Kiggavik Project
Final Environmental Impact Statement

Tier 1 Appendix 1D-III: Post-Environmental Assessment Commitments

September 2014

History of Revisions

Revision Number	Date	Details of Revisions
01	December 2011	Initial release Draft Environmental Impact Statement (DEIS)
02	April 2012	Revised DEIS – to address comments received from the Nunavut Impact Review Board as part of their conformity determination released on January 18, 2012
03	September 2014	FINAL Environmental Impact Statement

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1 Environmental Assessment Process

For a proposed Project to proceed to construction in Nunavut, it must gain approval at three primary milestones:

1. conformity with applicable land use plans,
2. a positive environmental assessment (EA) decision (should a review be required) with the accompanying Project Certificate, and
3. the required licenses and permits.

The information requirements to achieve each of these milestones varies in proportion to the level of detail required for effective decision making. Applications for project authorization and an accompanying project proposal are sufficient for the Nunavut Planning Commission (NPC) to determine conformity with broad planning policies, objectives and goals. The project proposal is also used by the NIRB in screening the proposal to determine if a full environmental review is required. A Draft and Final Environmental Impact Statement (EIS) are submitted to the NIRB for an evaluation of whether or not the proposed project may unduly affect the ecosystem integrity of the Settlement Area. Subject to acquiring a Project Certificate, licence and permit applications and documents contain the highest level of engineering and project detail.

Under the Nunavut process, there is a strict sequential requirement of acquiring land use conformity prior to the start of the EA. With respect to EA and licencing, there are two options:

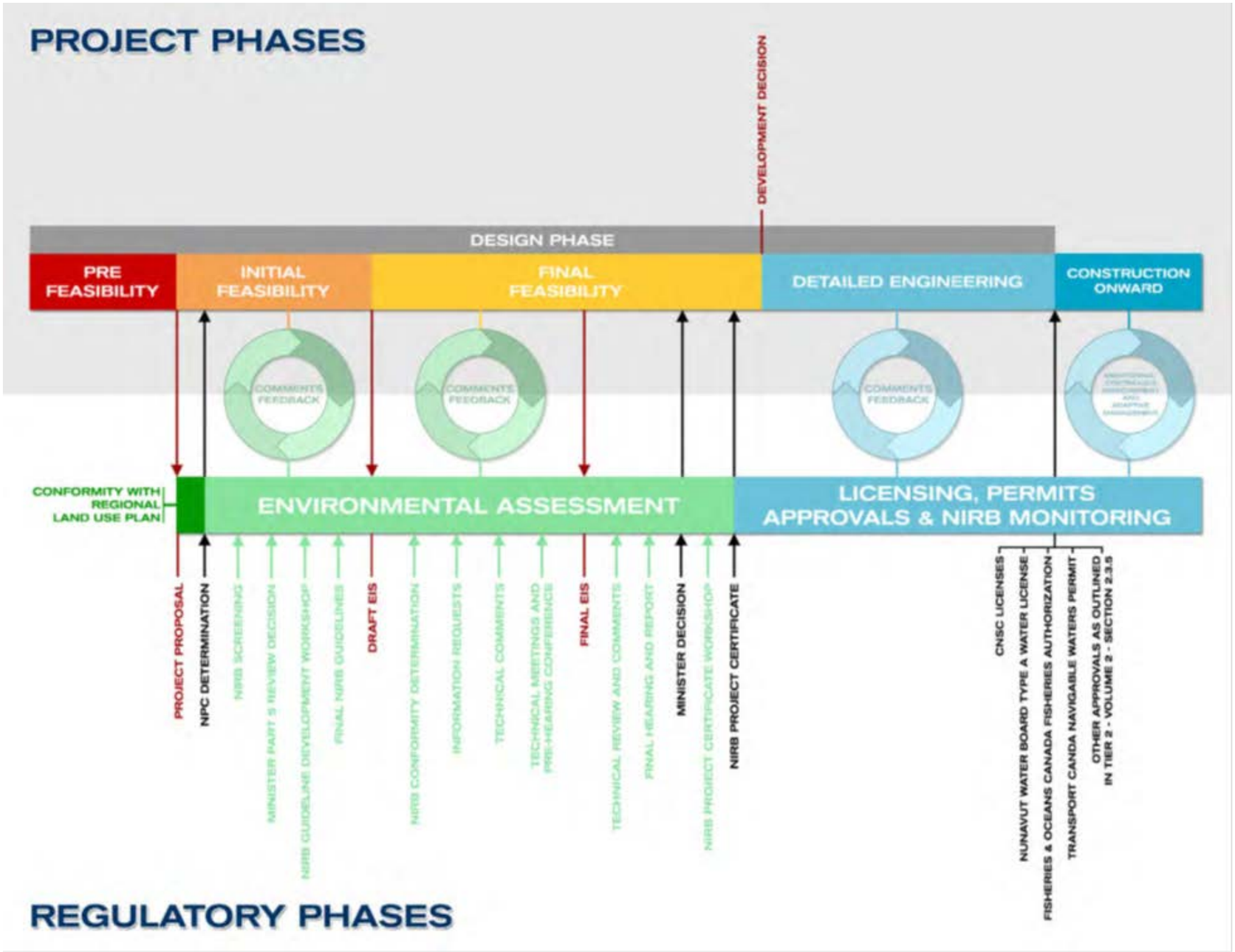
1. the EA and licensing/permitting processes can be sequential (the EA process is completed prior to the commencement of the licensing/permitting process), or
2. the EA and licensing/permitting processes can be concurrent (the EA and licensing/permitting process occur at the same time).

The information requirements of a concurrent EA and licensing/permitting process are much

greater at the EA stage than what are required for a project advancing sequentially through the EA and licensing processes as the detail of a concurrent process must satisfy both the EA and licensing regulatory stages at once. Regardless of whether a project advances concurrently or sequentially through the regulatory process, there is a requirement that terms and conditions contained within an EA Project Certificate must be known and implemented by government departments and agencies that are responsible for issuing licenses and permits.

AREVA is currently proceeding with a sequential EA and licensing/permitting process for the Kiggavik Project. This process is outlined in the Figure below. The Figure depicts two timelines.

Figure 1-1 Sequential EA and Licensing/Permitting Process



The top timeline illustrates the sequence of project engineering and life of project milestones associated with business decisions. The bottom timeline illustrates the sequence of Project approval milestones associated with regulatory decisions. Timeline detail focuses on the main regulatory approvals stages.

As illustrated in the Figure above, the sequential EA and licensing/permitting process allows for public and regulatory feedback to be incorporated into the design phase of the project. The process is iterative, incorporating mitigation measures and the re-evaluation of the facility design and the potential effects of the proposed activities. For example, comments and feedback during the development of the NIRB guidelines were considered as the initial feasibility studies were being undertaken and influenced the project description and assessment basis presented in the DEIS.

A key example is the removal of marine shipping of uranium concentrate as a response to public feedback within this time period (AREVA letter to NIRB dated March 24, 2011). Similarly, during the review of the DEIS, feedback in the form of information requests and technical comments will be considered during the final feasibility design phase. This iterative process is shown in the figure by the design phase spanning the entire EA process with feedback loops between the EA regulatory process and the project design phases. Feedback from the DEIS review has been incorporated into the FEIS.

2 Post-Environmental Assessment Commitments

2.1 Introduction

Different terminology has been used to identify when information or activities will occur post-environmental assessment (EA), which includes the following terms: licensing, detailed design, detailed engineering, final engineering, design of the facilities, final detailed design, and the construction phase. To clarify, all of these terms reflect information or activities that will occur during the licensing stage, as the information/activities are anticipated to provide sufficient detail for obtaining license approval. A list of post-EA licensing commitments can be found in Table 2.2-1 and Table 2.2-2.

Once a positive Minister's decision and NIRB project certificate are obtained, the final terms and conditions and project constraints will be known to AREVA. This will provide the necessary information upon which a development decision can be made, and detailed engineering can be finalized. The detailed engineering phase generates many of the details required to ensure the terms and conditions, and project constraints are effectively addressed and will also provide the basis upon which an effective licensing and permitting process (e.g. Nunavut Water Board (NWB), Canadian Nuclear Safety Commission (CNSC), Fisheries and Oceans and others) can be achieved.

Further detailed engineering supports licence and permit applications and approvals. This third level of project approval is used to demonstrate proponent competence and ability to implement the EA-approved project. Main licensing approvals include the CNSC Licence to Prepare and Construct, the NWB Type A Water Licence, Fisheries and Oceans Authorization and a Transport Canada Navigable Water Permit. Further details on licensing can be found in DEIS Tier 2, Volume 2, Section 2.3.5. The ability to obtain all required permits and licenses demonstrates that the proponent has the necessary procedures and quality management in place. It is at the completion of this stage that monitoring and management plans contain the full detail that is required for an operating site.

2.2 Preliminary Hearing Conference Decision

A Community Roundtable and Preliminary Hearing Conference (PHC) were held July 4 to 6, 2013 in Baker Lake. The Community Roundtable provided an opportunity for Kivalliq community representatives and others to ask questions about the proposed Kiggavik Project and voice concerns and comments. The PHC provided an opportunity for parties to present to the Nunavut Impact Review Board (NIRB) on the issues that were resolved during the technical meeting, and those issues that remained outstanding. The PHC was attended by the following parties/interveners: AREVA, NTI, KivIA, Baker Lake HTO, GN, CNSC, AANDC, EC, DFO, NRCan, TC and BQCMB. A PHC Decision was issued by the NIRB on July 5, 2013.

As noted in the Preliminary Hearing Conference (PHC) Decision Concerning the Kiggavik Project (NIRB 2013):

> The Board accepts the Commitment Lists as set out in Appendices 1 and 2, as amended by the Board's requirements set out below, and notes that their fulfilment is a key part of the FEIS requirements.

