Environmental Assessment Track Report

Former Gunnar Mine Site Rehabilitation Project

Submitted to the
Minister of the Environment

By
Canadian Nuclear Safety Commission and
Natural Resources Canada

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1.0 Introduction

This Environmental Assessment Track Report for the proposed Gunnar Mining Limited Site Rehabilitation Project was prepared jointly by the Canadian Nuclear Safety Commission (CNSC) and Natural Resources Canada (NRCan), in accordance with subsection 21(2) of the *Canadian Environmental Assessment Act* (the Act). Fisheries and Oceans Canada (FOC), Transport Canada (TC), Indian and Northern Affairs Canada (INAC), Environment Canada (EC), and Health Canada (HC) provided input. In conformity with the requirements of Section 21 of the Act, this report describes:

- The scope of the project;
- The factors to be considered in the assessment, and the scope of those factors;
- Public concerns in relation to the project;
- The potential of the project to cause adverse environmental effects; and
- The ability of the comprehensive study to address issues related to the project.

The information contained in this report is intended to assist the Minister of the Environment in making a determination whether to continue as a comprehensive study assessment, or to refer the project to a mediator or review panel.

2.0 Development Proposal Overview

The Government of Saskatchewan and the Government of Canada have signed a Memorandum of Agreement (MOA) to address the Cold War Legacy Uranium Mine and Mill Sites in Northern Saskatchewan. This agreement includes the rehabilitation of the former Gunnar Mining Limited mine site. Under the MOA, Saskatchewan Energy and Resources (SER) was assigned the responsibility to ensure that the project is carried out on behalf of the two governments. SER signed a contract with the Saskatchewan Research Council (SRC) to fulfill the role of project manager and designated agent to manage and perform the required environmental assessment requirements and rehabilitation activities.

On April 23, 2007, SRC (the proponent) submitted a project description (Reference 1) for the Former Gunnar Mine Site Rehabilitation Project (the project). Their proposal includes the following components:

- Demolition of existing buildings, facilities and structures;
- Appropriate disposal of materials resulting from demolition;
- Installation of an appropriate cover on all or a portion of the exposed mill tailings;
- Rehabilitation of existing waste rock piles;
- Rehabilitation of additional risk(s) as warranted;
- General site clean-up;
- Re-vegetation of areas of the rehabilitated site as required; and
- Appropriate monitoring during and after rehabilitation.

3.0 Environmental Assessment Process

3.1 Roles and Responsibilities

Under the *Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment Procedures and Requirements*, it was determined that the Canadian Nuclear Safety Commission may issue a licence to decommission the site under subsection 24(2) of the *Nuclear Safety and Control Act*. This regulatory duty is listed on the *Law List Regulations* of the Act, which is a section 5(1)(d) trigger under the Act. It was also determined that NRCan may provide financial assistance to the proponent for the purpose of enabling the project, which is a section 5(1)(b) trigger under the Act. Consequently, both federal organizations are responsible authorities (RAs) for the environmental assessment of this project.

Fisheries and Oceans Canada and Transport Canada will participate in the environmental assessment process as expert federal authorities (FAs) until such time as they have sufficient information to determine if their departments will have a section 5 trigger under the Act for the project, requiring participation in the environmental assessment of the project as an RA. The required additional information on specific "rehabilitation" activities and outcomes will be defined through the environmental assessment process and documented in the proponent's Environmental Impact Statement (EIS).

Indian and Northern Affairs Canada, Environment Canada and Health Canada indicated that they possess specialist knowledge or expert information in support of the assessment of this project, and are therefore expert FAs. As per section 12.4 of the Act, the Canadian Environmental Assessment Agency (the Agency) will act as the Federal Environmental Assessment Coordinator for this environmental assessment.

This project is also being assessed by the Government of Saskatchewan, as it is subject to an environmental assessment under Saskatchewan's *The Environmental Assessment Act*.

3.2 Cooperation of Federal and Provincial Processes

To achieve efficiency, a harmonized environmental assessment is being undertaken as per the *Canada-Saskatchewan Agreement on Environmental Assessment Cooperation* (Cooperation Agreement). The Saskatchewan Ministry of Environment and the Agency are coordinating these federal-provincial review efforts, and the latter leads the Project Administration Team[1] for the environmental assessment.

3.3 Requirement for a Comprehensive Study

The project is subject to the following provisions of the *Comprehensive Study List Regulations* of the Act:

[1] The "Project Administration Team" is composed of the RAs, the Agency, and the Province, as defined in the Cooperation Agreement and described in Section 2.1 of the Guideline-Scoping Document. Throughout this document and its appendices, the term "EA Team" is used when the expert FAs are participating.

19. The proposed construction, decommissioning or abandonment, or an expansion that would result in an increase in production capacity of more than 35 per cent, of

(a) a uranium mine, a uranium mill or a waste management system any of which is on a site that is not within the boundaries of an existing licensed uranium mine or mill.

Accordingly, a comprehensive study review process has been initiated.

3.4 Scope

Under the Act, "scope" refers to the scope of the project for the purposes of environmental assessment, and the scope of the assessment (the factors which are to be examined as part of the environmental assessment, and the scope of those factors). The Project-Specific Guidelines and Comprehensive Study Scoping Document (Guideline-Scoping Document) (Appendix 1) provides a description of scope for this environmental assessment. It was prepared by the Project Administration Team and has been revised from the draft version sent out for public review to reflect comments submitted by the public and the EA Team.

As described in 3.1 of Appendix 1, the scope of the project for the purpose of the federal environmental assessment, as established by the CNSC and NRCan, includes the physical works and activities associated with the decommissioning of the Gunnar site. These are:

- Demolition of existing buildings, facilities and structures;
- Appropriate disposal of materials resulting from demolition and remediation activities;
- Rehabilitation of existing waste rock piles;
- Rehabilitation of pit[2];
- Rehabilitation of mill tailings[3];
- Rehabilitation of additional risk(s) as warranted;
- General site clean-up;
- Re-vegetation of areas of the rehabilitated site as required; and
- Appropriate monitoring during and after rehabilitation.

The scope of the assessment covers the factors contained in Section 16(1) and 16(2) of the Act, and is provided in Sections 3.2 to 3.4 of Appendix 1.

The scope for the purposes of the environmental assessment is consistent with the description of the development proposal provided by the proponent in their project description. The scope is also consistent with the required provincial environmental assessment.

[2] Wording added following review by EA Team.

[3] Wording presented to the public in the draft Guideline-Scoping Document was "Installation of cover on above-ground and submerged mill tailings, where appropriate". Wording was revised in response to a public comment.

4.0 Public and Aboriginal Involvement

4.1 Opportunities for the Public to Participate

The comprehensive study process requires that public consultation take place and that the public be given an opportunity to participate in the review of the environmental assessment as follows:

- Public consultation during the preparation of the scope of the environmental assessment;
- Public participation during the comprehensive study; and
- Public comment period on the Comprehensive Study Report.

Opportunities for public participation have been provided through many forums, which are described below.

Information on the environmental assessment of this project is available for the public on the Canadian Environmental Assessment Registry Internet Site (CEARIS). The CEARIS reference number for this project is **07-03-30100**.

As per Section 21(1) of the Act, and as presented in a draft version of the Guideline-Scoping Document that was sent out for public review, the public was formally invited to comment in writing on the following:

- The proposed scope of the project for the purposes of the environmental assessment;
- The factors that should be considered in the assessment and the proposed scope of those factors; and
- The ability of the environmental assessment to address issues relating to the project.

Additionally, the public was also formally invited to comment on the following:

- Whether any additional studies or information are necessary to evaluate the impacts of the project and;
- Any other issues of interest to the public related to the project.

A 30-day public comment period (April 2 – May 2, 2008) on the draft Guideline-Scoping Document was organized by the Environmental Assessment Branch of Saskatchewan's Ministry of Environment. Concurrently, an invitation for public comment was posted on the CEARIS website, and advertisements were placed in the following newspapers on the dates shown:

- Saskatoon *Star Phoenix* - Saturday March 29, 2008
- Regina *Leader-Post* - Saturday March 29, 2008
- Prince Albert *Daily Herald* - Saturday March 29, 2008

- La Ronge *Northerner* – Wednesday April 2, 2008
- Regina *L'eau Vive* - Thursday April 10, 2008

The notices requested that the public provide comments on the Guideline-Scoping Document to the Agency or Saskatchewan Ministry of Environment by May 2, 2008. The notices also provided details concerning how to access the document, and how to provide feedback (e.g. by e-mail, by regular mail, by phone, and by fax). To facilitate the process and focus the comments on the questions being addressed at this stage of the environmental assessment, a Frequently Asked Questions (FAQ) document was provided. Copies of the newspaper notice and the FAQ document are provided in Appendices 2 and 3, respectively.

Invitations to the public to review and comment on the Guideline-Scoping Document were also broadcast daily on the radio on Missinippe Broadcast News, in English, Cree and Dene, between April 2 and 5, 2008.

The Guideline-Scoping Document and the Frequently Asked Questions were made available at First Nations and Northern Hamlet offices in the Athabasca Region, at the Saskatchewan Ministry of Environment in La Ronge, and online on CEARIS.

The RAs, the Agency, the Province of Saskatchewan, and the proponent also hosted a public consultation meeting on the Guideline-Scoping Document in Uranium City on May 14, 2008. The meeting was advertised in the north through the Northern Mines Monitoring Secretariat, and by the proponent while they were in Uranium City on April 8 and April 14. Further, the Project Administration Team faxed invitations directly to the band offices in the Athabasca Region and posted the meeting information on the CEARIS. The Agency also extended the invitation to the Métis Nation – Saskatchewan (MN-S) during a telephone conversation on May 2, 2008. To encourage participation by meeting attendees, the public comment period was extended to May 30, 2008.

In addition, as part of the Canadian Nuclear Safety Commission hearing process for the Environmental Assessment Track Report, the public has been invited to submit written comments or make oral interventions on all of the above elements during the thirty (30) day comment period prior to the September 17, 2008 hearing in Saskatoon, Saskatchewan.

4.2 Aboriginal Engagement

For all projects, the "Crown" must be satisfied that the duty to consult and, if appropriate, accommodate, has been met towards Aboriginal communities whose aboriginal rights and title or treaty rights or traditional use of land may be affected. For this project, the RAs and the Province of Saskatchewan represent the Crown. The Crown has initiated elements of consultation by notifying Aboriginal communities thought to potentially have an interest in the project, invited input to the EA process, and invited participation in meetings. The proponent has committed to continue to keep aboriginal communities involved in the development of the rehabilitation plan, and the Crown will continue to

engage communities throughout the environmental assessment process. A chronology of communications to-date follows.

In November 2007, the Agency contacted the First Nation communities in the Athabasca Basin to initiate a dialogue as to whether the current method of sharing environmental assessment information for uranium-related projects meets their needs in terms of engagement or if alternative mechanisms should be considered. The current process entails participation of Northern Saskatchewan Environmental Quality Committee (NSEQC)[4] members in meetings with the proponent, circulation of environmental assessment documents (Guideline-Scoping Document, project descriptions, screening and/or comprehensive study reports) to band offices, and advertising the review period and availability of environmental assessment documents in local media. No communities responded to this initial letter or follow-up telephone calls.

On May 8, 2008, the Agency, on behalf of the Project Administration Team, faxed each First Nation band office in the Athabasca Basin to inform them of the public meeting being planned in Uranium City, to request confirmation of the appropriate contact from each community with respect to the Gunnar Mining Limited Site Rehabilitation Project, and to extend the opportunity to meet with the Project Administration Team. A follow-up letter was faxed on May 26, 2008 to provide a brief summary of the meeting, to notify the communities that the comment period for the review of the Guideline-Scoping document had been extended, and to provide notification that applications for funding to participate in the environmental assessment would be available in the coming months.

The MN-S (Clearwater – Clearlake Northern Region 2) wrote on May 2, 2008 that they would like to be added to the distribution list for environmental assessment documents and participate in any current and/or future community consultation. The Agency has been in contact with the MN-S on ten (10) occasions between August 2007 and June 2008 to discuss the environmental assessment of this project and other projects in northern Saskatchewan. A meeting between the MN-S Northern Regional Directors, the Agency and the Canadian Nuclear Safety Commission is pending.

The Province of Saskatchewan and RAs, along with SRC, met with members of the NSEQC during the aforementioned May 14, 2008 public consultation meeting in Uranium City. A total of 19 people participated in the meeting, 8 of which were residents of northern Saskatchewan attending either as a member of the NSEQC or as a member of the public. The remaining participants were from the federal and provincial governments or SRC.

[4] The Northern Saskatchewan Environmental Quality Committee (NSEQC) is a regional EQC established to monitor the northern Saskatchewan uranium mines from a community perspective. It is composed of representatives from northern Aboriginal and non-Aboriginal "impact communities", and overseen by the Northern Mines Monitoring Secretariat.

4.3 Record of Comments Received

The comments received on the draft Guideline-Scoping Document are provided in Appendix 4, along with the responses by the EA Team. In total, six submissions were submitted, not including the aforementioned May 2 letter from the Métis Nation – Saskatchewan. While the issues raised were not contentious, the RAs modified the scope of project for the purposes of the environmental assessment to take into account the comments received, as described in Section 3.4 of this document.

The Province of Saskatchewan and the RAs have considered all comments, and modified the Guideline-Scoping Document to clarify and correct deficiencies noted by the public, where applicable. The revised Guideline-Scoping Document is attached as Appendix 1 of this document.

4.4 Next Steps

The RAs will ensure that the public and Aboriginal peoples continue to be provided with the opportunity to participate in the comprehensive study. The proponent has committed to continue to engage the Athabasca communities throughout the development of the rehabilitation plan. The RAs will monitor and/or participate in these proponent-led consultation activities. Additionally, as per Section 21.2 of the Act, the RAs will ensure that the public and Aboriginal peoples are provided with an opportunity to participate in the comprehensive study if the Minister of the Environment refers the project back to the RAs to continue as such. For instance, opportunities will be afforded to provide input into a draft version of the Comprehensive Study Report.

The Agency administers a Participant Funding Program which supports individuals and non-profit organizations interested in participating in environmental assessments. The Agency will make funding available to support public participation of concerned citizens and groups if the federal environmental assessment review process proceeds by means of comprehensive study. A notice on the availability of participant funding will likely be posted on CEARIS by the Agency in September 2008. Decisions on successful participants would be posted (should the environmental assessment continue as a comprehensive study) after the Track Decision is made by the Minister of the Environment.

Following review and final acceptance of the proponent's Environmental Impact Statement, the RAs will prepare a Comprehensive Study Report (CSR). The CSR will summarize the results of the environmental assessment and demonstrate how public comments received during the environmental assessment were considered.

Following the submission of the Comprehensive Study Report by the RAs to the Minister of the Environment, the Agency will facilitate public access to the Report and invite public comments on the report. After taking into consideration the Report and the comments received, the Minister of the Environment will then issue an environmental assessment decision statement.

5.0 Potential of the Project to Cause Adverse Environmental Effects

Although the specific activities associated with the proposed rehabilitation project have not been defined, the RAs have developed a preliminary list (Table 1) of potential adverse environmental effects that may need to be considered during the environmental assessment process. In identifying the potential environmental interactions and effects the RAs considered:

- The proponent's project description and baseline information;
- Public and Aboriginal input to-date;
- Input from the EA Team for the environmental assessment; and
- Professional judgement

The adverse environmental effects identified in Table 1 are examples of what could occur should mitigation measures not be put in place. Potential adverse environmental effects will be determined, and technically and economically feasible mitigation measures will be identified over the course of the environmental assessment. Also, the Act requires that a follow-up program be designed and implemented as part of a comprehensive study to help ensure mitigation measures are effective and any necessary adaptive management actions are identified and implemented.

Table 1: Potential of the Project to Cause Adverse Environmental Effects

Environmental Component	Potential Environmental Effects
Atmospheric Environment	• Change to air quality from radiological and non-radiological dust produced during decommissioning (e.g. demolition, transport)
Groundwater	• Change in groundwater flow • Change in water quality of groundwater and drainage water (radiological and non-radiological)
Surface Water	• Changes to surface water and sediment quality (e.g. radiological and non-radiological exposure) • Loss or alteration or disturbance of habitat • Disruption of life cycle of biota or direct mortality
Terrestrial Environment	• Change to soil quality • Stress on soil invertebrates • Vegetation stress (e.g. deposition of dust) • Loss, alteration or fragmentation of habitat • Disruption to breeding, nesting or movement of wildlife or direct mortality

Human Health[5]	• Consumption of contaminated country food including plants, fish, and animals • Changes to availability of Aboriginal traditional foods • Risks to the health of workers and visitors due to exposure to radiological and non-radiological contaminants (e.g. asbestos, PCBs, dust) and physical hazards • Reduced level of safety from accident/malfunction events
Land and Resource Use	• Temporary disruption to or permanent loss of land or resources currently used by aboriginal or non-aboriginal peoples (e.g. fishing, tourism, recreation and navigation)
Physical and Cultural Heritage	• Loss or destruction of items of historic mining interest (e.g. machinery)

6.0 Ability of the Comprehensive Study to Address Issues Relating to the Project

In evaluating the potential of the ability of the comprehensive study to fully address issues relating to the project, the RAs considered:

- The proponent's project description and baseline information;
- Public and Aboriginal input to-date;
- The ability of technically and economically feasible mitigation measures to reduce and minimize the potential adverse effects to an acceptable level;
- Input from the EA Team for the environmental assessment; and
- Professional judgement

Project Description and Baseline Information

The Project Administration Team reviewed the proponent's project description and appended baseline information to inform the development of the Guideline-Scoping Document. The Guideline-Scoping Document outlines the information and analyses necessary to address federal and provincial environmental assessment legislation and process requirements. The environmental assessment will be conducted in the planning stages of the proposed decommissioning project. The objectives of the environmental assessment will be to define and assess the options available for rehabilitating the site, as

[5] As per the definition of "environmental effect" in Section 2(1) of the Act, the following effects can only be considered when they relate to a change in the environment: health and socio-economic conditions; physical and cultural heritage; the current use of lands and resources for traditional purposes by Aboriginal persons; and any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

well as follow-up monitoring requirements, considering the level of risk acceptable to the public.

