Receipt and Processing McArthur River Ore Slurry at the McClean Lake Operation Project

Environmental Impact Statement
EXECUTIVE SUMMARY

Introduction

Overview and Need for the Project

AREVA Resources Canada Inc. (AREVA) is proposing to transport uranium ore slurry from the McArthur River Mine to be milled at the McClean Lake Operation (Project). The components of the McArthur River Mine and the McClean Lake Operation that are required for the Project have been the subject of previous environmental assessments. As no construction or changes are required at either the McArthur River Mine or the McClean Lake Operation, the Project activities to be undertaken at these operations would continue to operate within licensed conditions. The transportation of uranium ore slurry would be completed using the existing public provincial highway system linking the sites and modifications to the provincial highway network are not required.

In November 2009, AREVA submitted the Project Description/Proposal for the Project to Saskatchewan Ministry of Environment and the Canadian Nuclear Safety Commission to allow for the processing of McArthur River ore slurry at the McClean Lake Operation. It was determined that an environmental assessment is required under both the Saskatchewan Environmental Assessment Act and the Canadian Environmental Assessment Act. Subsequently, AREVA has completed an environmental assessment and prepared this Environmental Impact Statement for technical and public review.

The Project will provide the McClean Lake Operation with uranium ore slurry from the McArthur River Mine for milling for up to three years. The amount of uranium ore slurry proposed to be transported annually is up to approximately 14,000 cubic metres, resulting in an equivalent annual production of up to 3 million pounds (1.4 million kilograms) uranium concentrate. The amount of overall production at the McClean Lake Operation resulting from the Project will be at, or below, the currently licensed level of annual production of 8 million pounds uranium concentrate.

Ore slurry from the Cigar Lake Project was scheduled to arrive at the McClean Lake Operation for processing in 2007. In 2006 construction of the Cigar Lake Mine was set back by groundwater inflows. AREVA maintained production at the JEB Mill with ore from nearby ore bodies while remediation work proceeded at Cigar Lake. However, stock-piled ore was generally depleted in mid-2010 and there is currently no ore supply for processing at the McClean Lake Operation. As a result, the McClean Lake Operation ceased production in the summer of 2010 and is now in a care and maintenance mode.

Therefore, the purpose and need for this short-term Project is as follows.
1. Produce up to 3 million pounds uranium concentrate for approximately one year in advance of planned production from the Cigar Lake Project, to mitigate the effects of Cigar Lake ore production delays by:

- re-starting the JEB Mill following the 18-24 month production shutdown to commission the high grade circuits within the JEB Mill, so that the JEB Mill is ready for the onset of production from the Cigar Lake Project; and
- provide training and experience to employees for the handling of high grade ore slurry.

2. Produce up to 3 million pounds uranium concentrate for up to two years following the onset of production from the Cigar Lake Project to allow for continuous economic production from the JEB Mill during the initial production ramp-up from at the Cigar Lake Project.

Project Location
The Project location extends over an area that is bound by:

- the ore slurry loadout facility at the McArthur River Mine;
- provincial highways 914, 165, 2, and 102/905; and
- components of the McClean Lake Operation, including the JEB Mill, the JEB Tailings Management Facility and McClean Lake Operation waste management system.

Project Alternatives
An evaluation of “Alternatives to” the Project and “Alternative means” of carrying out the Project was completed following the Canadian Environmental Assessment Agency (2007) recommended approach. For this Project, there are no alterative sources of high grade ore available to process through the JEB Mill. Therefore, the only alternative to the Project is to further delay the commissioning of the JEB Mill until the onset of production from the Cigar Lake Mine.

“Alternative means” are the various technically and economically feasible ways the Project can be implemented or carried out (Canadian Environmental Assessment Agency 2007). For this assessment, alternative means evaluated included alternate routes for hauling the ore slurry (i.e., constructing a road linkage or using a former winter road) and alternate methods of transportation, including aircraft and a pipeline. None of the options considered proved to be viable for the Project.

Project Description
The primary components of the Project include:

- use of the existing, licensed, and operational ore slurry loading infrastructure at the McArthur River Mine;
• use of ore slurry trucks to transport the slurry in IP-2 compliant ore slurry transport containers along existing provincial highways 914, 165, 2, and 102/905 – for up to approximately 600 return trips per year for 300 days in a year, for a maximum of 3 years;
• use of the existing and licensed high grade ore slurry offloading infrastructure at the JEB Mill, located at the McClean Lake Operation;
• use of the existing milling circuits at the JEB Mill;
• deposition of tailings into the existing and operational JEB Tailing Management Facility; and
• use of the McClean Lake Operation waste management system for the handling of treated effluent associated with the use of the JEB Mill and deposition of tailings.

