Canadian Nuclear Safety Commission

Commission canadienne de sûreté nucléaire

Record of Proceedings, Including Reasons for Decision

In the Matter of

Applicant	Saskatchewan Research Council
Subject	Request for the Partial Removal of a Hold Point for the Gunnar Remediation Project
Public Hearing Date	September 30, 2015

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Canada

RECORD OF PROCEEDINGS

Applicant:	Saskatchewan Research Council
Address/Location:	125-15 Innovation Boulevard, Saskatoon, Saskatchewan, S7N 2X8
Purpose:	Request for the Removal of a Hold Point for the Gunnar Site Remediation Project
Date of public hearing:	September 30, 2015
Location:	Canadian Nuclear Safety Commission (CNSC) Public Hearing Room, 280 Slater St., 14th. Floor, Ottawa, Ontario
Members present:	M. Binder, Chair A. Harvey — D. D. Tolgyesi S. McEwan — R. Velshi
Secretary:	M.A. Leblanc
Recording Secretary:	D. Carrière
Senior Counsel:	D. Saumure

Applicant Represented By	**Document Number**
• J. Muldoon, Vice President, Environment Division • I. Wilson, Manager, Environmental Remediation Program • A. Klyashtorin, Chief Scientist, Gunnar Remediation Project • C. Reid, Manager, Tailings Operations Project • K. Bonstrom, Senior Geoscientist, O'Kane Associates • S. Shaw, Environmental Scientist, EcoMetrix	CMD 15-H10.1 CMD 15-H10.1A CMD 15-H10.1B CMD 15-H10.1C
CNSC staff	**Document Number**
• D. Newland, Acting Director General, Directorate of Nuclear Cycle and Facilities Regulations • K. Glenn, Director, Wastes and Decommissioning Division (WDD) • K. Lange, Senior Project Officer, WDD • D. Pandolfi, Project Officer, WDD • P. Thompson, Director General, Directorate of Environmental and Radiation Protection and Assessment • A. Levine, Advisor, Aboriginal Consultation • A. Gaw, Dosimetrist, Radiation and Health Sciences Division • G. Su, Geoscience Technical Specialist, Environmental Risk Assessment Division • G. Groskopf, Uranium Mines and Mills Specialist, Uranium Mines and Mills Division	CMD 15-H10 CMD 15-H10.A

Intervenors	Document Number
See appendix A	
Others	
• H. Sanders, Assistant Deputy Minister, Ministry of Economy • T. Moulding, Manager, Uranium & Northern Operations, Saskatchewan Environment	

Hold Point: as it pertains to the remediation of the tailings deposits, is removed

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1.0 INTRODUCTION

1. Saskatchewan Research Council (SRC) has applied to the Canadian Nuclear Safety Commission[1] to request the partial release of the Waste Nuclear Substance Licence regulatory hold point for Phase 2 of the Gunnar Remediation Project (the Project). The current licence, WNSL-W5-3151.00/2024, issued for the Project located in Northern Saskatchewan, expires on November 30, 2024.

2. The purpose of the Project is to reduce the risks posed by the Gunnar Legacy Mine Site (the Gunnar Site) in its current state to the health and safety of the public and the environment.

3. In January 2015, the Commission approved[2] the Environmental Assessment Report[3] (EA Report) and granted SRC a 10-year licence for the Project. The EA Report addresses and defines the scope of the Project and the assessment factors, along with the other requirements of the *Canadian Environmental Assessment Act* (CEAA 2012)[4]. The licence allows the remediation of the various site components within a series of phased work plans that must be approved by the Commission.

4. With that decision, the Commission requested that the Project be carried out in three phases:

    - Phase 1: maintenance and monitoring activities, and characterization of the Gunnar Site (completed);
    - Phase 2: execution of remediation activities of the various Gunnar Site components; and
    - Phase 3 post-closure care and maintenance.