Public and Aboriginal Input

The public was consulted on the ability of a comprehensive study to address issues relating to the project. No member of the public requested referral to a panel review.

Correspondence was received from members of the Northern Mines Monitoring Secretariat and the MN–S. No request for referral to a panel review was received.

The comments submitted and those raised during the public meeting were of a nature that could be addressed in a comprehensive study process.

Mitigation Measures

The RAs are of the opinion that there are technically and economically feasible mitigation measures to reduce and minimize potential adverse environmental effects to an acceptable level such that a comprehensive study is the appropriate track.

Input from the EA Team

Technical experts from the federal (and provincial organizations) involved in the environmental assessment will be engaged in reviewing and examining issues related to the project, regardless of whether they have a trigger or not.

Summary

The RAs are of the opinion that a comprehensive study can address the scientific and technical issues raised in relation to the project, based on the guidance provided to the proponent instructing the conduct of technical studies.

7.0 Summary and Recommendation

Pursuant to subsection 21(1) of the Act, the RAs have ensured public consultation with respect to the proposed scope of the project for the purposes of the environmental assessment, the factors proposed to be considered in its assessment, the proposed scope of those factors and the ability of the comprehensive study to address issues relating to the project.

Pursuant to paragraph 21(2)(a) of the Act, the RAs are providing this document to the Minister of the Environment to report on:

- The scope of the project, the factors to be considered in its assessment and the scope of those factors (Section 3.1 and 3.2 of Appendix 1);

- Public concerns in relation to the project (Section 4.0 of this document and Appendix 4);
- The potential of the project to cause adverse environmental effects (Section 5 of this document); and
- The ability of the comprehensive study to address issues relating to the project (Section 6 of this document).

The RAs, in consultation with the Agency and expert FAs, have concluded that a comprehensive study can fully address issues related to this project.

8.0 References

Saskatchewan Research Council. April 2007. *Former Gunnar Mining Limited Site Rehabilitation Project Proposal*. (E-Docs #3038197)

Appendix 1

Project-Specific Guidelines and Comprehensive Study Scoping Document

Former Gunnar Mine Site Rehabilitation Project

Project-Specific Guidelines and Comprehensive Study Scoping Document

Former Gunnar Mine Site Rehabilitation Project

December 2008

This document has been prepared to meet the requirements for Project-Specific Guidelines for the Saskatchewan environmental impact assessment process and for the federal Comprehensive Study Scoping Document as required by the *Canadian Environmental Assessment Act*. It was prepared by Saskatchewan Environment, the Canadian Nuclear Safety Commission, Natural Resources Canada and the Canadian Environmental Assessment Agency to assist the Saskatchewan Research Council with the environmental impact assessment of the proposed Former Gunnar Mine Site Rehabilitation Project.

Canada

Saskatchewan

1.0 INTRODUCTION

1.1 Site History

The Gunnar uranium mining and milling site (Gunnar site) on the north shore of Lake Athabasca (59°23' N, 108°53' W) in northern Saskatchewan ceased mining operations in 1963. The site, operated by the former Gunnar Mining Limited, had commenced uranium production in 1955. Uranium ore was mined initially from an open-pit and then from an underground operation. The Gunnar site officially closed in 1964 with little or no decommissioning of facilities. Shortly after closure, a trench was blasted between the open-pit and Lake Athabasca, allowing the open-pit and underground workings to flood. Later this trench was blocked by waste rock. Between 1971 and 1980 the warehouse building near the main dock was used as a fish processing facility.

When the original owner ceased operations at the site, Gunnar came under the care and control of the Province of Saskatchewan. On the coming-into-force of the *Nuclear Safety and Control Act* (NSCA) in May 2000, jurisdiction for regulatory oversight of many sites was clarified. These sites included tailings management areas resulting from the former operation of uranium mines. Under the NSCA, the province was requested by the CNSC to submit an application to the CNSC to licence the Gunnar site.

In 2006, Saskatchewan Environment (SE) took out a Miscellaneous Use Permit on the Gunnar site. The intent of this permit was to record the area in the SE Lands Branch records system so that no other SE land dispositions would be issued for the area.
In 2007, the Governments of Saskatchewan and Canada signed a Memorandum of Agreement to address the current environmental conditions of the abandoned uranium mine sites in northern Saskatchewan, including the rehabilitation of the Gunnar site. Under the Agreement, Saskatchewan Energy and Resources (SER), previously known as Saskatchewan Industry and Resources, is responsible for the Gunnar Mine Site Rehabilitation Project. SER has retained the Saskatchewan Research Council (SRC) under contract to act as project manager, licence applicant and designated agent to manage and perform the required environmental impact assessment and rehabilitation activities. For the purpose of this document, SRC will be recognized as the "proponent" from this point forward.

1.2 Development Proposal Overview

In April 2007, the proponent submitted a project proposal to SE and the CNSC describing the development and implementation of a plan to rehabilitate the Gunnar site such that the long term level of risk to the environment and the public is acceptable.

The project as proposed by SRC includes the following components:

- Demolition of existing building, facilities and structures;
- Appropriate disposal of materials resulting from demolition;
- Installation of an appropriate cover on all or a portion of the exposed mill tailings;
- Rehabilitation of existing waste rock piles;
- Rehabilitation of additional risk(s) as warranted;
- General site clean-up;
- Re-vegetation of areas of the rehabilitated site as required; and
- Appropriate monitoring during and after rehabilitation.

The proponent has been informed that the proposed rehabilitation of the Gunnar site will require environmental assessment under Saskatchewan's *The Environmental Assessment Act* (provincial Act) and the *Canadian Environmental Assessment Act* (federal Act). The proponent is required to conduct an environmental impact assessment (EIA) and prepare an environmental impact statement (EIS) for technical and public review. This document has been prepared to assist the proponent with the conduct of the EIA and the preparation of the EIS.

1.3 Purpose of the Draft Project-Specific Guidelines and Scoping Document

This Draft Project-Specific Guidelines and Comprehensive Study Scoping Document (hereafter called the Guideline-Scoping Document) comprises the requirements of both the provincial Project-Specific Guidelines and the federal Comprehensive Study Scoping Document. Under the 2005 *Canada-Saskatchewan Agreement on Environmental Assessment Cooperation* (Cooperative Agreement), Canada and Saskatchewan can agree to produce a single document to outline the specific process and information requirements for both the federal and provincial environmental assessment processes.

The Guideline-Scoping Document has been prepared to assist SRC with the conduct of the EIA and the preparation of the EIS. The document reflects concerns and issues that have been raised by provincial and federal officials and the public regarding the proposed project and identifies the information that should be included in the EIS. The EIS should identify the current levels of risks to the environment and the public posed by the Gunnar site and describe how the proposed plan will reduce those risks to levels considered acceptable by established criteria.

2.0 ENVIRONMENTAL ASSESSMENT PROCESS

2.1 Federal and Provincial Cooperation in the Environmental Assessment

Canada and Saskatchewan intend to cooperate throughout the process in a manner that meets the legislated environmental assessment requirements of both parties. Under the Cooperative Agreement, federal and provincial environmental assessment processes, directed respectively by the federal *Canadian Environmental Assessment Act* (federal Act) and the provincial *Environmental Assessment Act* (provincial Act), are coordinated for projects with federal and provincial jurisdiction, where not limited by individual statutory or process requirements of the respective processes. Accordingly, information requirements of both federal and provincial agencies have been included in the Guideline-Scoping Document so that the EIS will be sufficient to address the requirements of the environmental assessment processes of both the Government of Saskatchewan and the Government of Canada.

Under the Cooperative Agreement, the Province of Saskatchewan, Environmental Assessment Branch, is the Lead Party and contact for the Gunnar Mine Site Rehabilitation Project, and has established a Project Administration Team for the cooperative environmental assessment. Membership on the Project Administration Team includes representatives from SE's Environmental Assessment Branch, the Canadian Nuclear Safety Commission (CNSC), Natural Resources Canada (NRCan), and the Canadian Environmental Assessment Agency (the Agency).

As per the Cooperative Agreement, the Project Administration Team has worked together to consolidate the information requirements of both parties in this document. Members of the Project Administration Team will also be responsible for coordinating required decisions during the administration of the cooperative environmental assessment. Under the cooperative arrangement, a single environmental assessment and review process is used to obtain the information needed for federal and provincial environmental assessment processes. Both governments will use the information generated through the cooperative environmental assessment as the basis for their respective decisions about the project. However, each government will retain its ability to make project-related decisions on matters within its own legislative authority.

Pursuant to section 17(1) of the federal Act and section 9(1) of the provincial Act, the responsible authorities delegate the conduct of the environmental assessment to the Proponent. The Proponent will prepare an EIS based on this Guideline-Scoping Document. Once completed, the proponent will submit the EIS to the Project Administration Team for review.

2.2 Provincial Environmental Impact Assessment

Following technical review of the April 2007 SRC proposal for the rehabilitation of the Gunnar site by provincial agencies and departments, the Gunnar Mine Site Rehabilitation Project is considered to be a "development" pursuant to section 2(d) of the provincial Act. As a consequence, SRC is required to conduct an EIA of the proposed Gunnar Mine Site Rehabilitation Project and prepare and submit an EIS to the provincial Minister of Environment (provincial Minister).

Once the EIS is submitted, the Environmental Assessment Branch will circulate the EIS to provincial departments and agencies for technical review. These departments and agencies include the Saskatchewan Departments of Environment, Watershed Authority, Health, First Nations and Métis Relations, Culture Youth and Recreation (Heritage Branch), Industry and Resources, Northern Affairs, and Government Relations.

Following the technical review of the EIS, the Environmental Assessment Branch will prepare Technical Review Comments that evaluate the EIS. The EIS and the Technical Review Comments, along with the federal Comprehensive Study Report (discussed below), will then be provided to the public for a minimum 30 day review. After the public review of the EIS, the submissions from the public, together with information generated during the technical review of the EIS, will be provided to the provincial Minister for his consideration prior to making his Ministerial Decision whether or not to approve the development.

2.3 Federal Environmental Assessment

2.3.1 Regulatory Context

The proposed rehabilitation of the Gunnar site is an undertaking in relation to a physical work, and thus is a '*project*' as defined in section 2 of the federal Act. The CNSC and NRCan have indicated that they may take steps that enable various aspects of the project to be implemented. As a result, they have determined that they are RAs under the federal Act. As such, they must ensure that an environmental assessment, as scoped by them and in accordance with the federal Act, is conducted prior to the issuance of federal licences, authorizations, permits, approvals, and/or funding as described below.

2.3.1.1 Responsible Authorities

Canadian Nuclear Safety Commission (CNSC)

CNSC authorization of SRC's proposal would require the issuance of a licence to decommission the site. Licences are issued by the Commission under the authority set out in subsection 24(2) of the *Nuclear Safety and Control Act* (NSCA). Subsection 24(2) of the NSCA is listed as a "trigger" under the *Law List Regulations* of the federal Act in respect of the issuance of a licence. Pursuant to paragraph

5(1)(d) of the federal Act, an environmental assessment must be conducted before such a licensing decision can be made. CNSC is therefore an RA under the federal Act in relation to this project.

Natural Resources Canada (NRCan)

NRCan is participating as an RA under the federal Act for the environmental assessment of the Gunnar Mine Site Rehabilitation Project because it is considering providing funding for the rehabilitation project. NRCan is also participating as a federal department with expertise relevant to the Project. This review will be coordinated through the Environmental Assessment Group of NRCan's Science and Policy Integration Sector.

2.3.1.2 Expert Federal Authorities

Pursuant to the *Federal Coordination Regulations* under the federal Act, the following federal departments/agencies have an interest in the project related to their mandate and are participating in the review as expert Federal Authorities (FAs) in relation to the project: Fisheries and Oceans Canada (DFO), Transport Canada (TC), Indian and Northern Affairs Canada (INAC), Environment Canada (EC), and Health Canada (HC).

2.3.1.3 Federal Environmental Assessment Coordinator

The Canadian Environmental Assessment Agency (the Agency) is the Federal Environmental Assessment Coordinator (FEAC) for the proposed project and is responsible for coordinating the review activities of the RAs and expert FAs in accordance with section 12 of the federal Act and in conjunction with the provincial environmental assessment process. The FEAC will coordinate the federal participation on the joint federal-provincial Project Administration Team, which will include the RA and FA departments identified above as well as the provincial Environmental Assessment Branch.

2.3.2 Type of Federal Environmental Assessment

CNSC and NRCan have determined that components of the proposed Gunnar Mine Site Rehabilitation Project are described in paragraph 19(a) of the *Comprehensive Study List Regulations* of the federal Act, as described below:

> *19. The proposed construction, decommissioning or abandonment, or an expansion that would result in an increase in production capacity of more than 35 per cent, of*
>
> *(a) a uranium mine, a uranium mill or a waste management system any of which is on a site that is not within the boundaries of existing licensed uranium mine or mill;*

Although the project proposal refers to 'site rehabilitation', the CNSC and NRCan consider the proposed activities to be activities related to decommissioning of a mine,

mill and waste management systems. Paragraph 19(a) of the *Comprehensive Study List Regulations* of the federal Act would therefore apply to this proposal.

2.3.3 Comprehensive Study Environmental Assessment Requirements

In accordance with subsection 21(1) of the federal Act, the RAs are required to consult with the public with respect to the proposed scope of the project for the purposes of the federal environmental assessment, the factors proposed to be considered, the proposed scope of those factors, and the ability of the comprehensive study to address issues relating to the project.

Following this initial public consultation associated with this document, as described in section 5 and pursuant to subsection 21(2) of the federal Act, the RAs must submit a report to the federal Minister of the Environment (federal Minister), which will include the following:

- The scope of the project, the factors to be considered in the environmental assessment and the scope of those factors;
- Public concerns in relation to the project;
- The project's potential to cause adverse environmental effects; and
- The ability of the comprehensive study to address issues relating to the project.

After taking into consideration comments from the public, the RAs must also recommend to the federal Minister whether the environmental assessment should be continued by means of a comprehensive study, or whether the project should be referred to a mediator or review panel. The recommendation document is referred to as the Track Report.

Once the draft Track Report is completed, the CNSC will hold a public hearing to provide the public an opportunity to review, comment and present interventions before the Commission on the report prepared by the RAs. The hearing will be for the Commission to decide what Track Report and recommendation it will make to the federal Minister. Following the public hearing, the final Track Report will be submitted to the federal Minister to decide whether to refer the project back to the RAs to continue the comprehensive study process, or refer the project to a mediator or review panel. If the federal Minister decides that the project should continue as a comprehensive study, the project cannot be referred to a mediator or review panel at a later date.

If the federal Minister refers the project to a mediator or review panel, the project will no longer be subject to the comprehensive study process under the federal Act. The federal Minister, after consulting the RAs and other appropriate parties, will set the terms of reference for the review and appoint the mediator or review panel members. As per the Cooperative Agreement, the province will be immediately informed of this decision and will determine how the province would proceed. The public would have the opportunity to participate in the panel process.

If the environmental assessment continues as a comprehensive study, the RAs, following the review of the proponent's EIS and in consultation with SE, the Agency and the expert FAs, will conduct a comprehensive study and prepare a Comprehensive Study Report (CSR). The CSR will be prepared based on the proponent's EIS and any additional information gathered throughout the assessment process. The RAs will ensure there are opportunities for public participation during the conduct of the comprehensive study. Once completed, the RAs will submit the CSR to the Agency.

Following receipt of the CSR, the Agency will invite the public to comment on this report prior to the federal Minister taking a decision on the environmental assessment. Once the environmental assessment decision statement is issued, the federal Minister will refer the project back to the RAs for action.

A public registry for the project assessment has been established. This includes identification of the project assessment in the Canadian Environmental Assessment Registry (CEAR), which can be accessed on the Internet web site of the Agency (www.ceaa.gc.ca). The CEAR reference number for the project is **07-03-30100**.

2.3.4 Funding to Participate in the Federal Environmental Assessment

Whether the environmental assessment proceeds by means of a comprehensive study or is referred to a mediator or review panel, participant funding will be made available by the Agency to facilitate public participation. This funding would become available after the federal Minister makes a Track Decision, i.e. to either refer the project back to the RAs to continue the comprehensive study process, or refer the project to a mediator or review panel. Information on the Participant Funding Program can be found on the Agency's website at http://www.ceaa-acee.gc.ca.

2.4 Joint Public Consultation

As is required in both federal and provincial environmental assessment processes, the public will be given an opportunity to participate in the conduct of the environmental assessment. The requirements for this participation are set out in Section 4.3 of this document.

If the environmental assessment continues as a comprehensive study, the public would also be provided with an opportunity to review the CSR prepared by the federal RAs. This review will be coordinated with the review of the proponent's EIS and the Technical Review Comments prepared by the provincial Environmental Assessment Branch. This final public review period must be a minimum of 30 days to meet provincial requirements and will be extended, if necessary, through consultation with the Project Administration Team as per the Cooperative Agreement.

The public will be requested to provide their comments on the EIS, Technical Review Comments and CSR to the Agency and/or SE. The federal and provincial ministers will take into account the CSR and Technical Review Comments, respectively, and any comments received from the public, prior to making environmental assessment decisions. The ministers may request additional information or require that public concerns be further addressed before issuing environmental assessment decisions.

3.0 PROPOSED SCOPE OF THE FEDERAL ENVIRONMENTAL ASSESSMENT

Scoping establishes the boundaries of the federal environmental assessment. The scope identifies what elements of the development proposal to consider and what environmental components are likely to be affected, and focuses the assessment on relevant issues and concerns.

3.1 Proposed Scope of Project

Pursuant to section 15 of the federal Act, the proposed scope of the project for the purpose of the federal environmental assessment, as established by the CNSC and NRCan, includes the physical works and activities associated with the decommissioning of the Gunnar site. These are:

- Demolition of existing buildings, facilities and structures;
- Appropriate disposal of materials resulting from demolition and remediation activities;
- Rehabilitation of existing waste rock piles;
- Rehabilitation of pit;
- Rehabilitation of mill tailings;
- Rehabilitation of additional risk(s) as warranted;
- General site clean-up;
- Re-vegetation of areas of the rehabilitated site as required; and
- Appropriate monitoring during and after rehabilitation.