The Project Description section of the EIS provides details of each of these components and identifies those components that have the potential to interact with, and thereby potentially affect, the surrounding environment during normal Project operations, or as a result of accidents or malfunctions. Mitigation practices that limit potential environmental interactions with the Project are described as environmental design features or as operational procedures.

**Ore Slurry Loadout Facility at McArthur River Mine**

This Project will not result in any changes to the slurry loading infrastructure at the McArthur River Mine. Instead, the Project will enable AREVA to process a portion of McArthur River ore slurry at the McClean Lake Operation, with the remainder continuing to be processed at the Key Lake Mill. The Project will use the existing ore slurry loading facility at the McArthur River Mine. There will be no changes required to mitigation or operational controls currently in place at the McArthur River Mine.

**Transportation of Ore Slurry from McArthur River Mine to the McClean Lake JEB Mill**

This Project will not result in any changes to the existing public highway system. Environmental design features and mitigation to reduce the potential for collisions and rollover, or to reduce the effects from collisions and rollovers have been incorporated into the Project. The primary operational control related to the transportation of ore slurry from McArthur River Mine to the McClean Lake Operation is the use of standard ore slurry transport containers. Any container used by the Project will meet national and international regulatory standards. Minor modifications to AREVA’s Emergency Response Assistance Plan will be required for response to potential emergencies along the haul route for ore slurry. Currently AREVA’s Emergency Response Assistance Plan addresses all hazardous substances currently being transported to McClean Lake Operation.

**Receipt and Processing of Uranium Ore Slurry at the McClean Lake Operation (JEB Mill)**

This Project will not result in any changes to the offloading and processing infrastructure at the McClean Lake Operation.
Ore Slurry Offloading Infrastructure at the McClean Lake Operation

The JEB Mill ore slurry offloading infrastructure was part of the Canadian Nuclear Safety Commission and provincial approval to construct the JEB Mill expansion in 2006 (AREVA 2006). Construction of the offloading infrastructure was completed in 2007. No further construction activities are required to the JEB Mill ore slurry offloading infrastructure as a result of the Project. The Project will not require any changes to operational controls or mitigation that are currently in place at the container offloading facility. Supporting these operational controls is the Radiation Code of Practice and the Environmental Code of Practice for the McClean Lake Operation. The Environmental Code of Practice will not require any changes for the Project; however, the Radiation Code of Practice will require minor updates to reflect the operation of the high grade circuit.

JEB Milling Circuits

The Project involves the use of the existing milling circuits at the JEB Mill to process the McArthur River ore slurry. The processing of high grade ore specifically involves the use of a dedicated leaching, oxygen produced from the oxygen plant, and the tailings preparation circuit. While no construction is required, the Project will require some changes to the operational controls or mitigation that are currently in place at the JEB Mill. Supporting these operational controls are:

- the Radiation Code of Practice, which will require minor updates based on the operation of the high grade ore circuits;
- the Environmental Code of Practice for the McClean Lake Operation, which will require no modifications; and
- ongoing optimization activities within the JEB Mill.

Tailings Management Facility at the JEB Site

The processing of McArthur River ore slurry through the JEB Mill will generate a small amount of tailings requiring disposal. These tailings will be deposited in the JEB Tailings Management Facility. The JEB Tailings Management Facility was designed to reduce environmental effects from tailings disposal throughout operations and for the decommissioned facility, by application of operational and mitigation controls. The Project will not require changes to the original mitigation/operation controls in place for the storage of tailings. Ongoing approved optimization activities for the JEB Tailings Management Facility will continue.

Waste Water Management at the JEB Site

The JEB Water Treatment Plant is part of the existing waste water management system at the McClean Lake Operation’s JEB site. The JEB Water Treatment Plant removes dissolved metals and suspended solids, and discharges treated effluent to the Sink/Vulture Treated Effluent Management System. The Project will not require any changes to operational controls or mitigation that are currently in place at the JEB Water Treatment Plant or Sink/Vulture Treated
Effluent Management System. Supporting these operational controls is the Environmental Code of Practice for the McClean Lake Operation, which will not require any changes for the Project.

**Decommissioning**

As required by the Province of Saskatchewan, the key operating facilities associated with this Project, namely the McArthur River Mine and the McClean Lake Operation, have approved Preliminary Decommissioning Plans in place, along with the required letters of credit. These Preliminary Decommissioning Plans outline the major decommissioning steps for the operations. This Project will not alter the Preliminary Decommissioning Plans for either operation.

**Aboriginal and Public Involvement**

One of the principles of AREVA’s Corporate Social Responsibility is to engage with leadership of Aboriginal peoples, municipal leadership, and the general public. This engagement is completed in a manner that recognizes Aboriginal and public interest in AREVA’s business, to understand how AREVA’s operations may potentially affect their interests, and how their interests may be accommodated by AREVA. AREVA acknowledges that the Aboriginal people of Canada have a special status with rights that are constitutionally protected. AREVA is committed to working with Aboriginal peoples who are interested or may be potentially affected by the Project so that their rights are respected.