    The licence includes a regulatory hold point for Phase 2 of the Project. Phase 2 of the Project consists of carrying out remediation activities of the following components of the Gunnar Site: the tailings area, the waste rock pile, the open pit, and the mine shaft. With that decision, the Commission also requested that SRC develop plans for remediation of different site components, including detailed design description reports and project schedules for each site aspect, and present those plans at a public proceeding of the Commission allowing for public participation prior to approval of Phase 2 of the Project.

5. SRC requested the release of the Project Phase 2 hold point regarding the design plan and options for the remediation of the tailings area at the Gunnar Site to allow for the

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[1] The *Canadian Nuclear Safety Commission* is referred to as the "CNSC" when referring to the organization and its staff in general, and as the "Commission" when referring to the tribunal component.
[2] Record of Proceedings, including Reasons for Decision, *Request for an Environmental Assessment and Licensing Decision for the Gunnar Remediation Project*, January 14, 2015.
[3] *Environmental Assessment Report for the Proposed Gunnar Remediation Project in Northern Saskatchewan, Saskatchewan Research Council*, CNSC, August 24, 2015 (e-Doc 4497595, CEAR 30100)
[4] Statutes of Canada (S.C.) 2012, chapter (c.) 19, section (s.) 52.

construction of a cover system on the tailings.

Issue

6. In considering the application, the Commission was required to decide if SRC has submitted the necessary documentation demonstrating that it can remediate the tailings deposits at the Gunnar Site in compliance with the *Nuclear Safety and Control Act*[5] (NSCA) and the EA Report for the Project.

Public Hearing

7. The Commission, in making its decision, considered information presented for a hearing held on September 30, 2015 in Ottawa, Ontario. The public hearing was conducted in accordance with the *Canadian Nuclear Safety Commission Rules of Procedure*[6]. During the public hearing, the Commission considered written submissions and heard oral presentations from CNSC staff (CMD 15-H10 and CMD 15-H10.A) and SRC (CMD 15-H10.1, CMD 15-H10.1A, CMD 15-10.1B and CMD 15-H10.1C). The Commission also considered written submissions from five intervenors (see Appendix A for a detailed list of interventions). The hearing was webcast live via the CNSC website, and video archives are available for a three-month period following this decision.

2.0 DECISION

8. The Commission is satisfied that SRC has provided the necessary information to demonstrate that it can remediate the tailings deposits at the Gunnar Legacy Uranium Mine Site in compliance with the NSCA. Based on its consideration of the matter, the Commission is satisfied that SRC, as it proceeds with the remediation of the tailings deposits, will continue to make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed. Therefore,

> the Commission removes the Gunnar Remediation Project Phase 2 hold point as it pertains to the remediation of the tailings deposits at the Gunnar Legacy Uranium Mine Site.

9. The hold point for remediation of the other site components, including waste rock, the open pit and the mine shaft, remains in place and will be considered by the Commission at a later date, where the public will be invited to participate.

[5] S.C. 1997, c.9.
[6] Statutory Orders and Regulations (SOR)/2000-211.

10. With this decision, the Commission delegates the review and approval of the Detailed Design Description Report and project schedule for the remediation of the tailings deposits at the Gunnar Site prior to the start of remediation activities to the Director General of the Directorate of Nuclear Cycle and Facilities Regulation or the Executive Vice President of the Regulatory Operations Branch.

3.0 ISSUES AND COMMISSION FINDINGS

11. In making its licensing decision, the Commission considered a number of issues and submissions relating to SRC's response to the Commission's requirements and criteria to be met before the removal of the hold point. The Commission also considered the adequacy of the proposed measures for protecting the environment, the health and safety of persons, and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.

3.1 Background and Project Phase 2 Planned Activities

12. SRC explained that the purpose of the Project is to reduce the radiological and toxicological risk that the Gunnar Site poses to the public and the environment by utilizing sustainable remediation options that are both technically and economically feasible. The Project must include the implementation of a long-term environmental monitoring program and must minimize long-term care and maintenance as part of eventual entry of the Gunnar Site into the Saskatchewan Institutional Control Program[7] (ICP). CNSC staff reported that, although the current site has measurable impacts on the environment, effects are localized and radiation doses to members of the public are below the regulatory dose limit[8]. Remedial efforts at the site are therefore focused on stabilizing the tailings and waste rock area and isolating them from the environment. The EA presented preliminary options for remediation of site components; however, SRC required additional characterization work to develop specific remediation design plans.