3.2 Proposed Scope of Assessment

The scope of assessment defines the factors proposed to be considered in the environmental assessment and the proposed scope of those factors.
The RAs are required to consider the factors specified in section 16 of the federal Act, taking into consideration the definitions of the environment, environmental effect and project, prior to making a decision regarding whether to take action that would permit the project to proceed.

3.2.1 Proposed Factors to be Considered

As stated in the federal Act, “environmental effect” means, in respect of a project:

(a) any change that the project may cause in the environment, including any change it may cause to a listed wildlife species, its critical habitat or the residences of individuals of that species, as those terms are defined in subsection 2(1) of the Species at Risk Act,
(b) any effect of any change referred to in paragraph (a) on
(i) health and socio-economic conditions,
(ii) physical and cultural heritage,
(iii) the current use of lands and resources for traditional purposes by Aboriginal persons, or
(iv) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, or
(c) any change to the project that may be caused by the environment.

As described in subsections 16(1) and (2) of the federal Act, an environmental assessment conducted as a comprehensive study shall include a consideration of the following factors:

- The environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;
- The significance of the effects referred to in the previous paragraph;
- Comments from the public that are received in accordance with the cooperative environmental assessment process;
- Measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project;
- The purpose of the project;
- Alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means;
- The need for, and the requirements of, any follow-up program in respect of the project; and
- The capacity of renewable resources that are likely to be significantly affected by the project to meet the needs of the present and those of the future.

Accordingly, the EIS should include information for each of the above factors.

Further to subsections 16(1) and (2) of the federal Act, the CSR will consider the factors listed above and document any issues and concerns that may be identified through any regulatory, stakeholder and/or public consultation.

3.2.2 Proposed Scope of the Factors to be Considered

The proposed scope of the factors to be considered by the RAs in the comprehensive study includes the following list of environmental components likely to be affected. Additional information on these factors can be found in Section 4 of this document:

- Climate, Meteorology and Air Quality;
- Geology/Geomorphology;
- Hydrogeology;
- Surface Hydrology;
- Water Quality;
- Sediment Quality;
- Fish and Fish Habitat;
- Navigation;
- Soil Quality;
- Terrestrial Ecology;
- Heritage Resources; and
- Socio-Economic Environment.

3.2.2.1 Traditional Knowledge

The proponent's Environmental Impact Statement will include a specific section on the incorporation of traditional knowledge.

3.2.3 Valued Ecosystem Components

The assessment will consider potential effects the project may have on the environment and other aspects considered to be Valued Ecosystem Components (VECs). VECs of interest in this area will be chosen through consultation with northern residents through the Environmental Quality Committee (EQC)[1], incorporating traditional knowledge and land use. The most recent list of VECs includes the following:

Terrestrial Receptors:

- Birds – Mallard, Eagle, Merganser, Ptarmigan/Grouse, Scaup;
- Terrestrial Mammals – Bear, Woodland Caribou, Barren Ground Caribou, Snowshoe Hare, Moose, Wolf, Lynx;
- Terrestrial Vegetation – Blueberries, Labrador Tea, Lichen, Cranberries, Browse, Rosehips; and
- Humans.

1 The Environmental Quality Committee (EQC) was established to provide a forum to ensure consideration of concerns and recommendations of northerners on the way in which uranium development occurs in northern Saskatchewan. The EQC is currently made up of 32 representatives from "impact communities" (municipal and First Nations). Increasingly, over the years that the EQC has been operating, the EQC has become a more informed and regular voice, providing input into the decisions of both provincial and federal regulators concerning uranium mining issues in the North.

Aquatic Receptors:

- Aquatic Vegetation – Algae, Pond Lily, Pondweed;
- Consumers of Primary producers – Zooplankton, Chironomids, Sphaerids;
- Fish – Northern Pike, Lake Whitefish, Lake Trout, White Sucker; and
- Aquatic Mammals – Beaver, Muskrat, Otter, Mink.

SRC is to confirm and/or update the current VEC list with the EQC.

3.2.4 Spatial and Temporal Boundaries

Impacts with respect to spatial and temporal boundaries may vary depending on the factor being considered, and the assessment of these impacts should consider:

- Timing/scheduling of project activities;
- Natural variations of an environmental component;
- The time necessary for an effect to become evident, taking into account the frequency of the effect as well;
- The time required for recovery from an impact, including the estimated degree of recovery;
- Cumulative effects;
- Comments from the public; and
- Traditional knowledge and land use.

The proponent should clearly define (in text and maps) the rationale for the spatial boundaries that are used in the environmental assessment. The spatial boundaries should be determined specific to each factor being considered to effectively assess the potential environmental effects of the project. The study area, i.e., the geographic scope of the investigations, should include those local areas directly impacted by the undertakings associated with the project and also the zones within which there may be environmental effects that are cumulative, regional or global in their nature. The temporal scale of the assessment must encompass the entire lifespan of the rehabilitation project, and will include construction, operation (including maintenance and/or modifications), decommissioning, reclamation and abandonment of project components, as well as completion of a fish habitat compensation plan, if one is required.

4.0 PROJECT-SPECIFIC GUIDELINES

Section 4 of this document outlines the specific studies that should be undertaken and the information that should be obtained as part of the EIA, and how these should be presented and evaluated in the proponent's EIS. This section describes what would conventionally be understood as Draft Project-Specific Guidelines under the Province of Saskatchewan's environmental review process and also provides further detail about what the federal RAs propose to include in their scope of factors to be

considered. The guidelines portion of this document has been developed with input from provincial and federal experts. These guidelines reflect issues that have been raised by federal and provincial officials regarding the proposed rehabilitation of the former Gunnar mine site and identify the information that should be included in the EIS.

The EIA should focus on the identification of potential options for site rehabilitation activities (see subsection 4.2) and assess the potential for these options to eliminate or reduce environmental and public safety hazards at the site and minimize the risks to the environment and the public in the future. Performance goals, objectives, and decision criteria should be clearly understood before the assessment is initiated, and described in the EIS.

Information provided in the EIS that is related to the proposed Gunnar site rehabilitation plan should be complete and detailed. Existing information on environmental parameters for the Gunnar site that will not be affected by the proposed rehabilitation activities, or information which is cited to provide context for the discussion of potential impacts, may be referenced and provided in summary form.

Public consultation is an integral component of EIA, requiring stakeholders to be fully informed about a proposed project, and the preparation of a public involvement plan (see subsection 4.3). The identification and assessment of potential options for site rehabilitation activities at the Gunnar site, and the selection of the preferred options for specific activities, should be discussed with regional residents, Aboriginal peoples, organizations and other stakeholders.

The EIS should provide a thorough description of the existing physical and environmental conditions at the Gunnar site (see subsection 4.5) and an assessment of the current and/or potential hazards these conditions represent in the short and long terms to the environment and to public safety.

The EIS should also provide a description of existing off-site environmental conditions that potentially could be affected by the Gunnar rehabilitation project. These off-site conditions would allow assessment of any potential off-site impacts due to the project and contribute to the criteria under which abandonment is determined.

Should the proposed plan to rehabilitate the former Gunnar site be found environmentally acceptable provincially and not likely to cause significant adverse environmental effects taking into account the implementation of mitigation measures as per the federal Act, the SE and the CNSC would consider the proponent's application for the necessary approvals, permits and licences that would regulate the rehabilitation plan, and NRCan and the Province of Saskatchewan would consider funding the project. SRC would have to comply with all applicable provincial and federal laws.

These guidelines should not be considered as either exhaustive or restrictive, as concerns other than those already identified could arise during the investigations associated with the EIA.

Reference to SE's General Guidelines for Conducting an Environmental Impact Assessment[2] is recommended. In addition, SE, the RAs and the FAs are prepared to provide advice and assistance throughout the EIA with regard to the identification of environmental concerns and appropriate assessment methodologies.

4.1 EIS Executive Summary

An executive summary of the EIS is required. It should briefly summarize and cross-reference the EIS under the following topic areas:

- Description of the project;
- Purpose of, need for, and alternative means of carrying out, the project;
- Environmental effects of the project, including those from potential spills, malfunctions, or accidents;
- Any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;
- The significance of the environmental impacts and technically and economically feasible mitigation measures;
- Renewable resources that are likely to be affected significantly by the project, including current use of lands and resources for traditional purposes by Aboriginal persons;
- Comments from the public and SRC's responses;
- Identification of uncertainties in regards to the project elements and/or environmental effects of the project, including those of a chemical, physical, and/or radiological nature; and
- The need for, and the requirements of, a follow-up program in respect of the project.

The executive summary, which can be under separate cover, should avoid the use of technical terms and jargon. To enhance involvement of northern Saskatchewan residents and First Nations in the public participation process, the executive summary should be translated into each Aboriginal language, Cree and Dene, and made accessible in video or audio form.

[2] Saskatchewan Environment Environmental Assessment Branch. January 1996. The Saskatchewan Environmental Assessment and Review Process.

4.2 Project Description

The EIS should provide a comprehensive description of the conceptual elements of the Gunnar mine site rehabilitation project, including the need for the project, the development of the rehabilitation plan, the implementation of the plan, the development of monitoring programs for the completed works and the identification of the mechanisms for final abandonment and return of the site to institutional control[3].

The EIS should also describe project management and the integration of environmental, social and economic factors, occupational and public health and safety, and public consultation into the overall project. It should also provide a statement of the radiological and hazardous substance design objectives for the project.

Local and regional maps with identifiable features should be provided to show the location of the project and the status of current land dispositions for the Gunnar site and adjacent lands.

The EIS should include a comprehensive list of the applicable federal and provincial legislation, regulations and guidelines that will apply to the planning and implementation of the proposed project. The proponent should also briefly describe (in tabular form) the activity(s) requiring approval, the project stage the approval or the permit will be required at, the regulatory agency in charge for the approval or permit, name of the approval or permit, and associated legislation/regulation.

4.2.1 Purpose of and Need for the Project

The EIS should establish the purpose of and need for the Gunnar Mine Site Rehabilitation Project and identify ownership and management responsibilities for the project. Under the federal Act, "purpose of" the project is defined as what is to be achieved by carrying out the project, where as “need for” is defined as the problem or opportunity the project is intending to solve or satisfy. That is, “need for” establishes the fundamental rationale for the project.

A concise history of the Gunnar uranium mine development should be provided in order to place the proposed Gunnar Mine Site Rehabilitation Project in context.

4.2.2 Development of the Rehabilitation Plan

Site Characterization and Risk Assessment

[3] Prior to the site being reverted back to provincial 'institutional control' i.e. responsibility of the province, the proponent would need to apply for and be issued an abandonment licence under the *Nuclear Safety and Control Act*. For additional information, please refer to CNSC’s March 2007 document entitled “Licensing Process for New Uranium Mines and Mills in Canada”.

The EIS should contain a complete and detailed site inventory including but not restricted to the abandoned physical structures (mill, mine infrastructure, maintenance and storage buildings, offices, residences); locations of drill holes and flowing bore holes, if applicable; historical locations of structures no longer in place (including drum storage and tank farms, etc. that may have impacted soils and groundwater); physical surface works (roads, pipelines, powerlines, drainage works, etc.); effluent treatment systems; waste disposal sites (including those for tailings, waste rock, sludges, sewage, chemicals, garbage, etc.); and residual and hazardous wastes, as well as contaminated soils and sediments that are present at the former Gunnar mine site. Waste materials should be characterized chemically, physically and radiologically and evaluated for their potential as environmental contaminants.

In particular, any residual materials produced by mining should be analyzed to determine whether they are mineralized, non-mineralized or potentially acid generating. Analytical results should include but not be limited to physical, chemical, and radiological characteristics; key metal contaminants; leachate data; oxidation potential; and quantity and quality of any airborne emissions (e.g., SOx, NOx, dust, radon, and radionuclides). Any runoff or leachate from stockpiles or potentially contaminated areas should be characterized.

The current environmental status of the abandoned Gunnar pit should be described in detail with particular emphasis on water quality and hydraulic connections to local and regional surface and ground water systems.

Relevant details of prior studies or evaluations of the Gunnar site should be reviewed and incorporated where appropriate. The proponent is requested to supply a comprehensive reference list of documentation that has been compiled for the Gunnar site.

A key component of the development of the Gunnar rehabilitation plan will be the identification of the risks to the environment and to the public from the abandoned Gunnar mine site. The potential environmental and public hazards associated with the abandoned features of the mine should be identified and an assessment of the current level of risk to the environment and the public from these hazards should be conducted. The EIS should provide an overview of the nature and source of any potentially significant risks, including radiological risks, from the project to the workers and the public.

The environmental database in the EIS should identify environmental contaminants at the former Gunnar mine and evaluate the current levels of impacts on air quality, surface water and groundwater quality, soil, sediment, flora and fauna from these contaminants. An evaluation should be undertaken of these contaminants assessing whether, in the future, the contaminant levels would remain stable or would increase or decrease with or without rehabilitation activities. The proponent should address all contaminants of concern at the site, including contaminants not directly related to mining and milling operations. Areas of concern could include but may not be

limited to the former tank farm, maintenance shop, sewage treatment facility and garbage disposal area.

Risk assessment guidance documents from the Canadian Council of Ministers of the Environment (CCME), and metal-specific guidance from the United States Environmental Protection Agency (USEPA), the International Council on Mining and Metals (ICMM), and Health Risk Assessment Guidance for Metals (HERAG) should be consulted for further information on standard risk assessment methodologies[4].

Identification of Rehabilitation Options/Alternative Means of Carrying out the Project

The EIS should provide a detailed description of the rehabilitation options, documenting the pros and cons of each option for the Gunnar site based on the identification of the current and potential hazards and levels of risk to the environment at the site. The preferred option(s) should be identified and justified.

The EIS should discuss, in detail, the criteria (environmental, engineering, economic, scientific, public and Aboriginal concern) used by SRC to evaluate alternative means and/or options for the rehabilitation plan and justify the environmental acceptability of the preferred option using these criteria. Alternative means are defined as the various technically and economically feasible ways that the project can be implemented. The discussion should describe how radiological doses to workers and the public were considered in the assessment.

The criteria used to evaluate alternative means should reflect the potential concern for both the short-term (during implementation of the plan) and long-term (after abandonment of the rehabilitated Gunnar site) physico-chemical stability and environmental impacts of the project.

An important factor to consider, when developing rehabilitation options and the scope of physical rehabilitation works, is the impact of natural biological and geochemical processes on the site since it closed in 1964. Since this time, natural processes may have mitigated site hazards and reduced the level of risk to the environment and the public. If natural mitigation has been significant, the current level of risk to the environment and to the public may be acceptable without additional physical rehabilitation work. Proposed physical rehabilitation work should be evaluated in terms of the current level of risk to the environment and of the potential for disturbance to effective natural mitigation processes.

The EIS should identify the objectives of the rehabilitation plan and address:

4 Specific references include: 1) CCME. 1996. A Framework for Ecological Risk Assessment: General Guidance; 2) CCME. 1997. A Framework for Ecological Risk Assessment: Technical Appendices; 3) USEPA: http://www.epa.gov/osa/metalsframework/; 4) ICMM: http://www.euras.be/eng/project.asp?ProjectId=67; http://www.herag.net/; 5) HERAG: http://www.herag.net/.

- Post-rehabilitation landforms and drainage systems;
- Post-rehabilitation land use options for the Gunnar site; and
- Any potential opportunities to enhance environmental benefits.

The EIS should describe:

- Removal, disposal and rehabilitation procedures for all abandoned mine, mill and waste management structures and surface disturbances, including identification of radiological criteria for defining material as "clean" for the purpose of removal from the site;
- Salvage of materials from structures;
- Environmental mitigation and reclamation measures, including contouring, stabilization of waste rock and soil materials, rehabilitation of mill tailings, and re-vegetation procedures;
- Salvage and proposed reclamation use, and (if applicable) disposal of organic material (soils, tree seeds, merchantable and unmerchantable timber, slash and debris); and
- Any technical issues or technological requirements specific to the project.

Specifically, the proponent should document in the EIS how the plan will address methods to isolate hazards that are potential contaminant sources from surface and ground waters, and evaluate potential post-rehabilitation contaminant loadings from the rehabilitated Gunnar site to local surface drainage systems and groundwater.

The proponent should identify and document in the EIS any hazards that cannot be mitigated by the proposed rehabilitation plan and that would require long-term management.

The EIS should include performance goals and objectives for the rehabilitation plan, including decision criteria to determine the need to adjust mitigation, continue monitoring as designed, modify monitoring or conclude mitigation and monitoring.

4.2.3 Implementation of the Rehabilitation Plan

The EIS should provide a description of the proposed logistics and implementation of the rehabilitation plan. This should include:

- Anticipated commencement and schedule;
- Estimated manpower and skill requirements;
- Manpower housing and support facilities;
- Materials, transportation, and power requirements;
- Transportation of decommissioning equipment to the Gunnar site;
- Transportation of any materials from the site (if necessary);
- Construction and decommissioning of any roads built to facilitate rehabilitation activities;
- Any proposed use of the Uranium City airport and anticipated level of service;

- Sourcing of materials;
- Equipment requirements and maintenance;
- Worker health and safety considerations, including conventional and radiological concerns;
- Fire prevention and suppression programs, including wildfire;
- Emergency measures; and
- Contingency plans or procedures.

4.3 Public and Aboriginal Involvement

Regional residents and interested organizations should be fully informed of the proposal to rehabilitate the former Gunnar Mining Ltd. site. Potentially affected Aboriginal peoples must be provided with the information they need with respect to the project and its potential impacts. The proponent must ensure that it engages with Aboriginal peoples who may be affected by the project and who have asserted or established Aboriginal rights, Aboriginal title or treaty rights.

The EIS should describe the program for consultation with northern residents and Aboriginal peoples. The program should promote a broader understanding of the project, the identified environmental and public hazards at the Gunnar site, and the current levels of environmental and public risk associated with these hazards. Efforts should be made to involve the public and Aboriginal peoples in the development of the rehabilitation plan, including the identification of issues and objectives, options for final land forms and end uses, alternative methods of rehabilitation, and the determination of the preferred alternative for rehabilitation.