AREVA developed and implemented an Aboriginal and Public Involvement Strategy for this Project. AREVA has, and will continue to carry out a comprehensive program, including notification of, sharing of information, and engagement with those who are interested in the Project, including the leadership of Aboriginal peoples and municipal communities, as well as the general public. The engagement activities completed to date have assisted in the identification of questions and issues addressed in this Environmental Impact Statement. Various media formats are used to inform and engage those interested in this Project.

AREVA completes information and engagement programs throughout northern and central Saskatchewan on an ongoing basis and on a project-specific basis. This experience has provided the basis for a Project-specific Aboriginal and Public Involvement Strategy with the following intended objectives:

- encourage early information-sharing regarding the Project;
- communicate AREVA business decisions as related to the Project;
- provide opportunities for leadership of Aboriginal peoples, municipal leadership, and community members to engage in a dialogue with AREVA about issues, comments, concerns, and questions regarding the Project; and
- inform the Crown of any potential adverse effects on Aboriginal or Treaty rights related to the Project that are identified through the environmental assessment and engagement activities.
In accordance with AREVA’s objective to meaningfully engage with Aboriginal and municipal leadership and northern residents of Saskatchewan, AREVA has undertaken a substantial effort with respect to aboriginal and public involvement with this Project. The feedback AREVA obtained as a result of a wide range of communication activities was gathered through formal and informal question/answer periods during meetings, comments made through the project-specific website forum, comments made via the video recording booth, comments made to AREVA staff during open house forums, comments provided using the comment sheet, comments made via the Project email address, and the interactive poster. All of these comments have been included in the overall results. AREVA’s efforts to inform and engage with northern residents have yielded general satisfaction with the engagement process, which is an important outcome for AREVA.

The results of these efforts indicate there is consistent public interest in the state of the existing public highway regime, which in the absence of this Project, would remain an issue for northern residents of Saskatchewan. AREVA is committed to working with communities and the Province of Saskatchewan on this larger issue, and will continue to actively assist in the identification of general solutions.

As the Project does not involve any new construction and uses existing operations (McArthur River Mine and McClean Lake Operation) and the existing public highway regime, it is unlikely that the Project would adversely affect Aboriginal or Treaty Rights. Throughout the engagement process to date, there has been no information provided by Aboriginal leaders through the various engagement activities to date that specifically identifies any potential adverse effects to Section 35 Rights.

**Existing Environment**

The existing environment section of this Environmental Impact Statement is presented on a regional, rather than a site-specific basis, to provide the reader with an overview of the biophysical and socio-economic environment in which the Project is located. The McArthur River Mine, the McClean Lake Operation, and the majority of the highway haul route are within the Boreal Shield Ecozone of Saskatchewan (Acton et al. 1998). More specifically, the two facilities are located within the Athabasca Plain Ecoregion of the Boreal Shield Ecozone. The haul route transverses both the Athabasca Plain Ecoregion and the Churchill River Upland Ecoregion of the Boreal Shield Ecozone. The southern portion of the haul route between Pinehouse Lake and La Ronge is within the Mid-Boreal Upland Ecoregion of the Boreal Plain Ecozone (Acton et al. 1998).

**Effects from the Project on the Environment**

AREVA has completed an assessment of the Project-environment interactions that have the potential to result in residual effects to the biophysical and socio-economic environments. A summary of the results of the effects assessment and determination of significance for each primary pathway is provided as follows.
• **Changes in traffic volume and increased potential for collisions and rollovers, and spillage of ore slurry**

Changes in traffic volume and increased potential for collisions and rollovers, and spillage of ore slurry were assessed by evaluating the incremental traffic volume from the Project, considering environmental design features and mitigation to reduce the potential for collisions and rollover, or to reduce the effects from collisions and rollovers which have been incorporated into the Project. Collisions or rollovers that could result in a container breach and spill to the aquatic or terrestrial environment were determined to be unlikely. In the event of a spill to a waterbody (i.e., river or lake), effects to aquatic and human receptors are predicted to be localized and reversible soon after the spill and not significantly adverse.

• **Changes to Surface Water Quality from the Discharge of Treated Effluent from the JEB Water Treatment Plant**

The quality and quantity of effluent discharged from the JEB Water Treatment Plant associated with the processing of McArthur River ore slurry for the Project is predicted to be within the range of the effluent assessed in all previous environmental assessments for the McClean Lake Operation, including the most recently approved Caribou Project Environmental Assessment (2009; 2010), which were not predicted to result in significant adverse effects to downstream and aquatic and terrestrial environments. Therefore, effects related to discharge of treated effluent for the Project, in conjunction with current and planned future activities at the McClean Lake Operation, are also not anticipated to result in significant effects to the protection of surface water quality for aquatic and terrestrial ecosystem, and human use.