13. CNSC staff reported that SRC has completed the site characterization work required by Phase 1 of the Project. SRC submitted the *Gunnar Site Remediation Project – Tailings Remediation Plan* (Tailings Remediation Plan) to CNSC staff on July 7, 2015. CNSC staff reviewed the Tailings Remediation Plan and submitted a request to SRC for additional information. SRC responded to this request by publishing the revised Tailings Remediation Plan on August 17, 2015. CNSC staff confirmed on August 21, 2015 that the Tailings Remediation Plan satisfied all CNSC regulatory requirements and that CNSC staff would follow up on detailed construction plans and oversight processes once a contractor is selected for the remediation work.

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[7] Statutes of Saskatchewan (S.S.) 2014, c. R-4.21 – *The Reclaimed Industrial Sites Act*

[8] The regulatory effective dose limit to a member of the public is 1 millisievert per calendar year (*Radiation Protection Regulations*, SOR/2000-203)

14. SRC noted that the detailed engineering design for the tailings portion of the Project is underway and is pending approval of the Tailings Remediation Plan. SRC also noted that equipment is being transported to the Gunnar Site in preparation for all Phase 2 remediation activities, and that SRC plans on transferring local labour and equipment from the recently remediated Lorado Mill site to the Gunnar Site.

15. The Commission enquired about the status of the remediation plans for the other site components. CNSC staff responded that it conducted a conformity review of the plans submitted by SRC for the other site components and no major gaps were identified. At the time of the hearing, CNSC staff was carrying out a detailed review of the plan for the other site components. The plans have been posted for public review, and CNSC staff will be soliciting written interventions. CNSC staff explained that the participant funding issued[9] to review SRC's application to remove the regulatory hold point for Phase 2 of the Project (discussed further in section 3.3 below) included funding for the review of remediation plans for all site components.

16. The Commission enquired about lessons learned from the Lorado Mill remediation work. A SRC representative explained that they learned they must ensure building materials are available prior to the start of construction, and of the importance of involving local people and having meaningful consultations with communities. SRC is also utilizing expertise developed during other uranium mine and mill remediation work. The SRC representative noted that the Gunnar Site requires a more complex remediation; however, the tailings components of the two sites are similar. CNSC staff discussed the remediation work completed at the Lorado Mill site, as well as inspections conducted at this site. CNSC staff noted that the Lorado Mill site is well maintained and the cover is currently meeting its design objectives.

17. In regards to concerns raised by the Saskatchewan Environmental Society in their submission regarding the adequacy of funding to complete remediation work at the Gunnar Site and for the long-term monitoring of the site, the Commission asked if sufficient funds are available. A SRC representative confirmed that sufficient funds are available to implement the remediation plan.

18. During the hearing, CNSC staff verbally requested that the Commission delegate to the Director General of the Directorate of Nuclear Fuel Cycle Regulation or the Executive Vice President of the Regulatory Operations Branch the authority to allow SRC to proceed with other Phase 2 activities upon acceptance of the documentation listed in the LCH pertaining to the licensed activities at the Gunnar Site. CNSC staff stated that it will take appropriate regulatory action if SRC is found to be non-compliant with the requirements established by the Commission. CNSC staff committed to providing the Commission annual reports on the status of the Project. The Commission considered CNSC staff's request. However, the Commission wishes to keep the authority to release the remainder of Phase 2 activities. The Commission therefore does not confirm

[9] CNSC Participant Funding Program Decision, *Saskatchewan Research Council's Application to Remove the Licence Hold Point for Phase 2 of the Gunnar Remediation Project*, August 12, 2015.

delegation from the Commission to the Director General of the Directorate of Nuclear Cycle and Facilities Regulation or the Executive Vice President of the Regulatory Operations Branch of the authority to allow SRC to proceed with the other Phase 2 activities upon review and acceptance of the documentation listed in the LCH pertaining to the licensed activities at the Gunnar Site. Approval to proceed with the remainder of Phase 2 and with Phase 3 of the Project will be decided by the Commission at a later date.

