typically chemical concentrations but could also include other operational measurements such as flow or hydraulic head.

Action levels and administrative levels, as defined above, will be derived for each indicator parameter. As appropriate, short or long term controls may be applied. Short term controls would indicate conditions such as short term operational upsets. Long term controls may be indicative of a failure at an administrative level to respond to an operational upset, or to allow a

condition that is acceptable over the short term but could result in long term if cumulative effects were to persist.

Specific controls presented in the ECoP will be subject to review, based on operating experience, as required throughout the life of the project.

Follow up actions are required upon exceedence of an administrative level or action level. The ECoP will prescribe a general approach in this regard, however specifics will depend on the nature of the situation and should be commensurate with the potential impacts. The principal steps for follow up action include some or all of the following:

- an investigation as to cause and effect;
- a response to mitigate potential effects;
- corrective and preventative actions; and
- notification and reporting to regulatory agencies (for action level exceedences only).

Discharge limits are drawn from applicable legislation, such as the Metal Mining Effluent Regulations (MMER), as well as operating licences and permits.

4.1.2 Monitoring and Mitigation

The monitoring necessary to ensure compliance with the ECoP will be specified in an updated Environmental Monitoring Program. Operational requirements will be documented in procedures and work instructions. The environmental monitoring program will generally be performed by an on-site Environment Group. Operational monitoring will be performed by Operations personnel.

Mitigating measures and corrective and preventative actions required by the ECoP, unless otherwise noted within the ECoP, will be initiated by Operations personnel. The Environment Group may be consulted for the purpose of determining appropriate actions, as required.

Administrative level exceedences require that the cause of the exceedence be investigated and appropriate actions taken. Consideration will be given to the magnitude and duration of the exceedence in determining appropriate action to be taken.

Action level exceedences require that mitigating measures and corrective and preventative actions be employed, as appropriate to restore acceptable conditions and regain control. Follow up requirements may vary significantly from case to case. For example, the isolated case of an exceedence, with a readily apparent solution, would not warrant the same level of investigation and response as a series of exceedences which could indicate a chronic degradation in the

level of control. As such, personnel will exercise professional discretion in determining appropriate mitigating measures and corrective and preventative actions.

4.2 ENVIRONMENTAL MONITORING PROGRAM

As mentioned above, the Environmental Monitoring Program will document all required monitoring. It will indicate sample locations, frequencies, and parameters, as well as indicating any other requirements such as sample type (eg. grab or composite).

AREVA will draw on its experience at mine sites in Saskatchewan to develop the Environmental Monitoring Program, while taking into account unique characteristics of the Kiggavik Region to ensure that all Valued Ecosystem Components (VECs) are monitored.

4.2.1 Process Monitoring

Key parameters in tailings porewater will be monitored before the tailings are placed in the TMF. These key parameters will be the contaminants of greatest concern in that location and will likely include uranium and radium 226, as well as other heavy metals.

Key parameters of treated effluent will also be monitored before it is released to the environment. The effluent will be sent to monitoring ponds before discharge, and a composite sample of the discharge to the monitoring ponds will be taken using an autosampler for chemical analysis prior to discharge.

Effluent will also be tested for both acute and sublethal toxicity as per MMER requirements.

It is also anticipated that stack sampling will be performed on a regular basis to monitor air emissions. Mill stacks will have scrubbers to remove particulate and contaminants from the air stream before discharge; regular sampling will ensure that the scrubbers are operating effectively.

4.2.2 Environmental Monitoring during Operations

During operations the environment around the Kiggavik site will be monitored on an on-going basis to measure change against baseline and against non-exposure areas during the life of the project, and to ensure that no impacts beyond those that were predicted in this EIS occur. The Environmental Monitoring Program will include:

- Air quality monitoring: ambient sulphur dioxide, ambient levels of particulate, $PM_{2.5}$, and NOx in air, ambient levels of radon 222
- Meterological monitoring and precipitation samples

- Surface water elevation monitoring for waterbodies potentially affected by Project activities
- Surface water and sediment quality monitoring
- Groundwater quality & elevation
- Fisheries resources monitoring – fish tissue and fish health assessment
- Benthic macroinvertebrates community structures
- Vegetation quality monitoring and community structures

The frequencies and exact locations will be designed to meet the requirements of Environmental Effects Monitoring under the Metal Mining Effluent Regulations as well as all conditions of future permits and licences.

4.3 FOLLOW-UP PROGRAMS

In addition to any programs developed during the public review of the Project, AREVA has committed to the development of follow-up and adaptive management programs, including:

- Tailings Optimization and Validation Program;
- Mine Rock Optimization and Validation Program; and,
- Dust Management Program.

5 REPORTING

Reporting will be completed in compliance with territorial and federal government requirements and in cooperation with Nunavut residents and their representative organizations. Reporting may include but is not limited to:

- Notification and reporting of action level exceedences
- Quarterly reports submitted in compliance with the Metals Mining Effluent Regulations (MMER)
- Annual Report – will include details of the Environmental Monitoring Program results
- Status of the Environment (SOE) reports, which are issued throughout the operational period on a three-year basis
- Community Consultation eg. Community Liaison Committee meetings, open houses, site visits, social media etc.

6 REFERENCES

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