Elements of the public information/consultation plan should involve the contribution of traditional knowledge to the development of the rehabilitation plan and the identification of VECs and any current and traditional uses of the Gunnar site and environs.

The consultation program also should provide a basis for discussion of enhancement of regional business and employment opportunities with these groups. Public involvement and any concerns raised should be documented and considered in the EIS.

The EIS should describe consultation activities that were conducted regarding the planning of the former Gunnar mine site rehabilitation project, as well as the results, and the ways in which SRC intends to address/has already addressed concerns identified by the public and Aboriginal peoples. That description should include the consideration and description of any asserted or established Aboriginal rights, title and treaty rights and the potential impact of the project on those.

As interest in the Gunnar Mine Site Rehabilitation Project may extend beyond the project area, SRC should be prepared to provide project information to, and address issues identified by, persons residing outside of the project area.

It is noted that, in the proposal, SRC discusses the formation of an Advisory Forum to facilitate public and stakeholder consultations regarding the development and implementation of the rehabilitation plan for the abandoned Gunnar site. SRC also identifies key stakeholders including First Nations, communities, planning groups, federal and provincial government agencies and industry groups. It is suggested that the provincial government agencies include: Northern Municipal Services, Saskatchewan Ministry of Municipal Affairs (community development and economic opportunities for local people); Saskatchewan Ministry of First Nations and Métis Relations (building co-operative relationships with Aboriginal peoples and consultation on Aboriginal and Treaty Rights), Mineral Sector Steering Sub-Committee of the Northern Labour Market Committee (maximizing northern training and employment and possible training co-funding through Multi-Party Training Plan); and the Population Health Unit with the Athabasca Health Authority, Keewatin Yatthé and Mamawetan Churchill River Health Regions (identification of stakeholders).

4.4 Description of Socio-Economic Environment

4.4.1 Land and Resource Use

The EIS should provide a description of existing and proposed future land and resource use at the project site and within the study boundaries, as well as any current use of lands and resources for traditional purposes by Aboriginal persons. The EIS should describe terrestrial and aquatic recreational activities, cultural activities and culturally significant sites, and use of renewable and non renewable resources (e.g. trapping, hunting, fishing, and gathering).

4.4.2 Business and Employment

The EIS should provide a description of employment opportunities, requirements (including skill levels), and training needed to implement the Gunnar rehabilitation plan. Jobs and contractor opportunities targeted for Northerners and commitments to potential local, regional and Saskatchewan suppliers should be noted.
It is noted that, in the proposal, SRC commits to provide a forum for meaningful discussion of enhanced regional business, training and employment opportunities.

4.4.3 Public and Occupational Health and Safety

The EIS should identify potential occupational health and safety concerns, both conventional (physical and chemical hazards) and radiological, that would require management during the implementation of the Gunnar rehabilitation plan. Programs for conventional and radiological worker health and safety should be described. Any previous reviews of the Gunnar site identifying potential hazards to public and worker safety should be referenced.

The EIS documentation should include:

- Calculations of radiation exposures of all employees at the Gunnar site during the rehabilitation project;
- Potential chemical hazards to workers, including inhalation, dermal, and incidental ingestion exposure pathways;
- Programs proposed to control worker radiation doses and intake of radioactive and chemical substances in airborne dust;
- Measures designed to provide for the health and safety of workers during the implementation of the rehabilitation project, including demolition of structures, cleanup of hazardous waste and dangerous goods, disposal of waste materials and earthmoving activities;
- The development of occupational health and safety training modules for site workers; and
- An assessment of the potential effects of any environmental changes on human health or the use of lands, waters and resources for traditional purposes by Aboriginal persons and on the quality of any country foods that may be harvested. Potential entry of contaminants of concern in liquid and airborne waste streams (e.g. radionuclides, heavy metals) into food chains and the terrestrial or aquatic environment should be described.

Programs should meet the regulatory requirements of *The Occupational Health and Safety Act*, 1993; *The Occupational Health and Safety Regulations*, 1996; *The Radiation Health and Safety Regulations*, 1993; *The Saskatchewan Mines Regulations*, 2003; *Nuclear Safety and Control Act*, 1997; and *Radiation Protection Regulations*, 2000.

The EIS should provide an assessment of the potential safety risks to the public following the completion of the implementation of the rehabilitation plan and following the final abandonment of the rehabilitated Gunnar site. The proponent should provide information on risks to the public from all routes of exposure, if any, to conventional (physical and chemical) and radiological, for all phases of the project.

4.5 Description of the Environment

4.5.1 Environmental Database

The EIS should contain a description of the local environment which may be reasonably affected by the proposed Gunnar Mine Site Rehabilitation Project and allow an evaluation and prediction of the potential environmental effects of the project. The EIS should discuss the extent to which historic exploration and industrial development activities have influenced the current status of the environment, fisheries, wildlife and resource use at the Gunnar site (i.e. the environmental footprint of the historic Gunnar development).

All environmental data that are included in the EIS should be collected using current and accepted methodologies and be made available to the federal and provincial

regulators in digital form. These methodologies should be consistent in order to allow comparative use of the data and facilitate ecosystem management.

The database in the EIS should provide a sound basis not only for the environmental impact assessment of the rehabilitation project, but also for environmental monitoring and post-rehabilitation abandonment. The environmental data should contribute to, and be in a form compatible with, the existing environmental effects monitoring database for the assessment of potential effects on a regional scale.

Therefore, the data in the EIS should satisfy the following criteria:

(i) That the baseline data accurately describe the existing environment that may be affected by the project as proposed, as well as relevant background/reference conditions;[5]
(ii) That the data provide a sound statistical basis for comparative monitoring to verify effects predictions, confirm effectiveness of mitigation and the development of sound abandonment procedures; and
(iii) That the EIS be self-supporting, in terms of data availability and presentation.

It is noted, however, that databases of environmental information have been compiled previously for the Gunnar site. Existing data on environmental parameters that will not be affected by the proposed rehabilitation of the Gunnar site, but are cited to provide context for the discussion of potential impacts, may be referenced or provided in summary form.

4.5.2 Climate, Meteorology and Air Quality

Any current databases of climatic, meteorological and air quality information, including dust, radon and gamma radiation data, should be referenced in the EIS. Any implications for the project e.g., effects on hydrologic balances, airborne dispersal of dust, arising from on-site conditions should be discussed. Any use of off-site data must be thoroughly discussed and qualified with an understanding of local and regional variability and the geographic locations of on-site and off site meteorological stations.

The EIS should include a description of baseline radiological conditions of sufficient detail to allow the impacts of the project to be assessed using subsequent monitoring information. This would include but not be limited to the results of surveys of the radiological conditions of the existing environment, including a description of any significant gaps or uncertainties in the measurements.

5 For baseline data, two references are available: 1) CANMET Natural Resources Canada and INTEMIN SEGEMAR. 1998. Baselining: A Reference Manual, 1st edition, and 2) Mines Pollution Control Branch. 1989. Environmental monitoring guidelines for operational monitoring at uranium and gold mining and milling operations in Saskatchewan.

The EIS should include the current status of the Gunnar site with respect to climate change parameters.

4.5.3 Geology/Geomorphology

The EIS should contain a description of the regional and local geology and geomorphology of the Gunnar site sufficient to discuss the implications of the proposal to rehabilitate the Gunnar site. Relevant information should be discussed in terms of any potential effects on the project (e.g., ground stability, slumping and piping and material weathering and acid/metal release).

Any other geological features, such as faults, fractures, shears, and seismic activity that may have an impact on the project should be identified and their significance described.

4.5.4 Hydrogeology

The EIS should contain a description of the existing regional and local hydrogeology, including the stratigraphic, hydrogeological, geophysical and geochemical properties of the geological units, such as the permeability, porosity, retardation factors, fractures and fault zones, etc. It should provide an understanding of the regional and local ground water flow patterns and rates, recharge and discharge zones, and an assessment of the interaction between the hydrogeology and the proposal. The scale should be sufficient to reflect features of the Gunnar pit, waste rock/special waste disposal sites and main tailings area, drill holes, etc.

4.5.5 Surface Hydrology

The EIS should provide information on the regional and local hydrology, including data on watershed areas, drainage patterns, precipitation, evapotranspiration, water balance of natural and man-made water bodies (lakes, rivers, ponds, etc.), records and statistics (frequencies) of water levels and flows rates. The scale should be sufficient to reflect features of the Gunnar pit, waste rock/special waste disposal sites, main tailings area, drill holes, flowing boreholes, etc. There should also be a discussion of the interaction between the hydrology, hydrogeology and the proposed project and the impact under current and changing climate conditions.

The proponent should note that any works involving the diversion of surface waters would require approval by the Saskatchewan Watershed Authority.

4.5.6 Water Quality

The EIS should discuss the existing surface and ground water quality within the project boundary as well as in the background. It should provide the sampling parameters, frequencies, locations, history and analyses of the results varying with time. The anticipated quantity, quality and flow rates of surface and groundwater likely to be affected by the proposal should be provided.

4.5.7 Sediment Quality

The EIS should discuss the existing sediment quality of any potentially affected waters in and around the Gunnar site. The EIS should include physical, chemical, and radiological sediment data, including the sampling parameters, frequencies, locations, history and analyses of the results varying with time.

4.5.8 Fish and Fish Habitat

For the purpose of the assessment, "fish" refers to all life stages of resident fish, shellfish and crustaceans. "Fish Habitat" refers to the spawning grounds, nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life support processes.

Relevant information on fish and fish habitat likely to be affected (positively or negatively) by the proposed Gunnar Mine Site Rehabilitation Project should be included in the EIS. Sufficient physical, chemical, radiological and biological data should be obtained to quantify any gains or losses in the productive capacity of fish habitat resulting from the proposed Gunnar Mine Site Rehabilitation Project. This information should include the following:

- Biological indicators for the project area, including a rationale for their selection;
- Data on benthic invertebrate species composition and abundance;
- Fish abundance/density and biomass; fish species diversity, growth rate and condition for various fish species for various trophic levels; fish movement and migration patterns; and habitat use according to fish species, life stage, time of year, etc. for both waterbodies and watercourses within the project area;
- Information on fish species designated as "rare", "endangered", "threatened" and "species of special concern" under the *Saskatchewan Wildlife Act*, the *Species at Risk Act* (SARA), and/or the Committee on the Status of Endangered Wildlife in Canada (COSEWIC)[6].
- Fish habitat assessments, through collection of data on bathymetry, substrate type, aquatic vegetation, etc., and the identification of important or limiting habitat types (e.g., spawning habitat) for both waterbodies or watercourses within the project area;
- Sediment quality and limnology of any potentially affected waters adjacent to the Gunnar site; and
- Results of any previous studies at the Gunnar site predicting impacts to water quality, sediment quality, benthic invertebrates, fish, fish habitat and aquatic vegetation. The EIS should comment on how representative the results are over space and time and biological populations; clearly separate factual lines of evidence from inference; and state any limitations on the inferences or conclusions that can be drawn from the results.

6 See www.cosewic.gc.ca

The proponent should note that provincial Special Collection Permits will be required for components of the fish data collection program.

The EIS should identify the species within the aquatic environment that are important components of food chains leading to, and used by, people living in the region. The status of these species in the impact area in regards to their relative abundance and any measured levels of contaminants in their tissues, especially heavy metals and radionuclides, should be documented. The bioassay methods used should be indicated.

The proponent should note that meeting the requirements of the *Fisheries Act* is mandatory, irrespective of any other regulatory or permitting system. Subsection 35(1) of the *Fisheries Act* states that no person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat. Under subsection 35(2) no person contravenes subsection 35(1) by causing the alteration, disruption or destruction of fish habitat by any means or under any conditions authorized by the Minister or under regulations made by the Governor in Council under the *Act*. Subsection 36(3) of the *Fisheries Act* specifies that unless authorized by federal regulation, no person shall deposit or permit the deposit of deleterious substances of any type in water frequented by fish, or in any place under any conditions where the deleterious substance, or any other deleterious substance that results from the deposit of the deleterious substance, may enter any such water.

The legal definition of deleterious substance provided in subsection 34(1) of the *Fisheries Act*, in conjunction with court rulings, provides a very broad interpretation of deleterious and includes any substance with a potentially harmful chemical, physical or biological effect on fish or fish habitat.

4.5.9 Navigation

SRC's 2007 project proposal includes a number of potential remedial options that will be investigated as part of the environmental assessment process. Should the preferred alternatives have the potential to impact navigation, SRC would be required to submit an application to Transport Canada's Navigable Waters Protection Program. This application should be done as early as reasonably possible to avoid potential future delays.

To satisfy requirements under the federal *Navigable Waters Protection Act*, the following details should be provided in the application and should be summarized in the EIS:

- All proposed works in, on, over, under through or across any navigable waterway must be clearly identified;
- An appropriately scaled map illustrating the location of all in-water works;
- Latitude and longitude at proposed work locations;
- Chart and topographic map number;

- Photographs of the proposed work location (across, upstream and downstream views are required);
- Name of waterways and dimensions of these waterways (width and depth at point of crossing);
- Any known waterway users (including recreational, commercial and traditional) should be identified and details regarding any consultations with these user groups and/or individuals;
- Detailed drawings (both plan and profile views) of the proposed in-water work;
- Plans and descriptions of all temporary works including coffer dams, temporary crossings, or other infrastructure;
- A description of proposed construction schedules and methods for all in-water works; and
- Details regarding the predicted impacts on navigability that result from a change in the environment and a description of any proposed measures for the protection of navigation safety during and upon completion of the project.

Based on the information, the predicted impacts to navigation should be determined and measures should be proposed to improve navigational safety.

4.5.10 Soil Quality

The EIS should discuss the existing soil quality (including both disturbed and undisturbed sites) at the Gunnar site. The EIS should include information on soil profiles, including thickness of organic and mineral horizons and buffering capacities, as well as suitability for reclamation. Analyses of selected soil parameters should establish baseline conditions for monitoring potential contaminant movement and/or contaminant accumulation. Sample site selection should be sensitive to prevailing wind direction. Sample site selection should also be sensitive to plume dispersion due to the drainage pattern and the groundwater flow direction.

4.5.11 Terrestrial Ecology

Relevant information on terrestrial ecology likely to be affected by the proposed Gunnar Mine Site Rehabilitation Project should be included in the EIS. The information should address:

- Description of plant communities, including species lists, dominant species and densities for canopy, understory and ground cover;
- Numbers and characteristics of any potentially affected wildlife species e.g., woodland caribou, moose, bear, aquatic and riparian furbearers, avifauna, sensitive habitats, resident/migrant populations and species with commercial and/or subsistence values as well as their critical habitats;
- Any “rare”, “endangered”, “threatened” and plant or animal “species of special concern” that may occur in the study area that are listed in SARA, the *Saskatchewan Wildlife Act* and/or by COSEWIC shall be identified.

Relevant data on potentially affected vegetation, including rare, endangered and/or threatened flora, should be described for the project area. Analyses of selected vegetation parameters should establish baseline conditions for monitoring potential contaminants and/or contaminant accumulation. Sample site selection should be sensitive to prevailing wind direction, topography. Sample site selection should also be sensitive to plume dispersion due to the drainage pattern and the flow of ground and surface water.

The EIS should identify species that are important ecological receptors including species within the terrestrial environment that are important components of food chains leading to, and used by, people living in the region. The status of these species in the impact area in regards to their relative abundance and any measured levels of contaminants in their tissues, especially heavy metals and radionuclides, should be documented. In particular, due to the mercury levels reported in fish from the Gunnar Pit, the level of mercury in the tissues of species found in proximity to the Gunnar Pit should be considered.

The EIS should outline what precautionary measures will be taken to prevent the introduction of exotic (non-native) species into the area.

The EIS should address results of any previous studies at the Gunnar site that predicted impacts to wildlife and plants. It should comment on how representative the results are over space and time and biological populations; clearly separate factual lines of evidence from inference; and state any limitations on the inferences or conclusions that can be drawn from the results.

4.5.12 Heritage Resources

In the EIS, the proponent should note that following their review of the proposal, the Heritage Resources Branch, Saskatchewan Department of Culture, Youth and Recreation advised that, since the proposed Gunnar Mine Site Rehabilitation Project would take place in the footprint of the former mine disturbance, the Heritage Resources has no further concerns with the project proceeding as planned. The proponent should confirm these conclusions with local First Nations during the conduct of the EIA.

The proponent is to identify any historical artefacts that could be preserved to commemorate mining history.

4.6 Environmental Impact Assessment

4.6.1 General Concepts

An assessment of the potential environmental effects of the Gunnar Mine Site Rehabilitation Project, and their significance, must be described in the EIS. This assessment should be supported by technical data in sufficient detail and scope to ensure an accurate assessment of the potential environmental impacts of the project,

the likelihood of significant adverse effects, and whether the Gunnar Mine Site Rehabilitation Project could be justified on environmental grounds. The assessment should allow a determination whether the Gunnar Mine Site Rehabilitation Project would potentially affect the current use of lands and resources for traditional purposes by Aboriginal persons.

The assessment also should include the potential environmental effects of malfunctions or accidents that may occur in connection with the project. Any residual environmental effects that cannot be mitigated by the Gunnar Mine Site Rehabilitation Project should be identified and their significance discussed.
The changes that would occur to the Gunnar site as a consequence of implementing the proposed rehabilitation plan, and the potential environmental impacts of the rehabilitation plan, should be placed in context with the existing environmental conditions (i.e. current biological conditions on site). The proponent must also provide data on undisturbed conditions (i.e. identify environmental conditions off-site which might reasonably be affected by the project).