Further, commitment number 7 from PHC Appendix 2 (NIRB 2013) states that AREVA will:

> Continue to update commitment list table that refers to information to be provided in the FEIS and during the post-environmental assessment (EA) phases and include information requested by AANDC in information request (IR) #25.

The information requested in IR-AANDC-25 regarding subsurface conditions and geotechnical parameters is provided in Tier 3, Technical Appendix 6A, Surficial Geology, Terrain, and Shallow Geotechnical Conditions.

Table 2.2-1 below summarizes commitments for the Kiggavik Project and when that detail will be provided in the following categories:

- Prior to Completion of Licensing
- Prior to Start of Construction
- On-Going Throughout Operations
- Prior to Decommissioning

Table 2.2-1 Post-EA Commitments Resulting from PHC Decision Appendix 1

Post EA Information Identified in AREVA's Technical Comment Response Submission		Final Environmental Impact Statement (FEIS) September 2014				
No.	**AREVA Commitment**	**FEIS Tier**	**FEIS Volume or Appendix**	**FEIS Section**	**Comment**	**Timing of Additional Post EA Information**
1i	Fulfil requirements under the Navigable Waters Protection Act o Provide a list/table identifying which waterways meet the criteria established by the Minor Works and Waters (NWPA) Order and those that do not o Provide an application for approval under the NWPA for any waterways that do not meet the Minor Works and Waters (NWPA) Order o Provide an application for approval under the NWPA for works that do not meet the established criteria in the Minor Works, Water Intakes pamphlet and the Minor Works, Temporary Works pamphlet o AREVA will continue to abide by the conditions outlined in the Transport Canada Minor Works and Waters (NWPA) Order for winter crossings. o AREVA will consult with TC NWPP in order to determine the steps involved and information required to apply for a Proclamation of exemption by the Governor in Council under section 23	Tier 3	Technical Appendix 1D-III; Volume 2 - Project Description and Assessment Basis	Volume 2 Section 2.3.5.6 and Table 2.3-4	In accordance with Transport Canada requirements, AREVA will submit applications for approval under the *Navigation Protection Act* (NPA) when final design details for project components, such as dykes, water intakes, temporary works and outfalls that are listed in the Schedule of the NPA and/or considered as navigable waters. Table 2.3-4 provides a summary of works potentially subject to an application under the NPA at the time of Project licensing.	Prior to Completion of Licensing
1ii	AREVA will submit an Integrated Management System for consideration as part of the licensing and permitting applications provided to the regulatory agencies.	Tier 1	Technical Appendix 1D-III; Appendix 2T - EMS	Section 4	AREVA will submit an Integrated Management System for consideration as part of the licensing and permitting applications provided to the regulatory agencies at Project licensing.	Prior to Completion of Licensing
2i	Assess the condition for water depressurization for the End Grid deposit.	Tier 2; Tier 3	Technical Appendix 1D-III; Volume 2 - Project Description and Assessment Basis; Technical Appendix 5E - Prediction of Water Inflows to Kiggavik Project Mines	Volume 2 Section 5.5.3, Appendix 5E Attachment A	The depressurization at End grid is described in Volume 2 Section 5.5.3 as well as in Attachment A of Appendix 5E.	
2ii	Conduct detailed geotechnical work to support the route selection and design prior to commencement of the project.	Tier 1	Technical Appendix 1D-III	Appendix 1D	Detailed geotechnical work to be done prior to start of construction	Prior to Start of Construction
2iii	AREVA will undertake characterization of faults during pit and underground excavation to better characterized the relationship between the faults and the mines.	Tier 1; Tier 3	Technical Appendix 1D-III; Technical Appendix 5D - Groundwater Flow Model	Volume 5D, Section 5.2	The characterization of faults and their interaction with mine workings is described in the Hydrogeology follow-up program.	On-Going Throughout Operations
2iv	AREVA will collect site-specific geotechnical information for the detailed design and construction of site facilities prior to licencing of the facilities. This will include geotechnical properties, terrain sensitivity, and permafrost conditions of the site soils. This information will support the final design and construction of the site and access roads, the water management ponds and channels, final open pit designs, ore and mineralized waste rock pads, and mine infrastructure in general.	Tier 1; Tier 3	Technical Appendix 1D-III	NA	AREVA will collect site-specific geotechnical information for the detailed design and construction of site facilities prior to licencing of the facilities. This will include geotechnical properties, terrain sensitivity, and permafrost conditions of the site soils. This information will support the final design and construction of the site and access roads, the water management ponds and channels, final open pit designs, ore and mineralized waste rock pads, and mine infrastructure in general. This information is necessary for detailed design purposes and is not required for the environmental assessment of the Project.	Prior to Completion of Licensing
2ix (NIRB 5)	Provide detailed design and operational information on leak detection system	Tier 3	Technical Appendix 1D-III; Technical Appendix 2D - Design of Ore and Mine Rock Pads and Ponds; Technical Appendix 5D - Groundwater Flow Model	Appendix 2D Section 5.2.3. Appendix 5D Section 5.3.	The monitoring of pads and ponds for leak detection is provided in Volume 2D Section 5.2.3 and the use of monitoring wells around mine infrastructure is described in Volume 5D Section 5.3	

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Post EA Information Identified in AREVA's Technical Comment Response Submission		Final Environmental Impact Statement (FEIS) September 2014				
No.	**AREVA Commitment**	**FEIS Tier**	**FEIS Volume or Appendix**	**FEIS Section**	**Comment**	**Timing of Additional Post EA Information**
2v	AREVA will conduct climate monitoring and monitoring of ground thermal conditions during operations.	Tier 1; Tier 3	Technical Appendix 1D-III; Technical Appendix 5D - Groundwater Flow Model	Volume 5D Section 5.2	Climate monitoring and monitoring of ground thermal conditions is included in the hydrogeology follow-up program as described in Volume 5D Section 5.2.	On-Going Throughout Operations
2vi	Geotechnical investigations and detailed design of the Andrew Lake Pit Dewatering Structure will be completed prior to licencing and construction of the structure. Included in the investigation and design will be the geotechnical stability, seepage analysis, thermal analysis, characterization local materials to be used in the construction, and constructions plans which include practical aspects of the construction such as control measures for total suspended solids as part of the dewatering plan.	Tier 3	Technical Appendix 2F - Design of Andrew Lake Dewatering Structure	Appendix 2F, Section 6	As discussed in the KIA Information Request 31, it is not anticipated that there will be difficulties sourcing the till material due to the relative small volume of material required for the Andrew Lake Dewatering Structure. In comparison to the Meadowbank dykes construction which required approximately 267,000 m3 of till material (Golder, 2007. Final Report Detailed Design of Central Dike Meadowbank Gold Project Volume 3), the Andrew Lake Pit Dewatering structure will require approximately 39,600m3 of till material.	Prior to Completion of Licensing
2vii	Fulfil requirements under the Wastewater Systems Effluent Regulations SOR/2012-139 Fisheries Act Registration 2012-06-29	Tier 3	Appendix 5M - Aquatic Effects Monitoring	Section 6.3	The Wastewater Systems Effluent Regulations will be used as guidance to establish the criteria, monitoring methods, volumes, parameters tested, and the quality assurance/quality control (QA/QC) requirements at sewage discharge locations.	On-Going Throughout Operations
2viii (NIRB 4)	Present plan for monitoring for leaks / spills of sewage and clean-up in the event of a spill.	Tier 3	Appendix 10B - Spill Contingency	Appendix 10B Section 5.2.14	A draft plan for cleanup of a sewage spill is presented in Appendix 10B Section 5.2.14	
2x	Provides details on mitigation measures in the event of a leak	Tier 3	Appendix 10B - Spill Contingency	Appendix 10B Section 5.2	Section 5.2 has been revised to include plausible spill scenarios and anticipated response strategies.	
2xi (NIRB 6)	Provide a detailed groundwater monitoring plan including locations of monitoring wells, monitoring frequency, and analysis to be done.	Tier 3	Technical Appendix 5D - Groundwater Flow Model	Appendix 5D Section 5.3.	The ground water monitoring plan is provided in Volume 5D section 5.3.	
2xii	Update the Preliminary Decommissioning Plan and associated Financial Assurance (PDP/FA) to reflect the Project Detailed Design for construction licensing, and subsequently for operations licensing. The PDP/FA will comply with requirements of the following documents: o CNSC Regulatory Guide G-206: Financial Guarantees for the Decommissioning of Licensed Activities o CNSC Regulatory Guide G-219: Decommissioning Planning for Licensed Activities o All requirements of the Project Certificate issued by NIRB which are related to decommissioning o All requirements of land use permits which are related to decommissioning.	Tier 3	Technical Appendix 1D-III; Appendix 2R - Decommissioning	1.5	Commitment to update PDP and FA based on requirements contained within the Project Certificate and subsequent permits and licenses.	Prior to Completion of Licensing
2xiii	In addition, the following information sources will be utilized o Experience gained at AREVA's Saskatchewan based operations (Cluff Lake Project and McClean Lake Operation) o The Nunavut Tunngavik Incorporated Reclamation Policy (2008) o Environmental Guideline for Site Remediation (2002) o CSA N294-09 Decommissioning of facilities containing nuclear substances o Existing guidelines (eg. CCME)	Tier 3	Appendix 2R - Decommissioning	1.3	Consideration of external documents has been identified in Section 1.3; experiences at Cluff Lake and McClean Lake integrated at various locations in document.	