• **Changes to Groundwater and Surface Water Quality from the Long-term Contaminant Transport from the JEB Tailings Management Facility**

Effects predicted in the most recent environmental assessment for the Caribou Project included both incremental (project-specific effects), as well as current and planned future activities at the McClean Lake Operation (i.e., cumulative effects). The assessment indicated that the transport of constituents of potential concern from the JEB Tailings Management Facility into the groundwater flowing to Pat Lake and Fox Lake should have a low magnitude of effect on background concentrations in these lakes. Long-term surface water quality was not predicted to result in significant adverse effects to downstream and aquatic and terrestrial environments, and aquatic and terrestrial health. Surface water quality predictions made in the Caribou Project and the Midwest Project are not changed with respect to selenium resulting from the disposal of tailings produced by McArthur River ore slurry into the JEB Tailings Management Facility. Therefore, indirect effects to the long-term surface water quality from the Project in conjunction with current and planned future activities at the McClean Lake Operation are not anticipated to result in significant effects to the protection of surface water quality for aquatic and terrestrial ecosystem, and human use.

• **Changes in Traffic Volume may Increase the Potential for Collisions with Ore Slurry Trucks, which has the Potential to Cause Injury/Mortality to Humans**

As a result of this Project, the overall increase in truck travel on the provincial highways is anticipated to be less than 2.5%. Traffic is cumulative by nature and includes existing traffic
from the McClean Lake Operation and McArthur River Mine, additional traffic required for this Project, existing public traffic along provincial highways, as well as traffic that may be associated with the development of the Caribou and Midwest Projects, and the Cigar Lake Mine. Given the transportation operating history of AREVA, it is unlikely that the small increase to traffic volume will result in a significant increase to injuries or mortalities to humans along the haul route. However, in the event that a traffic accident occurs that results in a human injury or fatality, the effect would be of a high magnitude, resulting in a significant effect on the immediate family and community.

- **Hiring of Additional Personnel to Support the Project may Change Employment in Surrounding Communities.**

As a result of the Project, approximately 50 employees and contractors will be required to restart production at the JEB Mill and hauling of ore slurry, and there will be no changes to employment levels at the McArthur River Mine or the Key Lake Mill. It is anticipated that the Project will result in increased labour incomes, improved livelihoods, greater economic opportunities, and a general enhancement of economic conditions for communities in northern Saskatchewan. In addition, training and employment initiatives and commitments by AREVA should increase local opportunities to train and work at the McClean Lake Operation and other uranium operations in the region. The effects from the Project are predicted to have a positive effect on the continued persistence of long-term sustainable social, cultural, and economic properties in the Province of Saskatchewan.

- **Increased Activity from the Project may Change the Level of Business Activity in Surrounding Communities in Northern Saskatchewan**

Although no new business or joint-ventures will likely be created as a direct result of the Project, the operation of the JEB Mill is anticipated to have a positive incremental effect on business activity in northern communities, as well as at the provincial level. The McClean Lake Operation is predicted to improve the sustainability of the socio-economic conditions in the Athabasca Basin and the Province of Saskatchewan. The cumulative effects from the Project and other past, existing, and future developments would likely have a significant positive effect on the continued persistence of long-term sustainable social, cultural, and economic properties in the northern Saskatchewan and the Province of Saskatchewan.

**Ongoing Monitoring and Follow-up Programs**

Even the best models and data are imperfect reflections of the real system. As a result, there are a number of uncertainties in calculating the predicted concentrations of metals and radionuclides in water, sediments, and biota. In addition, necessary simplification of assumptions introduces bias and imprecision in estimates of exposures. To address these uncertainties conservative assumptions regarding exposure and dose estimates were used. Thus, the exposure and dose estimates calculated in this assessment are a cautiously conservative representation of reality and likely overestimate the potential for effects. In addition, the models used are updated with new monitoring and operational data, and new literature information as it becomes available.
The McClean Lake Operation has a number of follow-up programs in place to specifically address the long-term performance of the JEB Tailings Management Facility, the performance of the waste water management systems, the performance of the JEB Mill process, monitoring of transportation activities to and from the site, and monitoring changes to the socioeconomic environment around the McClean Lake Operation. As such, it is not anticipated that this Project will require a specific follow-up monitoring program.

Conclusion/Summary

On the basis of the detailed Project information and assessment of Project effects provided in this Environmental Impact Statement, AREVA believes that this Project can be operated in a manner that, taking into account environmental design features and mitigation, is not likely to cause significant adverse effects to the biophysical or socio-economic environments. This Project is expected to result in a positive effect on employment levels and socio-economic conditions in the Athabasca Basin and the Province of Saskatchewan.