4.6.2 Assessment Methodology

The assessment methodology must be described in the EIS, and should follow the general methodology listed below:

- Identify the potential interactions between all project activities and the existing environment during all phases of the project;
- Describe the resulting changes (positive and negative, direct and/or indirect) that would likely occur to the components of the environment and VECs as a result of the identified interactions with the project. Quantitative ecological risk assessment modeling and qualitative methods should be used to identify and describe the likely adverse environmental effect. As indicated in subsection 4.2.2, the proponent is advised to refer to CCME guidance on risk assessment;
- Identify and describe technically and economically feasible mitigation measures that may be applied to each likely adverse environmental effect (or sequence of effects). Mitigation strategies should reflect avoidance, precautionary and preventive principles. Describe how each mitigation measure proposed will affect the effect based on the assessment criteria used above, e.g., implementation of mitigation measure “X” will result in a “Y” change to the potential adverse environmental effect; and
- Describe the significance of the residual environmental effects that will likely occur as a result of the project, having taken into account the implementation of the proposed mitigation measures (i.e. residual environmental effects). For each identified effect, the predicted magnitude, timing, duration, frequency of occurrence, degree of reversibility, geographic extent, temporal boundaries (short or long term), probability of occurrence, and ecological context (sensitivity of the valued ecosystem components (VEC) to environmental disturbance) should be considered in determining if it is a likely significant adverse effect. The EIS must clearly explain the method used to determine effects level for each of the above

listed determinants and how these levels were combined to produce an overall conclusion. This method should be transparent and reproducible. All applicable federal and provincial laws must be respected.

The results of the assessment process should be clearly documented in the text as well as in summary matrices and tables. The analysis must be documented in a manner that readily enables the reader to draw conclusions on the significance of the environmental effects.

The assessment should consider scientific analysis of ecosystem effects, along with traditional ecological knowledge, local knowledge and available experience in determining the significance of potential effects. Mitigation to manage or avoid adverse effects shall be described for these components and for each undertaking in relation to the project.

4.6.3 Project-Specific Impacts

The EIS should document and evaluate the significance of positive and adverse project-related impacts of the rehabilitation project on all components of the environment. The EIS should specifically state whether the predicted project-related impacts would alter the current levels of environmental impacts associated with the abandoned Gunnar mine site.

Impact predictions should be categorized according to defined criteria, and should be as specific and quantitative as possible. Source terms for potential surface water, ground water and atmospheric impacts, together with any contaminant transport and plume dispersion modeling results should be provided. The results of field monitoring studies and quantitative ecological risk assessment modeling should be used to derive predictions of bio-physical impact, including details of model verification (peer review of model theory), calibration (site-specific adjustment), corroboration (comparison of predicted and observed), sensitivity and uncertainty analysis. It must be clear how predicted effects to the biota exposed to the project stressor compare to the expected “reference condition” for unexposed biota on a biological population basis, taking into account natural variation. All assumptions and levels of uncertainty related to potential adverse effects should be documented.

Specific guidance on assessing effects to human health, surface and groundwater and the atmosphere are provided below. However, the EIS shall include assessment of all potentially impacted environmental components.

Guidance on Assessing Potential Impacts to Human Health

The EIS should assess the potential effects of any environmental changes on human health or the use of lands, waters and resources for traditional purposes by Aboriginal persons and on the quality of any country foods that may be harvested. Potential entry of contaminants of concern in air, liquid and airborne waste streams, e.g., radionuclides, heavy metals, into food chains and the terrestrial or aquatic

environment should be described and any potential impacts and benefits from decommissioning activities should be determined.

Effects to local resources (e.g., surface and groundwater, fish, food, fur animals and plants), habitat losses and resource disruption can affect activities such as subsistence hunting and fishing, gathering, outfitting, and ceremonial/burial sites for local First Nations and non-First Nations resource users. A health impact assessment of these potential effects for people using First Nations traditional lands and public lands shall be conducted. The potential for any effects to the quality and quantity of local foods and the sport fishery also needs to be assessed from the perspective of human health impact(s).

An exhaustive list of potential contaminants that could result from the project, and those that are currently on-site, in vegetation and wildlife that would be consumed by humans shall be provided in the EIS. The proponent should also inventory and assess physical hazards to determine their risk to human health.

To assess whether a project may have adverse effects on workers or the public (including local First Nations and non-First Nations resource users) it is necessary to assess potential radiological doses to workers and the public. A dose assessment for workers and a health impact assessment for the public, including people using First Nations traditional lands and public lands, shall be conducted. The assessment should consider normal and accidental exposure conditions from expected airborne and waterborne releases as well as from other reasonably significant sources, e.g., transport, waste, for all phases of the project.

Please note that Health Canada recommends that the proponent determine an objective concentration of radioactivity in water and gamma radiation for rehabilitation purposes. For radiological constituents in water, the Maximum Acceptable Concentration (MAC) levels suggested for drinking water are usually used to be conservative (see Health Canada 2007, Tables 7 and 8)[7]. For gamma radiation, a dose rate should be determined based on a current acceptable risk and the exposure pathways being considered. The CNSC's *Radiation Protection Regulations* stipulate that doses to the public not exceed 1 millisievert per calendar year and that they must be as low as reasonably achievable (ALARA). In addition, it is recommended that for decommissioning projects, doses be based on reasonable-use scenarios developed in consultation with the public.

The Proponent must clearly identify the criteria and the content to be included in the human health assessment in the EIS. Key components of the human health assessment process include the identification of potential project-human interactions (potentially exposed groups of individuals and potential exposure pathways), radiological and chemical constituents of potential concern (COPC), human receptors

7 Health Canada. 2007. Guidelines for Drinking Water Quality: Summary Table. http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/doc_sup-appui/sum_guide-res_recom/index_e.html

and assessment criteria. Include the following information in the description of the human health assessment method:

- Predicted sources, quantities, and points of release of contaminants of concern including but not limited to radionuclides, heavy metals, and asbestos;
- Selection process for constituents of potential concern (an exhaustive list of potential contaminants that could result from the project in vegetation and wildlife that would be consumed by humans shall be provided in the EIS);
- Characterization of pathways to human receptors;
- Identification and characterization of human receptors; description of the use of lands, waters and resources for traditional purposes such as subsistence hunting and fishing, gathering, outfitting, and ceremonial/burial sites by Aboriginal peoples. Consumption of country foods should be quantified (see Canada North Environmental Services Limited Partnership, 1999)[8];
- Method used to convert radionuclide exposure and intake received by the various human receptors from the various pathways into a dose (e.g. intake values and conversion factors); and
- Criteria used to determine significance of impact from contaminants of concern (e.g. percentage of radiation dose limits and percentage of annual limit of intake).

Provide the following information for both the worker dose and human health assessment results:

- The resulting risk from radiation doses and chemical exposures that likely would occur to workers and the public as a result of interactions with the project.

Exposure of workers and the public to radiation and chemicals of potential concern should be assessed as a result of considering all reasonably credible routes of exposure, and (as applicable) age-dependant data, e.g., occupancy factors, breathing rates, dietary data , shielding data (for dwellings, other buildings). For public exposures this should be based on environmental fate modelling and available environmental monitoring data, while for workers this should be based on source term data and expected occupancy factors.

Guidance on Assessing Potential Impacts to Surface and Ground Water

A key element in the proposal to rehabilitate the former Gunnar mine site mine is the potential quality of local and regional surface and ground water systems following the rehabilitation of the site and its eventual abandonment. The EIS should address the following general impact assessment elements:

8 Canada North Environmental Services Limited Partnership. December 1999. Hatchet Lake Band Dietary Survey. Final Report. Project S.274.

- Hydrologic conditions and potential groundwater management problems e.g., permeability, porosity and fractures, and implications for containment/isolation of potential contaminants from groundwater systems;
- Predictions for any contaminant flows and concentrations of key metal contaminants e.g., arsenic, molybdenum, selenium, in any potentially impacted groundwater, surface waters and/or sediments based on current groundwater information and results from any environmental impact pathway and contaminant transfer pathway models, including model sensitivity analyses;
- Potential impacts on the local and regional hydrogeology, including re-establishment of any local and regional groundwater levels following completion of rehabilitation;
- Evaluation of the potential impacts on any adjacent surface waters, including regional lake levels and water/sediment quality;
- Contingency plans if contaminant migration predictions are not met, or if site-specific remediation objectives or risk management objectives are not met;
- Monitoring programs for potentially-affected surface and ground waters; and
- Potential effects of malfunctions, accidents or spills and contingency plans for mitigation and cleanup of spills to land or water (hazard identification including pathways to valued receptors, mitigation, environmental damage and recovery assessment, restoration).

If, at any location (e.g., waste rock storage areas), contaminated flows to the environment are anticipated the EIS should address:

- Short and long term aquatic environmental effects of the loading of chemical parameters on receiving waters and predicted mixing effect zone (water quality and sediment quality change);
- Potential impacts to benthic invertebrates, fish, wildlife and plants based on contaminant transport modeling results;
- Potential impacts on surface and ground waters;
- Evaluation of the aquatic and terrestrial environmental effects of this project using abiotic and biotic monitoring programs; and
- Current or proposed studies for the tracking of changes to aquatic, terrestrial and/or human health.

Potential impacts at any stream crossing locations along existing or proposed access roads should be identified and appropriate mitigative measures proposed. Setbacks of 90 m and 30 m, respectively, are required for development activities adjacent to fish-bearing and non-fish-bearing waters.

The potential impacts from all contaminant sources at the Gunnar site following implementation of the project should be combined to provide a cumulative assessment of potential contaminant loadings to the environment. This assessment should be discussed in the context of criteria for the design of monitoring programs and abandonment planning.

Guidance on Assessing Potential Atmospheric Impacts

The EIS should discuss whether the proposal to rehabilitate the Gunnar site would contribute to greenhouse gases and/or other climate change parameters.

4.6.4 Effects of the Environment on the Project

The assessment must take into account how the environment could adversely affect the project, e.g. effects from severe weather events, forest fires, or earthquakes. The assessment must consider any potential effects of climate change on the project, including an assessment of whether the project is sensitive to changes in climatic conditions during its lifespan e.g., impact on multi-year water balance calculations and/or impacts on permafrost.

Possible important interactions between the natural hazards and the project should be identified, followed by an assessment of the effects of those interactions, the available mitigation measures, and the significance of any remaining likely adverse effects on the project.

4.6.5 Effects on the Capacity of Renewable and Non-renewable Resources

The potential interactions between the project and the environment will be identified and assessed in order to determine the likelihood of interactions between the project and resource sustainability.

4.6.6 Mitigation and Contingency Planning

The EIS must identify and describe technically and economically feasible mitigation measures that may be applied to each likely adverse environmental effect. Mitigation strategies should reflect avoidance, precautionary and preventive principles. All mitigation measures described throughout the EIS must be documented in the mitigation section.

The EIS should also document mitigation and contingency plans which would be implemented in the event of any potential containment failures, spills, malfunctions, accidents or inadvertent waste releases associated with the project. The proponent should identify commitments for adaptive management measures to be implemented should monitoring or follow-up programs identify unreasonable or unforeseen environmental impacts.

Although the detailed mitigation and contingency plans would be designed in consultation with regulatory agencies during licensing, the EIS should document mitigation and contingency plans that would be implemented in the event of failures of the rehabilitation procedures.

A hazard analysis or other risk-based approach should be used to identify situations where mitigative measures may be needed, and if engineering or administrative

control solutions are not technically and economically feasible, then contingency plans should be developed.
The proponent should describe any legislation, regulations, guidelines, policies and specifications that will be adhered to during the rehabilitation project that will lead to avoidance or mitigation of adverse environmental effects.

4.6.7 Significance of Residual Adverse Environmental Effects

The EIS should describe the nature and extent of any residual environmental effects of the project including any residual contamination that is not addressed by the remediation project. As well, the EIS shall include a characterization as to whether residual environmental effects are significant or not significant, and the rationale for such characterization. It shall provide a detailed plan for responding to any known or predicted residual effects, and provide a procedure for identifying and responding to effects that were not predicted or foreseen. The proponent is encouraged to consult guidance materials from the Canadian Environmental Assessment Agency on determining significance of adverse environmental effects.

4.6.8 Cumulative Effects

The EIS should discuss whether existing environmental conditions, including effects from other former uranium developments in the area, would influence the project. The discussion should address whether the project-specific effects of the proposed Gunnar Mine Site Rehabilitation Project, combined with the impacts from existing and planned developments in the region would result in, or contribute to any cumulative environmental effects.

The Canadian Environmental Assessment Agency guidance documents on addressing cumulative environmental effects should also be consulted regarding the scope of cumulative impacts to be evaluated in the EIS[9].

4.7 Monitoring Programs for the Completed Rehabilitation Work

The EIS should identify the need for, and requirements of, any monitoring programs for the rehabilitated Gunnar site.

Although the detailed monitoring programs would be designed to satisfy federal and provincial regulatory requirements during licensing, the EIS should provide a description of proposed feasible monitoring procedures, including parameters, locations, sampling frequency and methodology. Taking into consideration improvements in monitoring techniques, the programs should be consistent with baseline data sampling methodology and be compatible with the existing regional environmental database.

9 Canadian Environmental Assessment Agency. 1999. Operational Policy Statement OPS-EPO/3-1999 Addressing Cumulative Environmental Effects Under the Canadian Environmental Assessment Act (http://www.ceaa-acee.gc.ca/013/0001/0008/guide_e.htm#cumulative); Canadian Environmental Assessment Agency. 1999. Cumulative Effects Assessment Practitioners Guide (http://www.ceaa-acee.gc.ca/013/0001/0004/index_e.htm).

The EIS should address:

- Monitoring programs for any potential environmental impacts, including potential contaminant loadings to plant and animal species that are significant in the food web and that are considered relevant Valued Ecosystem Components (VECs); and
- Monitoring programs for ground water and surface water quality in the vicinity of the rehabilitated Gunnar site.

Monitoring should ensure compliance with any regulatory requirements and also should allow the systematic audit of the implementation of the rehabilitation plan and the predicted success of the rehabilitation procedures. The monitoring programs, in verifying the success of the rehabilitation procedures, should confirm the design criteria for rehabilitation plan.

4.8 Follow-Up Program

The need for, and requirements of a federal 'follow-up program' in respect of the project is a requirement under the federal Act. The purpose of the follow-up program is to assist in determining if the environmental and cumulative effects of the project are as predicted and to confirm whether the mitigation measures are effective.

Information gathered during the follow-up will be posted on the CEAR, allowing others to review the results. Therefore, the monitoring program must describe a specific federal follow-up program that includes the detailed scope of the program together with schedule and reporting milestones. The federal follow-up may be a component of the larger monitoring program, but should be specifically defined and presented.

Effects, predictions, assumptions and mitigation actions that are to be tested in the follow-up monitoring program will need to be converted into field-testable monitoring objectives. The monitoring design should include a statistical evaluation of the adequacy of existing baseline data to provide a benchmark against which to test for project effects, and the need for any additional monitoring to establish a firmer project environmental baseline.

The follow-up program plan should be described in the EIS in sufficient detail to allow independent judgment as to the likelihood that it will deliver the type, quantity and quality of information required to reliably verify predicted effects (or absence of them), confirm EIS assumptions and confirm effectiveness of mitigation. The EIS should include a description of the objectives of the follow-up program, the elements of the plan required to achieve the objectives, the implementation plan and reporting commitments.

The follow-up program should include an assessment of radiation exposures to members of the public using environmental monitoring results collected after

implementation of the project. The program should be designed to collect information to replace important assumptions and reduce measurement uncertainties. The CNSC would ensure the implementation of any required follow-up program through the licensing and compliance process.

4.9 Site Abandonment and Return to Institutional Control

The EIS should include proposed criteria for abandoning the rehabilitated Gunnar mine site and commitments for monitoring the success of the rehabilitation work prior to final abandonment of the site.

Provisions for the long-term institutional control should be discussed, including, but not being limited to:

- Record keeping or archiving that fully describes the current site conditions, the rehabilitation plan and completed works, assessments, final configurations, and release verification;
- Post-abandonment site monitoring and verification;
- Need for passive site management;
- Land use controls; and
- Long term financial liabilities for monitoring, care, and maintenance, or contingency remediation.

4.10 Summary

The EIS should provide a concise, complete statement of the anticipated net environmental costs and benefits of the proposed rehabilitation of the former Gunnar mine site in both the short and long-terms. The discussion should include, if possible, any intangible costs and benefits that cannot be expressed in economic terms.

To satisfy requirements under the federal Act, this statement must include conclusions specifically on whether the project is likely to cause significant adverse effects on the environment.

Appendix 2

Copy of newspaper notice advertising request for public comment on *Draft Project-Specific Guidelines and Comprehensive Study Scoping Document*

Canada Saskatchewan

Public Notice

Public Comments Invited on the Draft Project-Specific Guidelines and Scoping Document for the Proposed Former Gunnar Mine Site Rehabilitation Project

The Saskatchewan Research Council (SRC), on behalf of the Governments of Canada and Saskatchewan, is proposing to rehabilitate the former Gunnar mine site, located on the north shore of Lake Athabasca in northern Saskatchewan.

The proposed project involves the: demolition of existing buildings, facilities and structures; appropriate disposal of materials resulting from demolition; installation of an appropriate cover on all or a portion of the exposed mill tailings; rehabilitation of existing waste rock piles; rehabilitation of additional risk(s), as warranted; general site clean-up and re-vegetation, as required; and appropriate monitoring during and after rehabilitation.

The project is subject to an environmental assessment under both the *Canadian Environmental Assessment Act* and *The Environmental Assessment Act* (Saskatchewan). To achieve efficiency, a cooperative environmental assessment will be undertaken as per the *Canada-Saskatchewan Agreement on Environmental Assessment Cooperation.*

The public is invited to comment on the draft Project-Specific Guidelines and Scoping Document for the cooperative assessment, which incorporates the respective requirements of the federal and provincial processes. The document identifies key issues and studies required in the Environmental Impact Assessment to be conducted by the SRC. **Comments must be received no later than May 2, 2008 and will be shared with both parties in order that each may review all submissions.**

Interested individuals may view a copy of the draft Project-Specific Guidelines and Scoping Document at First Nations and Northern Hamlet offices in the Athabasca Region. The document is available on the Canadian Environmental Assessment Agency's website at www.ceaa-acee.gc.ca, reference # 07-03-30100. The document, as well as SRC's proposal, is also available on the Saskatchewan Ministry of Environment's website at www.se.gov.sk.ca (click on Programs and Services/Environmental Assessment/Notices/Section 10/2007-068).