Table 2.2-1 Post-EA Commitments Resulting from PHC Decision Appendix 1

Post EA Information Identified in AREVA's Technical Comment Response Submission		Final Environmental Impact Statement (FEIS) September 2014				
No.	**AREVA Commitment**	**FEIS Tier**	**FEIS Volume or Appendix**	**FEIS Section**	**Comment**	**Timing of Additional Post EA Information**
2xiv	The PDP/FA will be updated when necessary to reflect the changes in project activities	Tier 3	Technical Appendix 1D-III; Appendix 2R - Decommissioning	1.1	Commitment made to revise PDP and FA as project changes occur.	On-Going Throughout Operations; Prior to Decommissioning
2xv (NIRB 7)	The Detailed Decommissioning Plan (DDP) will be developed for regulatory approval towards the end of the operational period, to facilitate a seamless transition from operations to decommissioning	Tier 3	Technical Appendix 1D-III; Appendix 2R - Decommissioning	2.9	Preliminary decommissioning plan has been described with commitment to develop detailed plan as decommissioning period approaches.	
3i	AREVA will continue to consult with the stakeholders throughout project life	Tier 3	Technical Appendix 1D-III; Volume 3 Part 1 - Engagement; Appendix 3C - Community Involvement	Tier 3 Volume 3 Appendix 3C Section 6.	As stated in Tier 3 Volume 3 Appendix 3C section 6.	On-Going Throughout Operations
3ii	Upon completion of the FEIS, IQ data gathered by AREVA will be provided to the KIA and NTI for storage.	Tier 2	Technical Appendix 1D-III; Volume 3 Part 2 - IQ	Tier 2 Volume 3 Part 2 Section 1.2	As stated in Tier 2 Volume 3 Part 2 section 1.2	Prior to Completion of Licensing
5i	AREVA will submit detailed design information on the mitigation designs, facilities, and equipment to minimize impacts to surface water, as well as the proposed operational programs for these facilities as part of the licensing package to CNSC.	Tier 1; Tier 2	Technical Appendix 1D-III; Volume 5 - Aquatic Environment	Appendix 1D, Commitments table	AREVA will submit detailed design information on the mitigation designs, facilities, and equipment to minimize impacts to surface water, as well as the proposed operational programs for these facilities as part of the licensing package to CNSC.	Prior to Completion of Licensing
5ii	The Kiggavik Project will comply with the Metal Mining Effluent Regulations which stipulate discharge limits for deleterious substances, and require routine monitoring of effluent.	Tier 2	Volume 5 - Aquatic Environment; Appendix 5M - Aquatic Effects Monitoring	Tier 2 Volume 5 Sections 4.2.1, 8.2.1.4, 8.2.1.7, 8.6, 9.2.1.4, 10.2.1.4, 11.2.2.4, 11.5, 13.3, 13.4, 13.5, 13.7, 14.1.3, Tier 3 Technical Appendix 5M Section 6.3.	Updated reference to MMER regarding water quality where applicable.	On-Going Throughout Operations
5iii	Pre-development baseline benthic invertebrate tissue chemistry will be collected. This will be provided as part of the licensing/permitting process.	Tier 2; Tier 3	Volume 5 - Aquatic Environment; Appendix 5C - Aquatics Baseline	Tier 2, Volume 5, Section 5.5.2.2; Tier 3, Volume 5, Appendix 5C, Attachment 5C-1 (all sections)	FEIS refers to benthic invertebrate tissue chemistry collected in August 2013; Also added Attachment 5C-1 to Appendix 5C (additional 2013 baseline)	
5iv	AREVA will include a summary of available findings and feedback from Aboriginal engagement on fish habitat compensation options in the detailed fish habitat compensation plan, presented at the time of Authorization.	Tier 3	Technical Appendix 5L - Conceptual Fisheries Offsetting Plan	Tier 3, Volume 5, Appendix 5L all sections, 1.3	Appendix 5L is now a Conceptual Fisheries Offsetting Plan	Prior to Completion of Licensing
5v (PHC-32, NIRB 8)	Provide additional cross sections that display the site hydrogeology and relationship between the faults and the proposed mines.	Tier 3	Technical Appendix 5E - Prediction of Water Inflows to Kiggavik Project Mines	Appendix 5E Figure 2.4-1	Appendix 5E Figure 2.4-1 to provide a plan view of regional faults incorporated at 2D vertical discrete elements	

Table 2.2-1 Post-EA Commitments Resulting from PHC Decision Appendix 1

Post EA Information Identified in AREVA's Technical Comment Response Submission		Final Environmental Impact Statement (FEIS) September 2014				
No.	**AREVA Commitment**	**FEIS Tier**	**FEIS Volume or Appendix**	**FEIS Section**	**Comment**	**Timing of Additional Post EA Information**
5vi (PHC-5, NIRB 8)	Details of the hydrogeology follow-up program will be provided prior to licencing and will include plans for acquiring additional baseline groundwater chemistry, hydraulic heads, and thermal conditions. The program will also include further study of the hydrogeologic relationship between faults and the mines that penetrate through the permafrost.	Tier 3	Technical Appendix 1D-III; Technical Appendix 5D - Groundwater Flow Model	Volume 5D Section 5.2	Volume 5D section 5.2 provides details of the hydrogeology follow-up program including the relationship between the faults and the mines.	Prior to Completion of Licensing
5vii (PHC-31)	Initiate additional static and kinetic testing of Type 2 drill core samples	Tier 3	Technical Appendix 5F - Mine Rock Characterization and Management	Volume 5F Section 11.	Continued mine rock characterization for all stages of mine development is provide in Volume 5 F Section 11.	
5viii	Initiate drill core sampling and static testing of samples from the purpose built pit	Tier 3	Technical Appendix 5F - Mine Rock Characterization and Management	Volume 5 F Section 11.1.1	The plans to conduct drill core sampling to confirm the suitability of the purpose built pit location is provided in Volume 5F section 11.1.1	
5vix	Implementation of the proposed Mine Rock Characterization Monitoring and Follow-up Program, including during the construction and early mine development stage of the operation: o investigations into the chemical properties of mine rock at Kiggavik and Sissons during operation as part of a Mine Rock Optimization and Validation Program; o installation of monitoring wells down gradient of the permanent clean mine rock stockpiles and down gradient of the Type 3 temporary stockpiles during operations, o installation of monitoring wells within the backfilled Type 3 rock after relocation to the pit after mine closure. The Follow Up program will focus on the water quality effects from all mine rock types	Tier 3	Technical Appendix 5F - Mine Rock Characterization and Management	Volume 5F Section 11	The mine rock monitoring and follow-up program is described in Volume 5F Section 11 and includes plans for mine rock testing and verification at all stages of mine development.	
5x	AREVA will provide thermal modeling results of the Andrew Lake pit to the CNSC during licencing.	Tier 1	Technical Appendix 1D-III	NA	AREVA will provide thermal modeling results of the Andrew Lake pit to the CNSC during licensing.	Prior to Completion of Licensing
6i	AREVA will endeavour to examine additional sources of information to improve the wildlife tissue information which supports the ecological risk assessment.	Tier 3	Appendix 8A - EHHRA	Appendix 8A, Section 3.2.11, Table 3.2-17	Incorporated additional baseline data, as available.	
6ii	AREVA will work collaboratively with local hunters to gather additional information on species subjected to harvest. Emphasis will be placed on high profile species (caribou and musk ox) and wildlife with aquatic feeding habitats (waterfowl). It is anticipated that this additional information may be available at the time of licensing and permitting.	Tier 1	Technical Appendix 1D-III	NA	AREVA will continue to gather information on concentrations in tissue through the hunter harvest study	On-Going Throughout Operations
6iii	AREVA will conduct additional nest and den surveys along the winter road and all weather road corridors prior to construction.	Tier 1	Technical Appendix 1D-III	NA	Updated the WMMP (Appendix 6C) to include Active Migratory Bird Nest Surveys should land clearing be required during the nesting season.	Prior to Start of Construction

Table 2.2-1 Post-EA Commitments Resulting from PHC Decision Appendix 1

Post EA Information Identified in AREVA's Technical Comment Response Submission		Final Environmental Impact Statement (FEIS) September 2014				
No.	**AREVA Commitment**	**FEIS Tier**	**FEIS Volume or Appendix**	**FEIS Section**	**Comment**	**Timing of Additional Post EA Information**
7i	AREVA will provide an updated marine shipping plan that will include details regarding compliance to the following regulations, standards, and guidelines, where appropriate: o Response Organization and Oil Handling Facility Regulations o Vessel Pollution and Dangerous Chemicals Regulations o Environmental Response Arrangement Regulations o Oil Handling Facilities Standards (TP 12402) o Release and Environmental Emergency Notification Regulations o Response Organization Standards (TP 12401) o Guidelines for Reporting Incidents Involving Dangerous Goods and Harmful Substances and/or Marine Pollutants o Marine Transportation Security Regulations	Tier 3	Technical Appendix 1D-III; Appendix 2J - Marine Transport	Section 3	At Project licensing, a revised MSP will be provided for review.	Prior to Completion of Licensing
7ii	The updated marine shipping plan will also include operators having double redundant radio equipment capable of communicating and coordinating with NORDREG and the Canadian Coast Guard	Tier 3	Technical Appendix 1D-III; Appendix 2J - Marine Transport	Section 3.6	AREVA will require all vessel operators to have double redundant radio equipment capable of communicating and coordinating with NORDREG and the Canadian Coast Guard.	
9i PHC-86)	Discuss with NHC means to facilitate access to preferred housing on the part of AREVA's permanent workers.	Tier 2	Volume 9 Part 1 - Socio-Economic Environment	Volume 9 Section 11.1.4	AREVA and NHC representatives met in April 2014 to discuss this concern. Section 11.1.4 notes that while there is potential for people with incomes to move into private housing, this scenario has not been realized in comparable situations (e.g., the NWT diamond mining context). Given the effects assessment, both parties generally agree that the Project will not result in a negative effect on housing given: • evidence that Meadowbank did not result in significant migration to Baker Lake; • increased incomes enable people to move into the private market in principle; • intra-community migration, if it occurs, is most likely to result in moves out of social housing units improving the conditions for those previously in overcrowded units or potentially freeing up units; and • evidence of out-migration to southern communities by Meadowbank employees reducing some demand on housing. Mitigation on behalf of AREVA would not be proposed to lessen negative project effects on housing as the assessment will conclude a positive effect on housing. Both parties acknowledge that despite increased incomes able to support a move to the private market this has not been realized in a significant way. It is agreeable for AREVA and the NHC to work collaboratively to implement possible AREVA and other-led mitigation items that may help to encourage improved housing situations. Possible AREVA Mitigation: • Ongoing communication with the NHC throughout operations to identify opportunities for information sharing and collaboration. Possible initiatives could be the inclusion of financial literacy and information on the rent policy as part of future possible pre-employment training program(s) or as part of other available AREVA programming. NHC Mitigation: • Encourage the construction of more affordable private sector housing with prices reasonable to be paid off during continuous employment during the anticipated mine life • NHC rent and housing allocation policies that encourage the move from social to private sector housing	