To obtain a copy of the draft document and/or to submit comments, contact:

Canadian Environmental Assessment Agency

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Appendix 3

Copy of *Frequently Asked Questions* document

Canada Saskatchewan

Request for Public Input
Environmental Assessment of the Former Gunnar Mine Site Rehabilitation Project

What is the project?

Gunnar is a former uranium mine and mill site that operated between 1955 and 1964. It included both open pit and underground mining operations. Work needs to be done to clean up the site. This project involves the proposed decommissioning of facilities and site rehabilitation activities.

Where is the project located?

The Gunnar site is located on the north shore of Lake Athabasca in northern Saskatchewan, on the southern tip of Crackingstone Peninsula, approximately 25 km southwest of Uranium City.

Who is the proponent?

The Governments of Canada and Saskatchewan signed a Memorandum of Agreement to clean up the Gunnar site. Under the Agreement, Saskatchewan Energy and Resources (SER) was assigned the responsibility to ensure that a site rehabilitation project is carried out on behalf of the two governments. Saskatchewan Research Council (SRC) is acting as the project manager for the required environmental assessment (EA) activities on behalf of SER. SRC is therefore the project proponent.

What is an environmental assessment?

EA is a process to predict the environmental effects of a proposed project before it is carried out. An EA identifies possible adverse (negative) environmental effects, proposes measures to mitigate (reduce) potential adverse effects, and predicts whether there will be significant adverse environmental effects, even after mitigation is implemented.

Why is the environmental assessment being carried out?

An EA for this project is required by both the federal and provincial governments, under the *Canadian Environmental Assessment Act* and *The Environmental Assessment Act* (Saskatchewan). Both governments are working together to coordinate their respective requirements in a single EA. Saskatchewan Environment – Environmental Assessment Branch is leading the federal-provincial EA Team, which includes the Canadian Nuclear Safety Commission (CNSC), Natural Resources Canada (NRCan), and the Canadian Environmental Assessment Agency, as well as technical experts from various federal and provincial departments.

At what stage is the environmental assessment?

The EA is in the initial stage known as “scoping”, where it is determined what project and environmental components should be considered in the review. A draft Guidelines-Scoping Document has been prepared based on concerns and issues raised by both governments regarding the project. This document includes “guidelines” that identify the information that should be submitted by the proponent as part of the EA process.

Where can I find out more information on the EA?

Information about the project and its EA can be found on Saskatchewan Environment’s web site at www.se.gov.sk.ca (Click on Programs and Services, Environmental Assessment Notices, Section 10, 2007-068) and on the Canadian Environmental Assessment Registry (CEAR) web site at www.ceaa.gc.ca (CEAR reference number 07-03-30100.)

The draft Guidelines-Scoping Document can be found electronically at the sites above. Copies are also available at First Nations and Northern Hamlet offices in the Athabasca Region, and Saskatchewan Environment offices in La Ronge and Regina.

How can I get involved in the environmental assessment?

At this time, the EA Team is requesting public input on the draft Guidelines-Scoping Document. Persons wishing to submit comments may do so in writing, either by completing the attached form or by contacting the Canadian Environmental Assessment Agency or Saskatchewan Environment - Environmental Assessment Branch. **Comments must be received no later than May 2, 2008. All comments will be considered public information.**

What happens after the public has commented?

The EA Team will consider the comments received for incorporation into the Guidelines-Scoping Document. The Guidelines will be submitted to the proponent to assist in the preparation of technical studies at the site.

The CNSC and NRCan will report to the federal Minister of the Environment on the scope of the federal EA, public concerns, and the potential of the project to cause adverse environmental effects. The federal Minister will consider this report and will either refer the project back to CNSC and NRCan so they can continue the comprehensive study review process, or refer the project to mediation or a review panel.

How can I stay informed about the project and the EA?

There will be other opportunities for the public to be involved in the EA of this project as it progresses. If you wish to be added to the **distribution list** for this project, please contact Saskatchewan Environment or the Canadian Environmental Assessment Agency.

Canada Saskatchewan

Request for Public Input
Environmental Assessment of the Former Gunnar Mine Site Rehabilitation Project

Public comments are invited on the draft Guidelines-Scoping Document for Environmental Assessment of the Former Gunnar Mine Site Rehabilitation Project (the Project).

Comments are being sought on:

1. The proposed scope of the project for the purposes of the EA;
2. The factors that should be considered in the assessment;
3. The ability of the EA to address issues relating to the project;
4. Whether any additional studies or information are necessary to evaluate the impacts of the project and;
5. Any other issues of interest to the public related to the project.

Please refer to the draft Guidelines-Scoping Document for further details on the above.

If there is insufficient space to record your comments, please use another sheet of paper.

1. The proposed Scope of Project includes the following:

- Demolition of existing buildings, facilities and structures;
- Appropriate disposal of materials resulting from demolition and remediation activities;
- Rehabilitation of existing waste rock piles;
- Installation of cover on above-ground and submerged mill tailings, where appropriate;
- Rehabilitation of additional risk(s) as warranted;
- General site clean-up;
- Re-vegetation of areas of the rehabilitated site as required; and
- Appropriate monitoring during and after rehabilitation

In your opinion, does the scope of the Project include all components of the project that are of concern to you?

☐ **Yes** ☐ **No** Comments:

_____

_____

_____

2. **Factors to be considered in the assessment**:
   The draft Guidelines-Scoping Document outlines the elements that will be considered in the EA. They include:

   - The purpose of and need for the project;
   - The potential environmental effects of the Project, including the effects of malfunctions or accidents, and cumulative effects, and their significance;
   - Measures to reduce adverse environmental effects of the Project;
   - Alternative ways to carrying out the project;
   - How the project will affect renewable resources now and in the future;
   - Follow-up and monitoring programs; and
   - Comments from the public

Please comment: In your opinion, are there other factors that should be considered? Are the boundaries (space and time) of the project assessment sufficient? Will the proposed factors cover all of your concerns? Are there aspects of the Project that require more attention than others?

☐ **Yes** ☐ **No** Comments:

3. **Ability of the comprehensive study to address issues relating to the Project:**
   At this stage, the environmental assessment is moving through a federal comprehensive study process as well as a provincial environmental impact assessment.

   Specifically for the federal comprehensive study: The Guidelines-Scoping Document addresses whether a comprehensive study will be adequate to address issues relating to the Project. Criteria include: 1) public concern; 2) potential environmental effects; and 3) the ability of proposed mitigation measures to reduce adverse environmental effects.

In your opinion, will the EA, as described in the draft Guidelines-Scoping Document, adequately address issues relating to the Project?

☐ **Yes** ☐ **No** Comments:

4. **In your opinion, are additional studies or information necessary to evaluate the impacts of the proposed project?**

☐ **Yes** ☐ **No** Comments:

5. **Do you have any other issues or concerns related to the project that you would like the provincial and federal EA Team to be aware of?**

☐ **Yes** ☐ **No** Comments:

Submittal of Comments

Persons wishing to submit comments on the proposed project and draft Guidelines-Scoping Document may do so in writing, either by completing this form or by contacting the Canadian Environmental Assessment Agency or the Environmental Assessment Branch at the addresses or fax numbers provided below. **Comments must be received no later than May 2, 2008.**

Saskatchewan Environment

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Canadian Environmental Assessment Agency

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445-123 Main Street
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Appendix 4

Public Comments on the *Draft Project-Specific Guidelines and Comprehensive Study Scoping Document* and Joint Federal/Provincial Response

Note: all comments will be passed on to the proponent

Source	#	Comment	Document Reference[6]	Response
Northern Mines Monitoring Secretariat (NMMS)	1	As with previous guidelines, this set also appears to be a collection of requirements by federal and provincial departments, ministries and agencies rather than a single guide, with all concerns integrated into a single, easily read, non-repetitive document. While this ensures the need of each represented entity, I am not convinced it provides a guideline that either can be easily commented on by members of the public or provides clear guidance for the proponent.	General	While the Guideline-Scoping Document is not written for the public (but for the proponent on the conduct of the EA and technical studies), the comment is noted for future application.
NMMS	2	The project is referred to as a 'rehabilitation' project. I did not find a clear definition of this term within the guidelines. It is my understanding that the proponent will require a CNSC license to carry out the work. It may be worthwhile to link the terminology of the required license and the title of the project at the EA phase to ensure clear comprehension by the public.	General	The title of the project is consistent with the title provided by the proponent. The "rehabilitation" activities and outcomes will be defined in the Environmental Impact Statement (EIS).
NMMS	3	Bullet 3 actually prescribes a solution. In doing so, the options available for appropriate management of the tailings become restricted. I would suggest that the proponent be encouraged to consider other appropriate management options, other than cover, to convince the CNSC and the public that cover is the best solution. This point is raised again as point 4 of section 3.1.	1.2	Bullet 3 refers to scope as was proposed by the proponent, Saskatchewan Research Council (SRC). The federal and provincial scope (Section 3.1) and instructions (Section 4.2.2, p. 21) were revised to reflect the comment.
NMMS	4	The VEC list has been established for projects conducted in the Boreal Shield Eco-region. The VEC list should be	3.2.3	Section 3.2.3 revised to indicate proponent is to confirm VEC list

[6] Refers to section of *Project-Specific Guidelines and Comprehensive Study Scoping Document* (Appendix 1 of EA Track Report), rather than section of *Draft Project-Specific Guidelines and Comprehensive Study Scoping Document* (the original document reviewed by the public)

		re-visited to ensure that it is appropriate for the Taiga Eco-region and once again meets with public approval.		with the NSEQC.
NMMS	5	The temporal boundaries have been described similar to those that would be relevant to a greenfield project. Bullets 3 and 4 do address recovery time to some extent, however, in a rehabilitation project, recovery times should become a critical factor for the evaluation of potential options.	3.2.4	The purpose of the Guideline-Scoping Document is to provide overall direction to the proponent on federal and provincial environmental assessment requirements, and is not meant to be prescriptive. The guidelines direct the proponent to define and assess the hazards and subsequently develop appropriate options. The information provided by the member of the public will be provided to the proponent for these purposes.
NMMS	6	I think that the first two paragraphs are attempting to say that all sources and pathways for/of contamination or potential contamination need to be identified and characterized. There is concern that by itemizing the sources key pathways such as open drill holes may not be evaluated.	4.2.2	Introductory paragraph revised to clarify this is not an exhaustive list.
NMMS	7	The second paragraph of 4.2.1 and the 4th paragraph of 4.2.2 appear to be in conflict. It is recommended that 1) these two points are clarified and that 2) the proponent is requested to supply a comprehensive reference list of documentation that has been compiled for the Gunnar site. There has been extensive data collection on this site over the years. It is important that **all sources** of information are considered in preparing the EA for this project.	4.2.1, 4.2.2	Request for reference list added to Section 4.2.2. Conflicting paragraph removed from Section 4.2.1.
NMMS	8	Neither public concern nor scientific are included in the list criteria used to evaluate alternative means. These are	4.2.2	Paragraph revised to "The EIS should discuss, in detail, the

		both important criteria that should be included.		criteria (environmental, engineering, economic, scientific, public and Aboriginal concern) used by SRC…"
NMMS	9	The statement 'any potential opportunities to environmental enhancement' should be clarified. What exactly is this referring to?	4.2.2	Bullet revised to provide clarification.
NMMS	10 a) b) c)	3rd bullet under 'The EIS should describe' - once again reference is made to installation of cover - refer to comments above. 4th bullet - really doesn't fit in this list. It may be more appropriate to describe the opportunity to use organic material that is salvaged from disturbance caused by rehabilitation operation to enhance site recovery. This would then include soils, small tree seeds etc. (Some of the more recent literature and studies indicate that the availability and use of salvage materials during rehab. programs increase the effectiveness and recovery time of the site.) This is a long sentence and it doesn't read very well. Can the project be considered successfully completed if long term management is acceptable close out criteria??	4.2.2 4.2.2, 2nd last paragraph	a) 3rd bullet reworded b) 4th bullet reworded c) Sentence revised to improve clarity. The proponent will define close out criteria in the EIS which will be reviewed for approval.
NMMS	11	This is a very important statement. Is it possible to give it more prominence within the document?	4.2.2, last paragraph	Agreed. Wording reinforced in 4.0 where topic is first addressed.
NMMS	12	How does this fit into an EIS? If this information is required prior to approval of the EIS, it limits the ability of the proponent to contract the work and for bidders to manage their workforce. For example, one contractor may find it more advantageous to remove material in the winter over and ice road vs. in summer via the barge. Those opportunities should not be prescribed by the	4.2.3	The proponent needs to include enough detail in the EIS for review and potential future approval while still allowing for the flexibility of completing the work. The introductory sentence was revised for clarity.

		proponent at the EIS stage of a project.		
NMMS	13 a) b) c) d)	The list of key stakeholder provided by the SRC seems to exclude the Metis of the region (there is a Metis local in Stony Rapids and there is a Metis Nation of Saskatchewan area director for the region). Since the Cluff decommissioning required the involvement of the Aboriginal people in the Ft. Chipewyan area, should they be considered in the Gunnar project? It is unclear what the Advisory Forum refers to or who it may include. The list of Provincial government departments is likely no longer valid. The Athabasca sub-committee of the NSEQC or the NSEQC is not included in the public or stakeholder consultation list. KY and MCR Health regions would have very little if any relevance to this project. Typo - Treaty Rights not Tights. The third paragraph is better covered under the section on 4.4.2. 5th para - refers to traditional knowledge - later in the doc. the term Traditional Ecological Knowledge is used - pg. 28.	4.3	a) The Project Administration Team has advised the proponent that the Métis Nation – Saskatchewan wishes to be involved in the environmental assessment process for this project. b) List of provincial organizations was updated. Typo corrected. c) This paragraph relates to the process for future public consultation rather than the content of the discussions. d) This distinction was deliberate. Aboriginal traditional knowledge (ATK) is knowledge that is held by, and unique to Aboriginal peoples. It is a living body of knowledge that is cumulative and dynamic and adapted over time to reflect changes in the social, economic, environmental, spiritual and political spheres of the Aboriginal knowledge holders. It often includes knowledge about the land and its resources, spiritual beliefs, language, mythology, culture, laws, customs and medicines. It may be considered in the overall environmental

				assessment of a proposed project. The term traditional ecological knowledge (TEK) is generally considered to be a subset of ATK that is primarily concerned with knowledge about the environment. TEK would be considered specifically in the discussion of potential environmental effects.
NMMS	14	Does not describe the professional services/employment opportunities that may exist.	4.4.2	Paragraph revised to include comment.
NMMS	15	This area should also identify drill holes that do or have the potential to transport water. 4.5.4 and 4.5.5 provide a clear delineation and definition of hydrological systems to ensure that proposed activities to do not adversely affect adjacent areas.	4.5.4, 4.5.5	Drill holes included in 4.5.4 and 4.5.5.
NMMS	16	Should Section 35 of the Fisheries Act be included as well?	4.5.8, last paragraph	Paragraph revised to include Section 35.
NMMS	17	It is unclear what the purpose of this discussing the existing soil quality might be. Is it intended to be discussion of soils in relatively undisturbed areas or disturbed areas? Should it be a reference site situation?	4.5.10	Paragraph revised to improve clarity.
NMMS	18	This likely doesn't fit here but the document should include a requirement to outline what precautionary measures will be taken to prevent the introduction of exotic (non-native) species into the area.	4.5.11	Section revised to include comment.
NMMS	19	Heritage Resources - While the Gunnar site cannot be described as a pre-contact site it is a very important part of the contemporary history of the area. This becomes more important in that it is the last site standing so to speak. It has been a long standing request of local residents that the history of the Gunnar site be preserved	4.5.12	Section revised to include comment.

		in an appropriate manner. It is an important consideration at this time to make sure that the proper artefacts from this site are preserved and commemorated in a way that is fitting to the hundreds (maybe thousands) of men and women who worked in the Canadian nuclear/uranium industry in the early days. This is definitely an element that will need to be addressed at the EA stage to ensure the appropriate artefacts are preserved.		
NMMS	20	Should the last line of the last paragraph refer to the ' . . . existing **adjacent** environmental conditions.'?	4.6.1	The intent of the paragraph was to refer to the current biological conditions on site. The proponent is also directed to provide data on undisturbed conditions (i.e. identify environmental conditions off-site which potentially could be affected by the project). The paragraph was revised for clarification, and to support content of 4.0.
NMMS	21	Second bullet should read '. . . and qualitative methods **should** be used . . . ' The assessment methodology described is not necessarily appropriate for a rehabilitation project.	4.6.2	Bullet revised as suggested.
NMMS	22	This is likely quite important as I understand there are ice lenses in the tailings mass.	4.6.4, first paragraph	Comment noted.
NMMS	23	In conclusion, it does not seem that these guidelines are necessarily the best fit to the type of project that is being proposed. In a rehabilitation project there are actually two actions that need to be assessed. The easiest to assess is the physical work that is being anticipated and corresponding mitigation measures that will be carried	General	The objective of this project is not to return the site to pristine conditions but to a condition where the level of risk is acceptable to the public and meets federal and provincial regulatory

		out as part of the implementation. The second, and far more difficult of the assessments is the effect of the proposed solutions from an environmental perspective. I do not see any references in the guidelines to anticipated environmental response, timelines to achieve a stable, 'healthy' environment capable of sustaining [???] or employing the most current rehabilitation science to achieve a safe stable environment. It appears that the guidelines emphasize the short-term implementation effects more than the long-term rehabilitation effects. Having said that, the use of ERA and HHA will influence the implementation options however, I am not convinced they will be enough to ensure the long term sustainability of the site from an ecological perspective. It may be useful to identify a reference site at this stage to provide a greater context to the site performance, particularly during the monitoring phase of the project.		requirements. The three-phase, multi-year approach proposed by the proponent will endeavour to reduce the ongoing risks to human and environmental health associated with the present orphaned mine site using current risk management methodologies. The requirement to implement and complete a long term follow-up program with a detailed schedule and reporting milestones will be undertaken to determine the effectiveness of the project's mitigation measures. Monitoring plans should include impacted and non-impacted reference sites. The provincial Institutional Control Program enforced under the Reclaimed Industrial Sites Act and Reclaimed Industrial Sites Regulations will address any requirements for monitoring and maintenance of the site upon completion of the follow-up program. The Guideline-Scoping Document has been developed with input from all levels of government, stakeholders and the public. This objective was strengthened by new references in Sections 1.2,

				1.3, 4.0, 4.2.2, and 4.6.1. Also see responses to Intervenor 2 Comment 5c and Intervenor 3 Comment 2.
Intervenor 1	1 a)	The long-term environmental risk of having left the mill tailings and mine blastings untreated for 58 years at the Gunnar uranium mine and mill is caused by alpha-emitting Radium-226 and its polonium decay isotopes products. Radium-226 and four of its decay products are high-LET high energy, alpha-emitting, genetically-damaging, radioactive toxic contaminants. Furthermore radium-226 has a 1620 year half-life. This means that from its very high (4 3/4 million electron volt) energy which decays into radon gas - two thirds of which has been escaping to the atmosphere - leaving about one third of the radon to decay into Po-218 which emits 6 million eV a-particles and has a 3 minute half-life; Po-218 decays into Po-214 (7.7 million eV a-particles with a half-life of 0.16 sec), decaying into the beta emitter Pb-210 (22 year half-life) which decays into the alpha-emitter Po-210 (5.3 million eV a-particles, 138-day half-life). This needs to be explained in the EIS, as well as their emissions of high-LET radiation (high linear energy transfer) of these millions of electron volts transferred across biota cells in extremely short distances and time. These are the "internal radionuclides" that get into genetic organs, altering the chemicals in the genes. For 58 years these have been produced by the disintegration and decay of Ra-226 and emerge to be monitored as Pb-210 and Po-210. D.T. Waite et al reported in 1983 that the plant roots of Typha s.p. in Langley Bay had absorbed 0.91 Bq/g Pb-210 and 0.37	General	a) All types of radiation are taken into consideration in dose conversion factors that will be used during the risk assessment process. b) Hereditary effects are included in risk assessments.

	b)	Bq/g Ra-226 (Arch. Environ. Contam. Toxica 17 373-380, 1988). The long-term effects of the genetic damage - which is not reversible - will continue to produce genetic abnormalities, which are inheritable, in the primary producers (i.e. plant life) benthic invertebrates and the stomach contents of fish and amounts to residual contamination. The EIS needs to discuss this situation.		
Intervenor 1	2	The long half-life of Ra-226 decaying - long-term - into Po-218, Po-214. Po-210 and Pb-210 should also be discussed.	General	See response to Intervenor 1 Comment 1.
Intervenor 1	3 a) b)	Draft guideline section 4.3 says: "The program should promote a broader understanding of the project identifying environmental and public hazards and the current levels of environmental and public risks associated with these hazards. Efforts should be made to involve the public in the identification of issues and objectives." These environmental and public hazards which include the genetic damage from the long-term constant production (even after covering, etc. of the radionuclides) need to be discussed in comparison to the genetic and poisonous behaviour of the non-radionuclide contaminants. The long half-life of radium-226 decaying into the super high- LET polonium isotopes for over 10,000 years needs to be expounded upon. (IAEA TECDOC1091 1999 Sec. 4.3 paragraph 4) According to this document, surveillance is insufficient. The current level of Ra-226, Pb-210 and Po-210 will need to be chemically tested in Langley Bay. The long-term of the energy emissions and the likely absorption by biota, the cells of which this energy will densely ionize and can be calculated roughly. The cell damage from the high-LET radiation is not easily repaired.	General	a) Radiological and chemical effects will be considered as part of the EA process. b) It is up to the proponent to establish which areas require testing, based on dose exposure to biota, including humans. The areas would then be confirmed by federal and provincial regulators.
Intervenor 1	4	In my opinion, it is not likely that the environment can be	General	See response to NMMS Comment

		rehabilitated from the radionuclide damage that remains from the 58 years of exposure but the present tailings must be removed or covered at least from the terrestrial areas. A clear and honest assessment is essential for this clean up. The cleanup of the Gunnar site needs to tell the whole truth and nothing but the scientifically-supported truth. The Funk and Wagnell dictionary defines "propaganda" as: "a systematic effort to persuade a body of people to support or adopt a particular opinion, attitude or course of action. Any selection of facts, ideas or allegations forming the bases of such an effort."		5. The proponent is directed to discuss rehabilitation options with the public during the conduct of the environmental assessment. The public will also have opportunities to review and comment on environmental assessment documents prior to environmental assessment decisions being taken. The EA process provides a coordinated and thorough review of the environmental issues associated with a proposed project to ensure the project would not cause significant adverse environment effects. Furthermore, the CNSC requires that licensees ensure releases of contaminants to the environment are As Low As Reasonably Achievable (ALARA).
Intervenor 1	5	From our examination of Table A.75 McClean Lake 2006 annual report I have a concern that the CNSC calculations of "contaminant loading" in the effluent from the water treatment plant which is released to the environment gives a column for Ra-226 but not for the polonium or lead. This, I have been told, is calculated separately. I have not been given any scientific reason for calculating these high-LET alpha emissions separately. I do not believe that I have the whole truth regarding the	General	The loadings reported in the McClean Lake Annual Report are those specifically required as per Environment Canada's Metal Mining Effluent Regulations (MMER). The only radionuclide included in the MMER is Ra-226; therefore the other radionuclides are not presented. While not

		scientific reasoning why Ra-226 decay products are not given in the table showing contaminant loading. If this is propaganda based on half-truths to persuade people of the CNSC's calculation of long-term risk, my confidence gets lost. Since I believe that it is the residual, shorter-lived high-LET alpha-emitting radionuclides that will cause long-term deterioration to the environment, I find it necessary to understand scientific reason that makes it necessary to calculate the Ra- 226 decay products separately.		reported in the loadings table (simply because they are not part of the MMER), other primary radionuclides in the decay chain such as Pb-210, Po-210, and Th-230 are measured in the treated effluent and reported in the annual report. Their loadings can be calculated by multiplying these reported concentrations by the volume of effluent discharged which is also documented in the annual report. Similarly, the major progeny within the uranium decay chain are measured and reported in the downstream receiving waters (e.g., lakes and streams) as well as within the sediments and fish tissues. These results are also reported in the appropriate environmental reports. When determining the actual radiation dose to biota, the combined dose resulting from any gamma, beta, and/or alpha emissions is calculated separately for each of the major progeny based on the measured concentration for each of the progeny. This is necessary because each of the progeny has its own unique emission signature

				(e.g., not all emit gamma, alpha particles or beta particles and their energies vary). Total dose is then determined by summing the dose provided by each of the separate progeny. This is why the progeny are modeled and/or measured separately. Once a total dose has been calculated, an assessment of environmental risk can be made.
Intervenor 1	6	As the IAEA, July 1999 Discussion Paper section 1.1 says: "The concept of sustainable development places environmental protection on an equal footing with human protection, on the basis that it is necessary first to protect the environment in order to protect human populations. It is therefore necessary to demonstrate protection of the environment explicitly."	General	Comment noted.
Intervenor 2	1	It seems intuitively obvious that the environmental footprint from rehabilitation of the existing Gunnar site should, and would, be significantly less than the significant footprint from the initial development. Recall that, in the original development, acidic tailings filled a small lake to overflowing and spilled into Lake Athabasca while infilling Langley Bay with the finest and most radioactive tailings. Rehabilitation may only see various minimal economically-justified covers placed on these residual tailings. Hence the real issue becomes one of reclamation for subsequent abandonment under provincial institutional control. That is, the goal of the reclamation should be to enable and facilitate safe abandonment.	Preamble (Introduction, Summary and Conclusion)	See response to NMMS Comment 5.

		Thus the EIA/EIS should provide two essential and substantiated products; • a reclamation plan for the entire site that meets the requirements for abandonment, and • a specified program of pre-abandonment surveillance involving routine monitoring, special technical studies, and environmental research that should be completed prior to abandonment. Note that monitoring, studies and research will undoubtedly continue after abandonment, but that it could be premature to consider these issues within the current EIA/EIS. In any event, such post-abandonment surveillance will likely be an extension of the pre-abandonment program.		
Intervenor 2	2	The tailings reclamation plan should be developed on the basis of an integrated assessment of the following environmentally acceptable options. 1. Selected pit disposal of some of the terrestrial tailings. 2. Covering the remaining exposed wind-blown and water-eroded terrestrial tailings with selected multiple barriers of waste rock, soil and vegetation. 3. Leaving well-vegetated and non-eroding terrestrial tailings in place without disturbance, yet under pre-abandonment surveillance. 4. Leaving Langley Bay to continue to naturally recover under (a) any feasible reduced radionuclide and tailings loading to the Bay, (b) any possible increased organic loading to the Bay, (c) allowing radionuclides and tailings in the		See response to NMMS Comment 5.

		Bay to naturally leave the Bay for likely safe deep-lake disposal in Lake Athabasca, and (d) pre-abandonment surveillance consisting of scheduled environmental monitoring, specific technical studies and biological research.		
Intervenor 2	3	The nature and extent of any required Fish Habitat Compensation Planning needs to be clarified.	3.2.4	The information provided in the project description is not sufficient for DFO to determine the extent and magnitude of impacts to fish and fish habitat that may result from the proposed project and therefore DFO is not able to determine at this time if fish habitat compensation will be required for the project. DFO will be able to make a decision once the rehabilitation options are better defined.
Intervenor 2	4	The following more-specific comments all relate back to the above abandonment approach and acceptable reclamation options, plus a practical desire of wanting to move forward towards implementing a reasonable reclamation project that is, at a minimum, a step in the right direction towards abandonment.	General	Comment noted.
Intervenor 2	5 a)	There will be <u>cumulative</u> environmental effects or <u>residual</u> environmental effects from the original release of tailings to Mudford Lake, Langley Bay and Lake Athabasca. These effects will have to be assessed via available monitoring, studies and research. Regular monitoring is essentially non-existent and available studies and researches are some 20 years old. A new round of studies/research could be required prior to abandonment.	3.2.1	a) and b) See response to NMMS Comment 5. c) Development and implementation of a follow-up program is a requirement under the *Canadian Environmental Assessment Act*. The purpose of the follow-up program is to:

	b) c)	The significance of the radiological effects to biota in Langley Bay will not be easily determined from the available research. New radiological modelling and further field/laboratory research may be required prior to abandonment. Reclamation may have to proceed under a precautionary approach. A follow-up surveillance program of monitoring, study and research will likely have to be completed prior to abandonment.		• verify predictions of environmental effects identified in the EA; • determine the effectiveness of mitigation measures in order to modify or implement new measures where required; • support the implementation of adaptive management measures to address previously unanticipated adverse environmental effects; • provide information on environmental effects and mitigation that can be used to improve and/or support future EAs including cumulative environmental effects assessments; and • support environmental management systems used to manage the environmental effects of projects.
Intervenor 2	6	The existing state of the water quality in Langley Bay and in the flooded Gunnar pit will be easy to assess relative to three other water sources; • open ponded water in the lower reaches of the Gunnar Main tailings (ponds which appears to be permanent and may be hosting primitive aquatic life),	3.2.2	See response to NMMS Comment 5.

		• groundwater in the Gunnar Main tailings which is likely hydraulically connected to the above ponded surface water and could have residual acidity from the tailings that may be enhanced or sustained by microbial activity. • runoff from the tailings to Langley Bay which may have seasonal highs and lows of radionuclides and metals due to climate and acidic groundwater runoff. Tailings from the original development reached Lake Athabasca beyond the entrance to Langley Bay. White "clouds" of precipitating gypsum from acidic mill effluents can be seen in black and white aerial photos of the mid to late 1950's. These photos could be used to indicate the likely extent of deposition of the very finest mill tailings. The deep depositional area should probably be cored prior to abandonment, to determine if the tailings have been safely buried as a discrete layer, or bioturbated into a safely mixed (diluted) layer. Speculation as to the nature, extent and safety of this "deep-lake tailings disposal" should be drawn to a close.		
Intervenor 2	7	The spatial boundary of the project should include the above deep depositional tailings area beyond Langley Bay in Lake Athabasca.	3.2.4	See response to NMMS Comment 5.
Intervenor 2	8	A Fish Habitat Compensation Plan could be required for Langley Bay at the time of abandonment. Impacts on Langley Bay from the reclamation will likely be insignificant in comparison to the current impact. The question is, when does any such compensation agreement have to come into effect? Similarly, a separate fish compensation agreement could	General	See response to Intervenor 2 Comment 3. Compensation is not required for works that took place in the past. Compensation typically comes into effect at the time of the harmful alteration, disruption or

		be required for complete tailings infilling of the now flooded Gunnar pit, but might have to come into effect at reclamation?		destruction of fish habitat (i.e. at the time of the rehabilitation works if they should result in a harmful alteration, disruption or destruction of fish habitat).
Intervenor 2	9	There is reference to describing existing environmental conditions, but natural (baseline) conditions should also be presented, especially in terms of establishing abandonment criteria.	4.0	Pre-mine conditions are unknown at the site, and so SRC is left to propose what approximates natural conditions. The Project Administration Team is interpreting baseline as the current condition of the site, but as newly indicated in 4.0 and 4.6.1, the proponent is directed to look at off-site conditions as well.
Intervenor 2	10 a) b)	The cumulative environmental effects for the reclamation project should include those from the original release of tailings. The identification of uncertainties should lead into a proposed follow-up surveillance program of routine environmental monitoring, special technical studies and environmental effects research on aquatic and terrestrial ecosystems.	4.1	a) The proponent has been directed to consider cumulative environmental effects (4.6.8) that are likely to result from the project in combination with other projects or activities that have been or will be carried out. This would inherently include effects of past activities at the Gunnar site. b) See response to Intervenor 2 Comment 5 c).
Intervenor 2	11	Specific mention should be made of the need to characterize: • seasonal runoff from the tailings into Langley Bay, • groundwater quality in the tailings, • water quality of the permanently ponded water on	4.2.2	See response to NMMS Comment 5.

		the tailings, and an assessment of any biota in these ponds, • how tailings groundwater influences the quality of ponded water on the tailings and the quality of runoff from the tailings.		
Intervenor 2	12	The review of prior studies and evaluations should focus on uncertainties and recommendations (past and current) as to further monitoring, studies, evaluations and research.	4.2.2	See response to NMMS Comment 5.
Intervenor 2	13	The identification and assessment of significant risks and hazards could be difficult and tenuous, perhaps dictating a precautionary approach.	4.2.2	Comment noted.
Intervenor 2	14 a)	At the top of page 17 there is an extremely well-worded paragraph on <u>natural</u> <u>mitigation</u> that I fully agree with. However, it fails to identify those areas of the tailings where this may be the case; namely along the outer edges of the tailings. Furthermore, it fails to mention that the main central part of the tailings is windswept or prone to water erosion and as such needs to be evaluated for placement in the Gunnar pit or covering with waste rock or woody debris. As it now stands this paragraph could be viewed as tantamount to induced error and should perhaps be balanced by a full statement as to what should be considered as tailings remediation options. If left as is, without some closing comment or an associated paragraph, this paragraph could be seen as introducing a "do nothing" bias to the recommended tailings reclamation options. As it now stands the paragraph could be of future site-specific utility in Technical Review Comments or the Comprehensive Study Report. The paragraph should not be dropped from the current document, but rather balanced and expanded.	4.2.2	a) to d) See response to NMMS Comment 5. e) Bullet revised as suggested. f) See response to NMMS Comment 5. g) Wording revised as suggested.

	b)	There could be an opportunity to prevent runoff (drainage systems) from reaching the main tailings and becoming contaminated enroute to Langley Bay. This should be fully explored.		
	c)	Although it is tempting to vegetate waste rock piles as an environmental enhancement, this could be a misuse of scarce financial resources. It might be of value to lower and recontour (flatten) waste rock piles, so as to foster natural revegetation and perhaps diminish springs and diffuse groundwater seepage.		
	d)	Four separate areas of submerged tailings need to be considered: • some small amount of selected tailings could be relocated to the Gunnar pit and perhaps protected by a thermocline (temperature/density water stratification), • lake bottom tailings in Langley Bay that may be being slowly covered by natural organic sediment and should not be disturbed, or are technically/economically impossible to excavate or cover, • lake bottom tailings in Lake Athabasca that have effectively been disposed of, and • tailings in the bottom of the permanent ponds on the Gunnar Main tailings that could possibly be filled in with waste rock and/or overburden.		
	e)	Unmerchantable timber, slash and debris should not be disposed of, but rather salvaged for possible use as an organic tailings cover that would decompose over the long term and naturally revegetate. Organic matter from		

		this decomposition could be flushed to Langley Bay. f) The contaminant loading in runoff to Langley Bay from the tailings should be estimated as possible. Reclamation may not change this loading (i.e. it may not be mitigable). The water quality in Langley Bay, at the mouth of Langley Bay and in nearby Lake Athabasca should be examined as part of assessing the significance of this loading. A pre-abandonment surveillance program should be proposed which integrates monitoring, study and research into water-quality, sediment and biota. g) There is another lofty but exceptionally well-written paragraph at the top of page 18. The second "should" of the first line should be removed. I wish the proponent well in attempting to satisfy this seemingly onerous request and will be interested in what they come up with. Congratulations may come to be in order. I fully support the intent of this paragraph.		
Intervenor 2	15	I would suggest that the objective should be "on-site disposal" and hence that transportation of any waste materials from the site should be minimized.	4.2.3	6th bullet revised as suggested.
Intervenor 2	16	In the first line, I would suggest that the first four words be changed to "Regional residents and interested organizations", so as to be all inclusive.	4.3	Sentence revised as suggested.
Intervenor 2	17 a)	In the 4th line of the 1st paragraph you should change "whether" to "the extent to which" and otherwise make it clear that you are expecting a description of the environmental footprint of the historic Gunnar development. In the last line of this paragraph "or" should be changed to "and".	4.5.1	a) Paragraph revised as suggested. b) An objective of the assessment is to ensure the collection of data follows acceptable scientific methodology.