Table 2.2-1 Post-EA Commitments Resulting from PHC Decision Appendix 1

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No.	**AREVA Commitment**	**FEIS Tier**	**FEIS Volume or Appendix**	**FEIS Section**	**Comment**	**Timing of Additional Post EA Information**
9ii	Licenses and permits required for heritage resource protection will be applied for during the appropriate stage. Details will be included in the Archaeology Mitigation Plan and Road Management Plan.	Tier 3	Volume 9 Part 2 - Heritage Resources	Appendix 9D Archaeology Mitigation Plan, Sections 2.3	Details included in Tier 3 Volume 9 Appendix 9D section 2.3	Prior to Completion of Licensing
10i	An updated contact list regarding Government Mandatory Reporting Requirements will be provided at Project licensing. GN Department of Health and Social Services contact information will be added to this list.	Tier 3	Technical Appendix 1D-III; Appendix 10C - ERP	Attachment A in Appendix 10C ERP updated	A contact list is included as an attachment to Appendix 10C - Emergency Response Plan. The contact list regarding Government Mandatory Reporting Requirements will be updated and provided at Project licensing.	Prior to Completion of Licensing
10ii (PHC-45)	An updated spill contingency plan compliant with applicable Nunavut Environmental Protection Act and Nunavut Spill Contingency Planning and Reporting Regulations requirements will be provided for review and approval at Project licensing.	Tier 3	Appendix 10B - Spill Contingency	Section 2.5 and 2.5.2 reviewed and minor updates, Section 1 Introduction, 1.3 Revisions to Plan Updated	Plan reviewed against Nunavut Environmental Protection Act and Nunavut Spill Contingency Planning and Reporting Regulations requirements and plan updated accordingly, including commitments for reviews and updates.	Prior to Completion of Licensing

2.3 Post-EA Commitments Identified Through Response to Information Requests

Table 2.3-1 lists responses to information requests generated during review of the DEIS where additional information requested was identified to be provided post-EA. The Commitment column in Table 2.3-1 below indicates the timing of when the additional information will be provided.

Table 2.3-1 Post-EA Commitments Identified Through Information Requests and Responses

Information Request		FEIS Tier	FEIS Volume or Technical Appendix	FEIS Section	Comment	Timing of Information
AANDC	20	Tier 1	Volume 1 - Main Document	Appendix 1D-III	Geotechnical setbacks from open pits to mine infrastructure will be provided as part of the detailed designs.	Prior to Completion of Licensing
AANDC	27	Tier 3	Technical Appendix 5F - Mine Rock Characterization and Management	Appendix 5F Section 11	Further explanation was provided during the IR stage. Additional information is presented in Vol 5F Section 11 on the program for further mine rock characterization through all phases of mine development.	Prior to Completion of Licensing; On-Going Throughout Operations
AANDC	30	Tier 3	Technical Appendix 5F - Mine Rock Characterization and Management	Appendix 5F Section 11	A discussion was provided in the IR responses. Additional information regarding the continued characterization of mine rock for all phases of mine development is included in Volume 5 F.	Prior to Completion of Licensing; On-Going Throughout Operations
AANDC	51	Tier 3	Technical Appendix 2P - OHS; Technical Appendix 2U - Hazardous Materials Management Plan	Appendix 2P Sections 3.8.4 and 3.8.5; Appendix 2U Sections 1.2 and 9.1	Working level information available at the time of licensing is addressed in Appendix 2U Section 1.2. WHMIS is addressed in Appendix 2P Section 3.8.4, 3.8.5 and Appendix 2U Section 9.1. Environmental management standards for hazardous materials are addressed in Appendix 2U Section 1.2.	Prior to Completion of Licensing
AANDC	69	Tier 3	Technical Appendix 2R – Preliminary Decommissioning Plan	Appendix 2R Section 7.2	Future financial assurance considerations are detailed in Section 7.2 of Appendix 2R.	Prior to Decommissioning
CNSC	3	Tier 2	Volume 6 - Terrestrial Environment	Volume 6 Sections 5.5 and 7.2.4	DEIS Tier 2, Volume 6, Terrestrial Environment, Sections 5.5 and 7.2.4 slope stability analyses are considered to be an integral part of the plan to mitigate adverse effects during all phases of the project. Section 7.2.7 outlines a monitoring system for permafrost and terrain stability. The detailed implementation of the monitoring system will be provided at the licensing phase. Detailed geotechnical investigations and design will be completed with the detailed design of each facility.	Prior to Completion of Licensing
CNSC	6	Tier 3	Technical Appendix 6A – Surficial Geology, Terrain and Shallow Geotechnical Conditions	Appendix 6A Attachment J	Attachment J of Appendix 6A provided a description of ground ice conditions. Additional geotechnical characterization including ground ice conditions will be completed for detailed design prior to licensing.	Prior to Completion of Licensing
CNSC	9	Tier 1	Volume 1 - Main Document	Appendix 1D-III	AREVA committed to undertake thermal modeling of the Andrew Lake Pit prior to licencing and update the associated groundwater model and inflow prediction if required based on the thermal analysis in PHC-5x to be provided at licensing.	Prior to Completion of Licensing
CNSC	16	Tier 1	Technical Appendix 5D – Groundwater Flow Model	Appendix 5D Section 5.2	Additional stratigraphic sections will be constructed as more hydrogeologic data is made available through the hydrogeology follow-up program described in Appendix 5D Section 5.2.	Prior to Completion of Licensing
EC	6	Tier 3	Technical Appendix 2E – Water Diversion; Technical Appendix 5O – Erosion Control Plan	Appendix 2E Sections 6.1 and 7; Appendix 5O Section 2.7	Commitment to monitor water quality and quantity included in Appendix 5O Conceptual Erosion and Sediment Control Plan. AREVA anticipates specific details on locations, parameters and frequencies to be determined at the time of licensing and permitting.	Prior to Completion of Licensing
EC	8	Tier 3	Technical Appendix 2E - Water Diversion	Appendix 2E Section 7.3	The timing and approach for detailed geotechnical and permafrost investigations is presented in Appendix 2E Section 7.3	Prior to Completion of Licensing
EC	9	Tier 1	Volume 1 - Main Document	Appendix 1D-III	Baseline data will be collected prior to detailed design to determine the depth of the active layer.	Prior to Completion of Licensing
GN-DOE	34a	Tier 3	Technical Appendix 10B - Spill Contingency and Landfarm Management Plan	Appendix 10B Sections 1, 1.2, and 1.3	All proposed fuel storage facilities will be designed, constructed, and operated according to the regulations and protocols outlined in Section 1 of the Spill Contingency and Landfarm Management Plan. Specifics regarding operational differences between fuel storage facilities will be developed upon completion of detailed engineering and presented at the licensing phase.	Prior to Completion of Licensing

Table 2.3-1 Post-EA Commitments Identified Through Information Requests and Responses

Information Request		FEIS Tier	FEIS Volume or Technical Appendix	FEIS Section	Comment	Timing of Information
GN-H&SS	57a	Tier 2	Volume 9 Part 1 - Socio-Economic Environment	Volume 9 Sections 6.5, 8.6.1, and 11.1.2	Specific interactions with GN-HSS have been identified related to emergency response planning, public health situations, and AREVA's worker health and wellness programs. Commitments have been made to work with the local health authority as AREVA moves to the licensing stage.	Prior to Completion of Licensing
GN-H&SS	57b	Tier 3	Technical Appendix 2P - OHS	Appendix 2P Section 6.1	A description of the anticipated Health Centre for the Kiggavik Project has been added to Section 6.1 in Appendix 2P, OH&S Plan and the available services it will provide.	Prior to Completion of Licensing
KIA	31.1	Tier 1	Volume 1 - Main Document	Appendix 1D-III	A dewatering plan will be prepared as part of the detail design for the Andrew Lake Pit Dewatering Structure to prevent or minimize suspended solids discharge to the environment.	Prior to Completion of Licensing
KIA	31.2	Tier 3	Technical Appendix 2F - Design of Andrew Lake Dewatering Structure	Appendix 2F Section 6	Prior to licensing, a detailed design of the dewatering structure will be completed and will evaluate the availability and further evaluate the geotechnical properties of the till core materials to ensure their suitability.	Prior to Completion of Licensing
KIA	31.3	Tier 3	Technical Appendix 2F - Design of Andrew Lake Dewatering Structure	Appendix 2F Section 6	The final design for the dewatering structure will be completed prior to licensing and construction and will be based on the results of the geotechnical studies proposed in Volume 2F, Section 6.	Prior to Completion of Licensing
NRCan	8.11	Tier 1	Volume 1 - Main Document	Appendix 1D-III	The interception of the water in the top 1.5m of the active layer around the open pits and is a design feature that will be defined through the detailed site design.	Prior to Completion of Licensing
NRCan	11.1	Tier 3	Technical Appendix 5D - Groundwater Flow Model	Appendix 5D Sections 5.2 and 5.3	Groundwater monitoring locations are described in Volume 5D, Sections 5.2 and 5.3. Detailed monitoring plans will be developed during licencing.	Prior to Completion of Licensing
TC	2	Tier 2 Tier 3	Volume 2 - Project Description and Assessment Basis; Technical Appendix 2J - Marine Transportation	Volume 2 Section 10.3.1; Appendix 2J Section 3.4	Marine shipping route options are discussed in Appendix 2J, Section 3.4. As the final shipping route has not yet been determined, the potential environmental effects of each route are considered independently in Volume 7 - Marine Environment so that these shipping options remain available at the time of licensing.	Prior to Completion of Licensing

3 AREVA's Integrated Management System

For the Kiggavik Project to proceed, it must achieve a positive environmental assessment (EA) decision and the accompanying Project Certificate, issued by the NIRB. The EA decision requires sufficient information to determine whether or not the proposed project will cause significant adverse environmental effects after mitigation measures are employed.