	b)	With regard to item (ii) at the top of page 22, it should be realized that there may not be any statistically valid environmental data for the Gunnar site; but that there should be sufficiently-sound scientific information for designing the reclamation scheme and for developing a post-reclamation follow-up surveillance plan of requisite environmental monitoring, study and research. The follow-up plan could be predicated on any substantiated need to collect some 10 to 15 years of statistically sound environmental data prior to abandonment. The development of this post-reclamation/pre-abandonment scientific surveillance plan should be an essential prime requirement of the EIA/EIS process.		The development and implementation of a follow-up program is a requirement under the *Canadian Environmental Assessment Act* and the CNSC will ensure its implementation through its licensing and compliance programs. As discussed in the response to Intervenor 2 Comment 5c, the results of the follow-up program will be used to support adaptive management measures and environmental management systems at the site.
Intervenor 2	18 a) b)	It is not clear what the "settling pond" is, I would suggest changing it to "main tailings area". The key unknown factor is the chemistry of the groundwater flow system in the main tailings and its influence on (1) the seasonal chemistry of the permanent ponded water on the lower tailings and (2) the seasonal chemistry of the runoff to Langley Bay. The chemistry of concern is inter-related acidity, salinity, TDS, radionuclides and metals. The reason for, and possible control of, any residual acidity beyond that from initial milling is an important factor for mitigating the long-term ongoing release of radionuclides from the tailings (and their transport to Langley Bay and beyond).	4.5.4 and 4.5.5	a) Paragraph revised as suggested. b) See response to NMMS Comment 5.
Intervenor 2	19 a) b)	The study of fish and fish habitat should focus primarily on Langley Bay and perhaps secondarily on the permanently ponded waters on the lower tailings. • A Fish Habitat Compensation Plan would	4.5.8	a) The study of fish and fish habitat should focus on all areas where fish or fish habitat may be impacted by the project.

		presumably be required for Langley Bay, but would it come into effect at reclamation or abandonment?		b) See response to Intervenor 2 Comment 3.
	c)	• There is a reasonable amount of some 20 year old data for Langley Bay, but perhaps nothing for the ponds, which may not be able to sustain fish because of salinity or acidity etc. The ponds could be eliminated by an infilling of waste rock and, as such, may not be of any continuing long-term interest. Would an infilling of the ponds require a Fish Habitat Compensation Plan?		c) DFO would require current fish utilization and bathymetry data on the ponds before making a determination.
	d)	• Does the Fisheries Act apply to the man-made ponds on the lower tailings? It is perhaps a stretch of the imagination to argue that they are a remnant of former Mudford Lake. Mudford Lake appears to have been filled far beyond its' natural shoreline with tailings. The proponent should enter the EIA/EIS process with tentative flexible answers to these questions from DFO.		d) See response c) above
	e)	The question arises as to if, and if so why, the Fisheries Act is applicable to the flooded Gunnar pit? The flooded pit is entirely man-made and it would not appear reasonable to preserve any fish population that has established, or to require a Fish Habitat Compensation Plan. The proponent should enter the EIA/EIS process knowing that they can potentially dispose of tailings in the pit, either by a complete infilling with an earthen cap or by a partial infilling with a water cap. Using the pit to dispose of waste rock or demolition debris would appear to be a poor reclamation option, but some badly contaminated debris could be disposed of and waste rock could be used as a capping. Consideration should be		e) The *Fisheries Act* would apply to the flooded Gunnar Pit because based on the 1981 and 2002 fish surveys; it is a waterbody that is frequented by a self-sustaining population of fish. However, the value of the habitat within the pit itself will be evaluated as part of the environmental assessment of the project. Should this or any other part of the project propose to harmfully alter, disrupt or destroy fish habitat, then the proponent will require a subsection 35(2) Authorization from Fisheries and Oceans Canada. Any compensation required to address DFO's no-net-loss of fish habitat policy will be based on the quantity and quality of the habitat as determined by the

		given to using the pit for tailings disposal. Pits are routinely used for tailings disposal at Saskatchewan uranium mines.		environmental assessment that will be completed for the project.
	f)	The reclamation option of a submerged weir (or some such similar structure) at the mouth of Langley Bay has been raised from time to time. This option should be evaluated in the EIA/EIS; but, in my opinion, it could eventually come to be rejected. I am presently opposed to the option because it could: • create or enhance a radiological hazard in the shallow biologically-active Bay due to trapping the ongoing upstream release of radionuclides and fine terrestrial tailings, • prevent or inhibit the above radionuclides and tailings from leaving the Bay and perhaps being safely deposited in Lake Athabasca via various forms of deep lake disposal, • shift the reclamation focus away from on-site containment of the upstream terrestrial tailings by pit disposal and various possible erosion-resistant coverings, and • be an inappropriate expenditure of scarce financial resources in comparison to other options.		f) Comment noted.
	g)	Note that a vegetated cover (top layer of a multi-component barrier) on the terrestrial tailings could result in the slow long-term release of organic matter to Langley Bay (and beyond) which would form a bioturbated natural anoxic cover of organic sediment on submerged Bay and Lake tailings. I am not opposed to slow natural deep-lake disposal of tailings; but, at this		g) Comment noted.

		time, am philosophically opposed to any proposed larger amount of man-made tailings disposal in Lake Athabasca (e.g. by dredging Langley Bay tailings and relocating them to nearby Lake Athabasca).		
Intervenor 2	20	There is a third incredibly well-worded paragraph at the end of this section on p 27. It should be expanded to include fish and relocated to some general introduction to section 4.5, or at least be revised and repeated in section 4.5.8 on fish.	4.5.11	Last bullet of 4.5.8 revised to include suggested changes.
Intervenor 2	21	I would like to see a publicly safe mill site, a filled in pit that is publicly safe, contoured waste rock piles that have no visible springs and environmentally benign seepages, or waste rock piles that have been eliminated by their use as tailings covers or a pit capping, complete covering of the wind-blown and water-eroded exposed tailings, and virtually no man-made reclamation (i.e. only natural reclamation) of Langley Bay. The environment would be improved in a precautionary way by eliminating the windblown tailings, by any possible reduction in the aqueous transport of radionuclides to Langley Bay, by ongoing natural covering of the Langley Bay tailings with organics, and by the continuing transport of Langley Bay radionuclides to deep lake disposal in Lake Athabasca.	4.6.1	See response to NMMS Comment 5.
Intervenor 2	22	I fully support the use of a precautionary approach, scientific analysis, TEK, local knowledge and available experience.	4.6.2	Comment noted.
Intervenor 2	23 a)	With regard to the 1st paragraph, predicted project-related impacts should be compared to: • current background environmental conditions as ascribed to the original Gunnar development, and • inferred natural baseline environmental conditions prior to the original Gunnar	4.6.3	a) See response to Intervenor 2 Comment 9. b) See response to NMMS Comment 5.

		development. The second comparison will need to be refined by a follow-up scientific surveillance program prior to abandonment. b) With regard to 2 of the 3 paragraphs at the top of page 32 (the 1st and 3rd): • Contaminated inflows to Langley Bay are expected and should be characterized on a seasonal basis. • A decision will be required as to Langley Bay being a mixing zone or receiving water. At this time I would say mixing zone, but am not fully convinced. • Three types of "tracking studies" should be proposed; routine (regularly scheduled) environmental monitoring, special technical studies such as the above-suggested coring of the deep lake tailings-disposal area immediately outside of Langley Bay, and more basic supportive field and laboratory research on, say for example, dose/effect relationships for fish or the repetition, upgrading and extension of prior (20 year old) biological studies of Langley Bay. • The above three types of tracking or follow-up surveillance studies should be scheduled for completion prior to abandonment. • These three-pronged tracking studies are required for Langley Bay, directly vegetated tailings and vegetated composite tailings covers.		
Intervenor 2	24	While I agree with and support the intent of this section, I see any slow failure of the rehabilitation as being detected by the above tracking and as being corrected	4.6.6	Comment noted.

		prior to abandonment**.**		
Intervenor 2	25	While I agree with and support the intent of this section, it should only be regarded as starting the discussion.	4.9	Comment noted.
Intervenor 3	1	I believe that Guidelines and the Scoping Document are generally good but there are particular issues that should be inquired about. With regard to the scope of the project I hope that the general site cleanup includes checking the integrity of the capping of the extensive exploratory test drill sites. With regard to the factors to be considered, I would like to stress that the EIS should include in Section 4.4.3 and 4.6 a reevaluation of the risk analysis of the SRC proposal. (More on the topic below)	General, 4.4.3, 4.6	As indicated in a revised paragraph of Section 1.3, "The EIS should identify the current levels of risks to the environment and the public posed by the Gunnar site and describe how the proposed rehabilitation plan will reduce those risks to levels considered acceptable by established criteria."
Intervenor 3	2	I am pleased that the federal Government of Canada finally accepts its responsibility for the cleanup of the abandoned uranium mine and mill site but I believe it should share the majority of the cost of remediation with the Saskatchewan provincial government. I am concerned that Phase 2 of the project, which involves the actual site clean-up, is planned only to last about three years. That does not seem long enough. Phase 3, which consists of monitoring the site, must be clearly and honestly planned for as long humans are in this part of the world: forever.	General	The Gunnar project is the result of an agreement between the Governments of Canada and Saskatchewan. Under this agreement, the Governments of Canada and Saskatchewan will each contribute $12.3 million towards project cost. The Government of Saskatchewan is responsible for the overall management and implementation. Phase 2 is currently projected to last for three years. Phase 3 cannot begin until all Phase 2 work has been completed. Therefore, Phase 2 would be extended if necessary. Once Phase 3 is completed, the Government of Saskatchewan will take responsibility for the site

				under the Institutional Control Program. This program ensures that long-term care and maintenance is undertaken on all decommissioned mine and mill sites.
Intervenor 3	3	This environmental assessment will attempt to identify options for site rehabilitation and any environmental effects of the proposed Gunnar Mine site rehabilitation project, and to determine whether these effects can be mitigated before the project can be considered for licensing by the CNSC. I hope that this project will only mediate what damage that had been done in the past. Care must be made to prevent more damage stirring up uranium dust, prevent more toxic spills and make sure there are money and resources to solve the many problems of removing hazards to the environment.	General	Section 4.2.2 addresses the risk assessment of options.
Intervenor 3	4	I would like to point out that of the 78 abandoned mines in this province Gunnar Mine scored the worst for hazards to both public safety and the environment: radiation, toxic chemicals, and hazardous scrap materials. The most challenging problem may be the unconfined tailings deposits amounting to 4.4-million tonnes that have made their way into Lake Athabasca since the operation was shut down in 1964.	General	Comment noted. *Point of Clarification:* The proponent indicates that an estimated total of 4.4 million tonnes of tailings were discharged from the Gunnar Mining Limited mill during operations into three tailings areas. An estimate developed from data available in Appendix "A" (and associated references) of the Project Description is 8% of the total tailings reside in Langley Bay or 352,000 tonnes.
Intervenor 3	5	The EIS needs to recognize the longevity of the wastes	General	The tailings options presented by

		brought to the surface. Even if we have perfect containment of the mill tailings each radionuclide there will be reduced by half after 76,000 years because Th-230 keeps contributing other radionuclides down the chain. The number of becquerels of each material is equal to the number of becquerels of U-238 that has been extracted due to the principle of radioactive equilibrium (secular equilibrium).		the proponent and reviewed/approved by the Project Administration Team will take longevity of the waste into consideration in the design planning.
Intervenor 3	6	Question: Is the separation of radium and thorium considered so that they can be geologically disposed?	General	Alternative means of carrying out the project that are technically and economically feasible will be considered.
Intervenor 3	7	The SRC proposal has made an inventory of resident nuclear substances in the waste rock and tailings but all, U-238, U-235, U-234, Ra-226, Rn-222, Po-218, Po-214 and Po-210 as well as Th-230 and seven other alpha emitting radioactive materials found in uranium ore bodies and will require conscious attention in a remediation plan. The EIS needs to discuss all of these, not just the uranium and radon. There needs to be more focus on the internal alpha and beta radiation. The SRC proposal has little mention on this topic focusing on gamma radiation and ambient radon.	General	See response to Intervenor 1 Comment 1a.
Intervenor 3	8	Alpha radiation is recognized as being more biologically damaging than gamma or beta radiation per unit of ionizing energy deposited in living tissue. The EIS should have a plan informing the community residents and workers about alpha radiation. The focus should not be about the lack of penetration but about the danger from inhalation, ingestion of radioactive dust as well as contamination through openings in the skin.	General	Standard radiological risk assessment will take this issue into account. A Radiation Protection Program would also be developed to protect workers.
Intervenor 3	9	Question: What kind of warning system will be in place to inform humans of the danger at the site thousands of	General	Site access (post abandonment) is a licensing issue that would be

		years in the future?		addressed during the abandonment licensing phase
Intervenor 3	10	My concern with the implementation of any plan to remediate this site is that the conventional radiation risk analysis predicts too little harm from the exposures because it does not fully acknowledge the genetic damage capability of uranium and other radionuclides. This approach will jeopardize the safety of the worker, the community around the site, the camping tourist and, importantly, the environment in the long term.	General	See response to Intervenor 1 Comment 1b.
Intervenor 3	11 a) b)	In the SRC proposal, section 11.1 on risk assessment, it concluded "exposure to terrestrial wildlife to radionuclides indicated that there are no risks of adverse effects from radiation exposure." I challenge this. It goes on to state: "Exposure to non-radionuclides showed that uranium is an issue for terrestrial animals with a large aquatic diet such as beaver, ducks, mink and muskrat. Uranium concentrations in aquatic plants, benthic organisms and sediments are the main contributors." Those making risk assessments need to have another look at uranium. Uranium will always be a hazardous radionuclide despite it's long half life making it look just like any chemical because, as Dr Busby states, for internal exposures "Uranium exhibits serious radiogical genotoxic effects through its affinity for DNA, for nervous tissue and because of its high atomic number (Z = 92) which makes it preferentially absorb natural background gamma radiation and release that energy into the DNA as photoelectrons."(2008) The conventional risk model of ICRP does not include this aspect of radiological behaviour. The EIS should discuss the relevance of	General	a) Radiological and chemical effects from uranium will be assessed. b) and c) In the guidelines the proponent is asked to: identify and characterize human receptors assessed, identity the method used to convert radionuclide exposure and intake by the various human receptors from the various pathways into dose (e.g. conversion factors) and identify the criteria used to determine the significance of impact (e.g. percentage of radiation dose limits). The International Commission on Radiation Protection (ICRP) risk model is used to determine radiation dose to human receptors using generic characteristics for

		conventional models of risk assessment for those who are exposed to internal alpha and beta radiation since the international risk assessment community is challenging the old assumptions. (For example, the Committee Examining Radiation Risks for Internal Emitters, CERRIE). According to Dr Chris Busby the science of radiation risk is currently in a state of flux, mainly as a result of new discoveries in radiation biology made in the last ten years. The assumptions of International Commission on Radiological Protection are based on studies of the Japanese A-Bomb survivors before DNA was discovered. It centres on the dose and the response which are believed to be linearly correlated. The absorbed dose represents the average energy absorbed in unit mass where the energy density is the same in all the cells of the body irradiated. Modeling risk in individuals who have internal irradiation, however, needs to acknowledge that the short range radiation from alpha and beta radiation cause high energy ionization in local tissue but no irradiation elsewhere. The dose to these cells near to these particles may be either fatal or mutagenic. Note: it is the cell dose that is important not the averaging the energy into the whole body or in organs, as the conventional model does. This gives a false assurances because the ionization density is diluted so it seem as if the whole body doses are very low, perhaps below natural background doses as was the conclusion in SRC's evaluation of risk for the "hypothetical camper". The SRC (and other Canadian authorities) should fully examine the issues of radiation and health for all living beings, and diligently study the evidence of harm from		each category of receptor and dose conversion factors. The dose conversion factors are generated from biokinetic models which predict the dose from external radiation and from radionuclides taken into the human body. Biokinetic models are periodically updated to consider discoveries in radiation biology. The selection of human receptors should consider the applicability of using a human child under 3 and a fetus as receptors. The ICRP determines the risk per Sievert of radiation dose by examining evidence in epidemiological studies and recommends radiation dose limits. If the radiation dose to the public is less than the public dose limit there should be no significant adverse effect. This is the internationally accepted criteria upon which the Canadian dose limits are based. The ICRP recommendations are periodically updated to consider new information. If warranted ICRP recommendations and federal

	c) d)	exposure to internal radionuclides. The radiological risk model should be challenged in all aspects. For example, there should have more than cancer as its endpoint for humans and the model should be checked with epidemiological studies of the human receptors that include human child under 3 and fetus. There should be a larger number of plants and animal species studied.		regulations will change to take into account new information. The most recent ICRP recommendations were published in ICRP Publication 103 in March 2007. It was recommended that even though the risk was found to be slightly lower the dose limits should remain the same so, at this time, the risk assessment criteria should be based on the current dose limits found in the *Radiation Protection Regulations*. d) Risk assessments take a conservative approach and tend to focus on the most sensitive species and VECs (with the view that if the most sensitive species is studied and risks to it mitigated, all species would be protected). The current list of VECs will be revised as necessary to reflect site specific characteristics.
Intervenor 4	1	*In your opinion, does the scope of the project include all components of the project that are of concern to you?* The scope of project components are 'more' than enough. *In your opinion, are additional studies or information necessary to evaluate the impacts of the proposed project?* Absolutely not. Deal with only ongoing environmental hazards. *Do you have any other issues or concerns related to the*	General	Comments noted.

		project that you would like the provincial and federal EA Team to be aware of? This process is far too complicated and cumbersome. Public participation to this degree is ridiculous.		
Intervenor 5	1	*In your opinion, are additional studies or information necessary to evaluate the impacts of the proposed project?* There have been enough studies. *Do you have any other issues or concerns related to the project that you would like the provincial and federal EA Team to be aware of?* Let's get it done! No more money on paperwork. It would be inappropriate use of funds to spend more on studies and paperwork. Get equipment on the ground before someone gets hurt or materials (e.g. asbestos) are salvaged/used etc.	General	Comments noted.