Tier 3 Technical Appendix 2T, Environmental Management System provides the structure that aligns the various requirements outlined in the NIRB guidelines with elements of the requirements of the Canadian Nuclear Safety Commission (CNSC) for an Integrated Management System (CNSC REGDOC- 2.9.1 Environmental Protection and CSA Standard N286-12 Management System Requirements for Nuclear Facilities). The AREVA Integrated Management System (IMS) encompasses not only the management of environmental protection, but also health, safety, and quality management. The IMS provides the basis for the integration of the requirements of:

- the NIRB;
- the Nunavut Water Board (NWB),
- the CNSC and other regulators; and
- AREVA's policies (Environmental Protection, Health and Safety, and Quality)

Tier 3 Technical Appendix 2T outlines how the various requirements of individual management and monitoring plans will be integrated into the environmental protection and management framework within the IMS. We believe this captures the elements of the requirements of the environmental protection plans and associated management, monitoring and mitigation plans requested by the NIRB, which will be required by the NWB, the CNSC, and other regulators. The environmental protection and management framework incorporates environmental assessment, continual improvement and adaptive management. The IMS is an evolving documented system that is used for planning environmental monitoring programs, reporting environmental performance, and ensuring follow-up programs and mitigation measures are implemented.

With the completion of the environmental assessment process and the issuance of a project certificate and conditions by the NIRB, a number of licences and permits must be obtained from a number of agencies, many of which are involved in the environmental assessment review process. These licences and permits will be required to construct, operate and decommission the Project.

The IMS, which flows from the requirements of CNSC REGDOC-2.9.1 and CSA N286-12, will incorporate the environmental performance features of each Project component and Project activity. The IMS is developed in anticipation of each of the phases of the Project lifecycle and together with detailed project engineering, is presented as part of the detailed licensing, permitting and authorization applications. In this way, assurance is provided that the project design and mitigation

measures meet or exceed those outlined in the FEIS. It also provides the opportunity to revisit the environmental aspects and mitigation measures outlined for each phase in the environmental assessment and to identify additional mitigation measures based on information collected during the previous phase of the project, or evolution in our understanding of project-environment interactions.

In addition to re-evaluation at the time of licensing each phase of the Project, the IMS is also reviewed and updated in response to any major change within each project phase, as prescribed by regulation, regulatory documents and standards. This process ensures that any changes to environmental aspects are captured and appropriate mitigation is incorporated into the IMS. Thus, the IMS is a document that evolves in response to changes and phases of the Project. This is commensurate with AREVA's Environmental protection and management framework and consistent with the Inuit Qaujimajatuqangit concept of Pilimmaksarniq/Ayoikyumikatakhimanik: skills must be improved and maintained through experience and practice (IQ-Nunavut 2008).

The monitoring, mitigation and management plans requested in the NIRB guidelines are provided in the following Tier 3 Technical Appendices:

- Technical Appendix 2C: Explosives Management Plan
- Technical Appendix 2H: Ore Storage Management Plan
- Technical Appendix 2I: Water Management Plan
- Technical Appendix 2J: Marine Transportation
- Technical Appendix 2M: Road Management plan
- Technical Appendix 2N: Borrow Pits and Quarry Management Plan
- Technical Appendix 2P: Occupational Health and Safety Plan
- Technical Appendix 2Q: Radiation Protection Plan
- Technical Appendix 2R: Preliminary Decommissioning Plan
- Technical Appendix 2S: Waste Management Plan
- Technical Appendix 2U: Hazardous Materials Management Plan
- Technical Appendix 3C: Community Involvement Plan
- Technical Appendix 4C: Air Quality Monitoring and Mitigation Plan
- Technical Appendix 4F: Noise Abatement Plan
- Technical Appendix 5F: Mine Rock Characterization and Management
- Technical Appendix 5J: Tailings Characterization and Management
- Technical Appendix 5L: Conceptual Fisheries Offsetting Plan
- Technical Appendix 5M: Aquatic Effects Monitoring Plan
- Technical Appendix 5O: Sediment and Erosion Control Plan
- Technical Appendix 6D: Wildlife Mitigation and Monitoring Plan
- Technical Appendix 9C: Human Resources Development
- Technical Appendix 9D: Archaeological Resource Management Plan
- Technical Appendix 10B: Spill Contingency and Landfarm Management Plan

These plans will be incorporated into the Kiggavik Project IMS and provided for review in anticipation of the initial NWB and CNSC licensing of the Kiggavik Project. Technical Appendix 2T outlines the structure of the AREVA Integrated Management System with an emphasis on environmental management, monitoring, mitigation and reporting plans.

The following tables represent AREVA's proposed design and management mitigation measures to mitigate Project-related effects on the environment summarized from the management plans identified above.

3.1 Atmospheric

Table 3.1-1 Atmospheric Environment Mitigation - Air Quality

Project Activity	Environmental Effect	Mitigation
Siting of Project facilities	Air emissions generated by the operation of some Project facilities (e.g., acid plant, power plant) will affect air quality.	• Air pollution controls installed on exhaust stacks (e.g., wet scrubbers, dust collectors).
Operation of heavy equipment, machinery, and marine vessels	Air emissions generated during the operation of heavy equipment, machinery, and marine vessels will affect air quality.	• Standard operating procedures for equipment and machinery use • Regular maintenance on equipment/machinery such that the equipment is kept in good operating condition • Develop community complaint/response procedure • Where available, use equipment equipped with exhaust emissions controls like catalytic converters and diesel particulate filters • Optimize the number of movements and minimize travel distance, where possible • Optimize the number of barge shipments and offloading activities • Meet the Canada-wide Diesel Fuel Sulphur Content standard of 15 ppm for off-road engines
Unpaved Road Transportation	Change in air quality due to dust generated from vehicles, heavy equipment, and machinery travelling on an unpaved surface.	• Minimize or reduce vehicle speeds on unpaved roads (including pit ramps) and enforce speed limits, where possible • Control dust by applying water or an approved dust suppressant to mine site roads, when/where required • Maintain all unpaved road surfaces via grading or other maintenance practices to correct structural deficiencies and minimize the amount of silt (i.e., fine particles)
Blasting	Change in air quality due to dust and particulates generated during blasting.	• Optimize the number of charges per day to reduce NO_x and particulate matter emissions • Optimize/minimize the use of ANFO to reduce emissions of NO_x
Milling and Tailings Management	Change in air quality due to air emissions from the milling process, as well as the potential decay of radon progeny from the tailings management facilities.	• Appropriate air pollution controls installed on exhaust stacks of the mill complex and acid plant (e.g., wet scrubbers, dust collectors) • A water layer on top of the tailings will act as a barrier, thereby limiting the release of radon • Tailings will be deposited into the TMFs as a slurry below the water layer barrier to prevent tailings exposure to the atmosphere
Waste Management	Change in air quality due to incineration of combustible waste (i.e., food waste)	• Installation of an incinerator that complies with Canada-wide standards.

Table 3.1-2 Atmospheric Environment Mitigation - Climate Change

Project Activity	Environmental Effect	Mitigation
Design of Project facilities	Increased emissions contributing to climate change	• To reduce greenhouse gas emissions, energy efficient and emission minimization features will be incorporated into building design and in the operation of equipment and ancillary facilities.
Operation of heavy equipment	Increased emissions contributing to climate change	• Standard operating procedures for use of equipment and machinery • Regular maintenance on equipment/machinery such that the equipment is kept in good operating condition • Reductions in greenhouse gas emissions from the optimization and management of heavy equipment operation, vehicles, and marine vessels. • Where available, diesel-powered equipment/machinery meeting federal emissions standards will be used. • Optimize the number of heavy equipment/vehicle movements and minimize travel distances. • Optimize the number of barge shipments and off-loading activities.

Table 3.1-3 Atmospheric Environment Mitigation - Noise

Project Activity	Environmental Effect	Mitigation
Construction, operation, and final closure of the mine, infrastructure, airstrip, borrow sources and roads, including equipment operation and vehicle use	Increase in atmospheric noise levels	• Ensuring equipment is located as far away as possible from noise sensitive receptors. Minimize the number of pieces of equipment, vehicle speed, and duration in the sensitive areas. • Fitting gas or diesel-powered equipment with intake (if appropriate) and exhaust silencers (mufflers) meeting manufacturer's recommendations, and maintaining these silencers in effective working condition. • Where more than one type/model of equipment or technique can be used to complete a particular job with similar efficiency, use equipment with the lowest overall sound potential. • To the extent possible, routing heavily-loaded trucks away from residential areas. • Develop a community complaint/response procedure to address noise concerns. • Regular maintenance of equipment, including lubrication and replacement of worn parts and exhaust systems. • Turning off equipment with potential to generate excessive noise when not in use, where feasible. • Limiting vehicle speeds on roads. • Restricting vehicle traffic to approved access routes to and from the site. • Maintaining unpaved road surfaces to reduce tire noise. • Enclose moving parts to reduce noise output, where applicable. • If possible, position equipment in a sheltered location or behind a barrier to reduce noise dispersement. • Shielding noise sources with the planned development of stock piles and buildings to reduce noise dispersment. • Restrict type of equipment to those compliant with applicable standards. • To the extent possible, selecting ventilation intake/exhaust equipment with low sound levels and/or pre-packaged mitigation measures.
Blasting	Increase in atmospheric noise levels	• Significant blasting activities will not occur when caribou are migrating through the area. • Use delays and appropriate blast schedule. • Optimize the maximum amount of explosives (kg) to be used in any single blast either above or below ground.
Construction and operation of the dock facility, and associated equipment and vehicle use	Increase in atmospheric and marine environment noise levels	• Optimize the number of barge shipments and offloading activities. • Minimize idling of tug engines and equipment at the dock site. • Where possible, schedule barge shipments and offloading activities within daytime hours. • To the extent possible, routing loaded trucks away from residential areas. • Develop a community complaint/response procedure to address noise concerns.
Marine vessel operation	Increase in atmospheric and marine environment noise levels	• Optimize the number of container ships and barge shipments. • Minimize propulsion noise by using low-cavitation propeller shapes and completing regular propeller and engine maintenance. • Marine vessels to maintain a constant speed and course, where possible. • Vessels will not exceed 13 knots along established shipping routes in Hudson Bay and Hudson Strait. • Vessels will travel a maximum speed of 10 knots surrounding Churchill during the open-water season, unless otherwise required for safe navigation. • Marine vessels will be routed to avoid sensitive areas. Ship logs will record vessel speed and speed reductions.
Air Traffic	Increase in atmospheric noise levels	• Limit low altitude flights and restrict air traffic to daytime house when feasible by scheduling take-off and landing times. • For long-range flights greater than 25 km, a minimum altitude of 610 m above ground is required except during take-offs and landings, when low-level ceiling conditions occur, high winds, or when other risks to flight safety exist.

Table 3.1-4 Atmospheric Environment Mitigation - Vibration

Project Activity	Environmental Effect	Mitigation
Construction, operation and final closure of the mine, infrastructure, airstrip, borrow sources and roads, including equipment operation, blasting, and vehicle use	Excess vibration for sensitive receptors	• Where more than one type/model of equipment or technique can be used to complete a particular job with similar efficiency, using equipment with the lowest overall vibration potential. • To the extent possible, routing heavily-loaded trucks away from residential areas. • Develop a community complaint/response procedure to address vibration concerns. • Regular maintenance of equipment, including lubrication and replacement of worn parts to prevent vibration. • Limiting vehicle speed on roads. • Restricting vehicle traffic to approved access routes. • Turning off equipment with potential to generate excessive vibration when not in use, where feasible. • Maintaining project road surfaces to reduce vibration effects. • To the extent possible, completing activities with the highest vibration potential during the day to avoid night time disturbance (i.e., blasting). • Blast monitoring of ground vibrations will be conducted. Monitoring results will be interpreted following a blast event and mitigation measures will be implemented where necessary.

3.2 Terrestrial

Table 3.2-1 Terrestrial Environment Mitigation - Terrain

Project Activity	Environmental Effect	Mitigation
Construction, operation and final closure of the mine, infrastructure, airstrip, borrow sources and roads, including equipment operation, blasting, and vehicle use in permafrost rich areas	Permafrost degradation	• Limit the Project footprint disturbance area. • Conduct additional site specific field investigations to assess specific poorly drained areas and local variations in permafrost conditions (ground-ice content) prior to construction. • Avoid surface disturbance in high ground-ice areas to reduce potential for deepening the thaw depth and associated thaw settlement. • Padding of surface horizons to maintain existing permafrost conditions. • Insulate infrastructure (where feasible) and/or use equipment platforms to reduce any heat transfer to frozen ground. • Use of thermal stabilization methods (such as convection air embankment, heat drains, snow fences, and reflecting surfaces), where feasible. • Implement proper construction and engineering design to consider stabilization methods that are not susceptible to frost heave and minimize thawing effect in permafrost sensitive areas. • Construction in permafrost sensitive areas during winter, where feasible. • Restrict vehicle traffic to designated access routes. • Routine maintenance of roads (i.e., grading, structural repairs). • Coarse materials (i.e., surface gravel layer) placed on top of existing ground conditions during road construction to protect the insulating layer. • Manage drainage around infrastructure to minimize pooling water. • Insulate infrastructure, where feasible.
Construction, operation and final closure of the mine, infrastructure, airstrip, borrow sources and roads	Terrain instability	• Avoid or minimize the amount of problematic terrain types (e.g., ground- ice rich) within the mining areas and along road alignments, where feasible. • Consideration of road design criteria based on recommendations of similar projects in the Arctic environment.
Construction of the mine, infrastructure, airstrip, borrow sources and roads	Landform disturbance	• Consider local and regional climatic conditions of the Project location and the presence and expected changes to permafrost terrain. • Avoid or minimize disturbance of uncommon landforms like eskers, wetlands and shoreline areas. • Minimize the use of glaciofluvial landforms during mine infrastructure construction.

Table 3.2-2 Terrestrial Environment Mitigation - Soils

Project Activity	Environmental Effect	Mitigation
Operation of machinery, heavy equipment, vehicles, and mine infrastructure during all phases of the Project (i.e., construction, operations, final closure, and post closure)	Change in soil quality due to air emissions.	• Industrial machinery and equipment (including the diesel-powered generators) will meet federal air emission standards. • Low sulphur diesel fuel will be used to reduce emissions associated with diesel fuel combustion. • Scrubbers will be installed on exhaust stacks to remove particulates, acid mist and excess SO_2 from air emissions.
Dust created during all phases of the Project (i.e., construction, operations, final closure, and post closure)	Change in soil quality due to dust deposition on soils.	• Where possible, blasting may be avoided on days where dust dispersion outside of the Project footprint is anticipated to be excessive due to the prevailing winds speeds. • During open pit mining, blasting patterns will be used to control the dispersion of materials as well as dust. • Increasing road maintenance, restricting vehicle speed, and optimizing traffic volume will reduce airborne dust from vehicular and other equipment traffic. • Dust control measures will be implemented within the mine site footprint. Water and/or an approved dust suppressant will be applied to unpaved surfaces as appropriate.
Soil movement and storage during the site clearing process during the construction phase.	Admixing of the stripped topsoils with subsoils, as well as soil contamination will affect soil quality	• Stripped topsoil will be stockpiled separate from subsoils stored at the overburden stockpile location to prevent soil admixing, as well as loss of the growth medium layer that will be used for reclamation purposes. • Stripped topsoils will be well-segregated from ore piles and Type 3 mine rock stockpiles to prevent soil contamination. • Frozen or wet soils removed during site preparation will be stored with dry soil materials of the same nature (i.e., topsoil, subsoil) to prevent potential migration and subsequent admixing with other soil or mine rock stockpiles. • Site pads will be sloped towards surface run-off ponds to contain potential migration of contaminated material. • Radiological clearance surveys will be conducted during reclamation of disturbed areas to confirm decommissioning objectives are met.
Vehicle, heavy equipment, and machinery movement during the construction, operations, and final closure phases of the Project	Change in soil quality due to soil compaction.	• During final closure, disturbed areas will be scarified to loosen compacted soils to facilitate revegetation. • Winter road integrity will be monitored and soft areas avoided by vehicular traffic. Rig matting may be used to prevent rutting and disturbance to soils.
Construction, operation and final closure of the mine, infrastructure, airstrip, borrow sources and roads	A reduction in soil quantity caused by the Project exposing soils to environmental conditions	• Freshwater diversion channels will be constructed to divert surface drainage around the Project footprint to prevent erosion and potential contamination of surface drainage. • Diversion channel bottom and side slopes will be armoured with riprap and geotextile materials to mitigate potential channel erosion. • Culverts will be installed where the proposed All-Season Road (if constructed) crosses natural drainage patterns to facilitate water movement. • Temporary erosion control structures (e.g., silt fences) will be used during construction activities, as appropriate. • Soil burial during development of the roads and airstrip will be confined to boundaries established during detailed design of these components.

Table 3.2-3 Terrestrial Environment Mitigation - Vegetation

Project Activity	Environmental Effect	Mitigation
Site clearing and vegetation burial during construction activities associated with the mine, infrastructure, airstrip, borrow sources and roads	Change in vegetation abundance and community diversity.	• Pre-construction surveys will be completed of the Project footprint boundaries for listed species. • Where possible, access routes will be deflected to avoid sensitive species identified during the pre-construction surveys. • Site clearing and vegetation burial will be confined to the Project footprint to the extent possible to prevent unnecessary disturbance to vegetation. • Stripped topsoil will be stockpiled separate from subsoils to preserve the growth medium layer that will be used during reclamation efforts. • Waterbodies and watercourses were selected during routing of the proposed winter road to minimize vegetation disturbance. • Rig matting may be used along the winter road in areas where granular material is not practical to prevent damage to underlying vegetation. • All equipment and machinery will be cleaned of foreign particles (e.g., soil, thatch) prior to initial transport to the Project to prevent the introduction of invasive and/or non-native vegetation. • Progressive reclamation will occur throughout the Project operations at disturbed areas no longer used to return them to a natural state.
Dust created during all phases of the Project (i.e., construction, operations, final closure, and post closure)	Change in vegetation quality	• Where practical, non-calcareous materials from quarry sites will be used during road construction to reduce the amount of dust-prone aggregate used. • During open pit mining, blasting patterns will be used to control the dispersion of materials as well as dust. • Where possible, blasting may be avoided on days where dust dispersion outside of the Project footprint is anticipated to be excessive due to the prevailing winds speeds. • Dust control measures will be implemented within the mine site footprint. Water and/or an approved dust suppressant will be applied to unpaved surfaces as appropriate. • Speed limits will be enforced to reduce airborne dust from vehicular and equipment traffic.
Air emissions generated during construction, operations, and final closure of the Project	Change in vegetation quality	• Industrial machinery and equipment (including the diesel-powered generators) will meet federal air emission standards. • Low sulphur diesel fuel will be used to reduce SO_2 emissions. • Scrubbers will be installed on exhaust stacks to remove particulates, acid mist and excess SO_2 from air emissions.

Table 3.2-4 Terrestrial Environment Mitigation - Wildlife

Project Activity	Environmental Effect	Mitigation
Construction, operation and final closure of the mine, infrastructure, airstrip, borrow sources and roads, including equipment operation, blasting, and vehicle use	Change in mortality risk to wildlife.	• Where practical, site clearing during construction will occur outside of the migratory bird breeding season. • Prevention of breeding birds from nesting within the Project footprint. Efforts will be made to avoid disturbing any nests found. • Alignment of roads for best visibility (i.e., minimize blind spots for drivers to reduce the potential for wildlife-vehicle collisions). • Constructing road profiles to enable wildlife retreat from the road. • No hunting buffers established around the mine site and access road(s). • Road activity will be managed when caribou are migrating through or near the Project footprint. • Controlling vehicle speeds and traffic convoys to reduce the potential for wildlife-vehicle collisions. • Project personnel will be warned with signage and radio communication when wildlife are moving through the area. • Coordinating radio communication among mine personnel to alert mine staff of wildlife presence. • Reporting wildlife observations to environmental staff. • Wildlife deterrence training for mine staff to avoid unnecessary wildlife mortality events. • Increasing worker awareness of potential mortality risks. • Many site buildings will be interconnected via corridors, thereby reducing interactions between Project personnel and wildlife. • All food waste will be incinerated to prevent wildlife attraction, which could lead to problem wildlife issues. • In the event that problem wildlife does occur and the safety of Project personnel is deemed to be at risk, the local Conservation Officer will be contacted to obtain authorization to destroy the animal. • Project personnel will be restricted from carrying firearms on-site.
Construction, operation and final closure of the mine, infrastructure, airstrip, borrow sources and roads, including equipment operation, blasting, and vehicle use	Change in wildlife movement	• Wildlife have the right-of-way when travelling on or through the Project footprint. • Temporary shutdown of roads may be initiated when large numbers of caribou are migrating through the area. • Speed limits will be posted and strictly enforced on all roads and mine sites. • Design road embankment height to prevent visual obstruction and facilitate ease of wildlife crossing. • Avoiding construction activities within 10 km of designated water crossings from May 15 to September 1, in accordance with the DIAND Caribou Protection Measures. • Snow management along roadways to avoid long continuous cuts or piles of snow that could restrict spring migration. • Minimize the use of fencing, and, where required, minimize the length of fencing, unless required for safety – these structures will be seasonally decommissioned if near identified caribou movement areas. • Coordinating radio communication among mine personnel to alert mine staff of wildlife presence near project infrastructure.
Construction, operation and final closure of the mine, infrastructure, airstrip, borrow sources and roads, including equipment operation, blasting, and vehicle use	Change in habitat availability for wildlife	• Maintain Project activities within the surveyed boundaries of the Project footprint. • Where possible, construction activities involving site clearing will be scheduled to occur outside of the breeding and nesting period for migratory birds (i.e., May to July). • Managing road activity during important seasonal migratory seasons and during post-calving to reduce sensory disturbance and avoidance of habitat. • Dust control along mine site roads during dry summer periods to reduce sensory disturbance and avoidance of habitat. • Eliminate dust dispersal from tailings management facilities through subaqueous deposition of tailings. • Activity along the access roads will be restricted to reduce the functional loss of habitat due to disturbance. • Grizzly bear and wolverine den sites will be avoided as practical if observed. • Progressive reclamation of disturbed areas to return them to a natural state. • Promoting natural regeneration of native vegetation in reclaimed areas by using stockpiled native topsoil during reclamation. • Aircraft will not fly over the Beverly caribou calving grounds located 70 km northwest of the Project area. • Speed limits will be enforced to reduce airborne dust from vehicular and equipment traffic. • During open pit mining, blasting patterns will be used to control the dispersion of materials as well as dust. • Where possible, blasting activities (for road construction) within 3 km of a known raptor nest site will be restricted during the territory occupancy and nesting season (mid May through to end of August). • All aircraft will maintain a minimum flying altitude of 610 m above ground level, except during take-off, landing, slinging of equipment, high winds, or other risks to flight safety. • Winter road integrity will be monitored and soft areas avoided by vehicular traffic. Rig matting may be used to prevent rutting and soil

Table 3.2-4 Terrestrial Environment Mitigation - Wildlife

Project Activity	Environmental Effect	Mitigation
		disturbance.
Construction, operation and final closure of the mine, infrastructure, airstrip, borrow sources and roads, including equipment operation, blasting, and vehicle use	Change in wildlife health	• Speed limits will be enforced to reduce airborne dust from vehicular and equipment traffic. • Routine maintenance of roads (i.e., grading, structural repairs). • Eliminate dust dispersal from tailings management facilities through subaqueous deposition of tailings. • Install appropriate air pollution controls on exhaust stacks of the mill complex and acid plant (e.g., wet scrubbers, dust collectors).
Aircraft and vehicle use during the construction, operations, and final closure phases of the Project	Reduced nest productivity	• Land-based activities within a 3 km radius of active raptor nest sites will be restricted during the nesting season. • Increasing worker awareness of nests near mining activity. • A nest-specific management plan will be developed that describes buffer zones for aircraft and vehicular traffic around nest sites. • No on-ground visits to known active nest sites by staff. • Known raptor nests will be avoided by a 1.5 km buffer, when achievable.

3.3 Aquatic

Table 3.3-1 Aquatic Environment Mitigation

Project Activity	Environmental Effect	Mitigation
Construction, operation and final closure of the mine, infrastructure, airstrip, borrow sources and roads	Change to surface hydrology	• Project footprint will be minimized and situated such that natural drainage areas and watershed boundaries are maintained. • All roads will be designed to maintain natural flow paths and install appropriate cross-drainage structures (i.e., culverts). • The site water management system will be designed to recycle water where applicable and water use will be optimized to reduce withdrawal requirements and discharge quantities. • Diversion channels will be designed to intercept freshwater and divert it around development areas and into natural stream channels. • Sedimentation ponds will be designed with a control structure so that evaporative losses can be minimized. • In-water construction will follow standard protocols and best management practices. • Snow fences will be constructed to limit snow drifting on site. • Andrew Lake pit will be refilled at a rate such that effects to surface hydrology are minimized. • DFO procedures for water withdrawal from ice-covered waterbodies in the Northwest Territories and Nunavut will be followed. Specifically, no more than 10% of the under-ice volume will be withdrawn from a lake during one ice covered season. • Water will be sourced and discharged into large waterbodies to reduce effects to surface hydrology. • During decommissioning, the ground surface will be recontoured and natural flow patterns will be restored
Effluent produced during mine operation	Changes to water quality, sediment quality, and aquatic biota due to effluent discharge	• All water used on-site will be treated at either the Kiggavik or Sissons water treatment plants. • The water treatment plants will be designed to meet or exceed all appropriate regulations as well as site-specific discharge limits. • Environmental control features will be incorporated into the design of the WTPs to meet water quality guidelines. • Effluent will be discharged into a large waterbody (i.e., Judge Sissons Lake) to reduce potential effects to water quality.
Air emissions and dust generated during all phases of the Project (i.e., construction, operations, final closure, and post closure)	Change in water quality due to acid deposition, lake acidification, and an increase in COPCs	• Industrial machinery and equipment (including the diesel-powered generators) will meet federal air emission standards. • Low sulphur diesel fuel will be used to reduce SO_2 fumigation. • Scrubbers will be installed on exhaust stacks to remove particulates, acid mist and excess SO_2 from air emissions. • Where practical, non-calcareous materials from quarry sites will be used during road construction to reduce the amount of dust-prone aggregate used. • During open pit mining, blasting patterns will be used to control the dispersion of materials as well as dust. • Where possible, blasting may be avoided on days where dust dispersion outside of the Project footprint is anticipated to be excessive due to the prevailing winds speeds. • Dust control measures will be implemented within the mine site footprint. Water and/or an approved dust suppressant will be applied to unpaved surfaces as appropriate. • Speed limits around the mine site and along all roads will be enforced to reduce airborne dust from vehicular and other equipment traffic.
Tailings Management	Changes to water quality	• The tailings management facilities will be designed to avoid interactions between tailings and natural waterbodies, to maximize the use of mine workings for long-term

Table 3.3-1 Aquatic Environment Mitigation

Project Activity	Environmental Effect	Mitigation
		management of tailings and to ensure the long-term protection of terrestrial, aquatic, and human environments.
Construction of the mine, infrastructure, airstrip, borrow sources and roads, including Andrew Lake Pit	Changes to fish habitat quantity and quality	• Diversion channels will be designed to keep runoff and water flows within natural drainage pathways. • In-water construction will follow standard protocols and best management practices. • Andrew Lake pit area will be dewatered after the spring spawning season and before freeze-up (July/August). • Andrew Lake open pit will be dewatered during the construction phase, and refilled during the closure phase at rates such that effects to water quality are minimized. • Andrew Lake pit will be de-watered at a rate such that effects to downstream water quality are minimized. • Turbidity curtains installed prior to construction of the Andrew Lake berm and before dewatering according to best management practices. • Installation of the freshwater intake structures and effluent diffuser structures will follow best management practices, including the installation of turbidity barriers prior to constructing the berm in Andrew Lake. • A fish rescue will occur prior to dewatering the northeast portion of Andrew Lake in order to minimize the potential for fish losses due to stranding. • Water systems will be designed to recycle water where applicable, and water use will be minimized to limit withdrawal requirements and discharge quantities. • The Project footprint will be minimized and situated such that natural drainage areas and watershed boundaries are maintained. • Road construction and installation of stream crossings will follow best management practices and erosion control measures will be incorporated into the design of stream and watercourse diversions. • Crossing structures on all fish-bearing streams will be designed and installed to facilitate fish passage under all flow conditions up to, and including, the 1 in 10 year flood. • DFO procedures for water withdrawal from ice-covered waterbodies in the Northwest Territories and Nunavut will be followed. Specifically, no more than 10% of the under-ice volume will be withdrawn from a lake during one ice covered season. • During decommissioning, the ground surface will be recontoured and natural flow patterns will be restored.
Blasting at the Andrew Lake Pit and Main Zone Pit.	Shockwaves and vibrations can result in physical injuries to fish, as well as disrupt fish during spawning or migration activities.	• Use of smaller charge sizes (<13 mm/sec ppv) during the open water and/or incubation season to reduce the blasting setback distance. • Complete the Andrew Lake blasting program during the frozen water period. • Smaller blast charges used near Andrew Lake outlet stream during the egg incubation period (about 4-6 weeks from early to mid-June until early to mid-July depending on when spawning begins in a particular year) in order to reduce the blasting setback distance to less than 160 metres. • Modify the blasting program to complete the required blasting near the Andrew Lake outlet stream (i.e., located on the south side of the pit) during times of year when egg incubation is not occurring. • Blast monitoring of ground vibrations will be conducted. Monitoring results will be interpreted following a blast event and mitigation measures will be implemented where necessary.

3.4 Marine

Table 3.4-1 Marine Environment Mitigation

Project Activity	Environmental Effect	Mitigation
Transport vessels between Churchill and Baker Lake	Change in mortality risk to marine mammals	• To reduce the potential of a vessel strike, vessels will travel at a maximum speed of 8 to 10 knots when transiting this area at all times during the open-water season, unless otherwise required for safe navigation. • Along established shipping routes in western Hudson Bay and Hudson Strait, vessel speeds will not exceed 13 knots, unless otherwise required for safe navigation. • Vessels will avoid unnecessary acceleration and maintain a constant course, whenever possible. • Presence of a local MMO on board vessels travelling through Chesterfield Inlet to monitor for marine mammals during transit and implement mitigation measures to prevent inadvertent modification of animal behaviour or movement..
Transport vessels between Churchill and Baker Lake	Change in marine mammal and fish behavior due to underwater noise	• Vessels will avoid unnecessary acceleration and maintain a constant course, whenever possible. • Using best practices regarding vessel operations (avoid unnecessary acceleration; maintain a constant course, routine maintenance of propellers). • Routine maintenance of propellers and engines to minimize unnecessary noise. • Vessels will travel at a maximum speed of less than 13 knots unless otherwise required for safe navigation. • Vessels will use specific vessel transit routes to limit acoustical inputs to similar and predictable areas during marine transportation, unless otherwise required for safe navigation.

3.5 Human Health

Table 3.5-1 Health and Safety Mitigation

Project Activity	Human Health Effect	Mitigation

Construction, operation and final closure of the mine, infrastructure, airstrip, borrow sources and roads, including equipment operation, blasting, and vehicle use	Worker exposure to radiation	• All staff working in areas where there is the potential for radiation contamination will be provided with appropriate Personal Protective Equipment (PPE) for mandatory use, as well as formal training.
		• The operating principle of radiation protection is "As Low As Reasonably Achievable (ALARA)" with social and economic factors also considered.
		• Dose rate constraints are established as objectives, below the dose limit, to be achieved during operations.
		• A Radiation Protection Plan (RPP) is implemented to mitigate risks from radiation exposure to workers, the public and the environment.
		• The RPP consists of equipment design features (e.g. sealed and lead-lined mobile equipment cabs, ventilation), operational practices (e.g. minimize time spent in areas with significant radiation levels, dust suppression) and worker awareness.
		• The Radiation Code of Practice (RCOP) is a document, required by the CNSC under the Uranium Mines and Mills regulations, which describes a set of workplace radiological levels and worker exposure levels used for operational control of radiation doses, referred to as administrative and action levels.
		• Contamination control measures will be implemented where radioactive materials may be found, exclusive of the sources on site, and to the off-site shipment or arrival of suspected contaminated material or equipment. Components of the contamination control measures include:
		  • Maintenance of radioactive contamination within on-site areas at acceptable levels;
		  • Limitation of radioactive contamination of materials sent off-site and received on-site; and
		  • Limitation of radioactive contamination of materials transferred between areas on-site.
		• A "clean" (dry) and "dirty" facility for changing clothes and showering will be provided. Dirty work clothes will not be stored in the clean side.
		• All staff changing from their work clothes to street clothes must wash suitably before doing so.
		• All work clothes shall be laundered on a daily basis by site services personnel. Dirty work clothes will not be permitted in camp.

Construction, operation and final closure of the mine, infrastructure, airstrip, borrow sources and roads, including equipment operation, blasting, and vehicle use	Acute and chronic worker exposure to COPCs	• Engineering controls (e.g., ventilation) will be established to maintain exposures to all airborne contaminants at levels less than their TLV-TWA or 8-hour exposure limit. • All staff working in areas where there is the potential for exposure to COPCs will be provided with appropriate Personal Protective Equipment (PPE) for mandatory use, as well as formal training (e.g., WHMIS). • Implementation of workplace practices and procedures to maintain a safe working environment. • Proper hygiene practices will be encouraged of all staff • Staff will be encouraged to keep all windows in vehicles and equipment cabs closed to reduce exposure to dust. • A first aid station will be located at the mine site that will be staffed by a registered nurse. • Eyewash and shower stations will occur in areas where hazardous substances are stored or used. • The Project site will contain signage, warnings, and/or administrative controls for safety in the workplace. • There will be supervisory personnel on-site to ensure trained personnel are following safety protocols and procedures when handling hazardous materials (e.g., explosives).

3.6 Socio-economic

Table 3.6-1 Socio-economic Mitigation and Benefit Enhancement

Project Activity	Socio-economic Effect	Mitigation
		• preference to Inuit employment and contracting • transport provided to and from the mine site from the seven Kivalliq communities • promoting Inuit culture at the mine site • initiatives to assist workers to meet the challenges of the rotational work schedule and family problems that threaten an individual's ability to continue working • providing a safe and secure workplace • business development initiatives that aim to build capacity and competitiveness for long term sustainability and growth of Inuit Firms • participating in multi-party training and education initiatives • off-site education and training for Inuit prior to start of production for trade and technical roles and for operational trainees • Detailed socio-economic mitigation and benefit enhancement is currently being negotiated in the Inuit Impact Benefit Agreement with the Kivalliq Inuit Association in accordance with Article 26 of the *Nunavut Land Claims Agreement.*

3.7 Archaeology

Table 3.7-1 Archaeological Mitigation

Project Activity	Environmental Effect	Mitigation
Construction of the mine, infrastructure, airstrip, borrow sources and roads, including equipment operation, blasting, and vehicle use	Disturbance of archaeological sites	• Avoidance of known archaeological sites during Project planning and construction. • For archaeological sites that cannot be avoided, an assessment of cultural significance of the site(s) be completed by a qualified archaeologist holding a valid Nunavut Territory Archaeologist Permit. • Systematic data recovery. • Worker education for prevention of disturbance. • If archaeological materials or features are encountered, the following procedures will be followed: • Cease construction activity in the vicinity of a discovered archaeological resource. • Territorial Archaeologist will assess the cultural significance and identify mitigation options. • If the cultural remains are determined to be significant enough to warrant further action and they cannot be avoided, the qualified consultant in consultation with the Territorial Archaeologist, Inuit Heritage Trust and representatives of local communities will determine an appropriate course of action. • In the case of human remains, the RCMP will be contacted. If remains are determined to be archaeological, representatives of local communities as well as the Inuit Heritage Trust will be contacted to determine how to appropriately deal with the remains. Options could include avoidance or potentially respectful removal and reburial.

3.8 Community Engagement

Table 3.8-1 Community Engagement

Project Activity	Socio-economic Effect	Mitigation
Community Engagement	Interest in the road between Baker Lake and Kiggavik	• AREVA will continue to involve the Baker Lake HTO in road management
	Interest in the Thelon crossing	• Continue sharing any changes in crossing location with residents in Baker Lake and continue to seek local knowledge • Write and implement a Road Management Plan that will consider the Thelon crossing should the all-season access road option be approved • Construct any bridge or ferry crossing in compliance with DFO and TC requirements • Continue to value and promote the value of the Thelon River as a Heritage River by respecting GN-CLEY archaeological requirements and the Thelon River Management Plan
.	Community involvement	• Community Engagement will continue through the minelife – Environmental Assessment, Construction, Operations, Decommissioning and Post Decommissioning Monitoring. • Company presence in Baker Lake throughout the mine development and operation.
	Protection of wildlife, caribou in particular	• AREVA will continue to work with the Baker Lake HTO regarding wildlife issues and will continue to meet with the other Kivalliq HTOs • AREVA will continue working with the Chesterfield Inlet HTO on marine concerns, issues, and transportation.
	Learning about uranium mining	• Tours to Kiggavik will occur during licensing, construction and operation of the mine. • Future Consultations will contain information on uranium and radiation.
	Comments on having information presented and translated in Inuktitut have been received throughout the region at various events.	• AREVA will continue to communicate in Kivalliq communities in English and Inuktitut. • AREVA has committed to continue to assist the Inuit Language Authority to translate uranium specific terms into Inuktitut.