3.2 Tailings Remediation

3.2.1 General Description of the Tailings Remediation Plan

19. The Commission examined the acceptability of SRC's plan for the remediation of the tailings deposits at the Gunnar Site to confirm that the plan is in accordance with CNSC regulatory requirements and the objectives outlined in the EA Report for the Gunnar Site that was approved by the Commission in January 2015.

20. SRC stated that the purpose of the Tailings Remediation Plan is to present the preferred remediation design for the exposed tailings deposits at the Gunnar Site. The preferred option was determined during the EA as in situ remediation of the tailings using an earthen cover system to mitigate ecological and human health risks to acceptable levels post-reclamation.

21. The Tailings Remediation Plan presents the preferred final landform design for the tailings area, as well as the proposed borrow materials and sources. As discussed in more details in the Tailings Remediation Plan, SRC provided a detailed description of the activities related to the review of available background information, assessments performed, development of programs and selection of the preferred option.

3.2.2 Preferred Tailings Remediation Designs

22. SRC detailed the preferred tailings remediation designs for the three primary tailings deposits at the Gunnar Site: Gunnar Main, Gunnar Central and Langley Bay. The preferred tailings remediation designs for Gunnar Main and Gunnar Central consist of:

- creating water-shedding landforms using waste rock to stabilize the tailings;
- placing a minimum 0.6 metre thick cover of borrow material; and
- constructing armoured drainage channels to direct surface water runoffs.

The preferred tailings remediation design for Langley Bay consists of:

- using borrow material or quarried fill that establishes a defined beach area based on the estimated high water level for Langley Bay;

- placing riprap material along Back Bay and Langley Bay shorelines to protect the tailings cover system from wave action and ice scour; and
- constructing armoured drainage channel to provide an outlet for the Back Bay catchment to Langley Bay.

23. For the secondary tailings, SRC also detailed the preferred tailings remediation designs (Gunnar Main Back Release (Catchment 3) and Beaver Pond tailings areas). The preferred tailings remediation design for these two areas is to cover the tailings in-place using a one metre borrow material cover. SRC stated that a thicker cover is required for these areas due to wetter conditions and the requirement for additional separation between the rooting zone and the local water table.

24. SRC detailed a vegetation plan to ensure a dense and sustainable vegetation canopy is established allowing for effective erosion control and high transpiration capacity of the final tailings cover system. SRC also detailed its surface water management activities that will assure the long-term integrity and performance of the reclaimed areas. SRC noted that further details regarding vegetation and surface water management will be included in the forthcoming detailed construction plan.

25. SRC also provided construction details, indicating that the contractor for conducting infrastructure preparation and tailings cover construction will be selected through a procurement process. Regarding worker accommodations, SRC stated that the existing camp is adequately sized and only minor modifications are required. Heavy equipment will be mobilized to the Gunnar Site via extension of the winter road from Uranium City during the 2015-2016 winter season. SRC also explained that non-hazardous waste generated through remediation activities will be disposed of on-site in an appropriate manner within the designated disposal facility. All hazardous materials generated (if any) by remediation activities will be transported off-site for disposal at a licensed facility.

26. SRC presented a preliminary timeline of tailings remediation activities, stating that remedial work is anticipated to be completed over a three- to six-year period following the removal of the Phase 2 hold point.

27. SRC discussed its failure mode analysis for the preferred remediation designs, and stated that mitigation measures for failure modes that result in unacceptable/intolerable risk ratings relate to rigorous detailed design. SRC stated that, provided the proposed mitigation measures or alternative measures are implemented to address the potential risks, it expects that the proposed reclamation designs for the Gunnar tailings facilities will be geotechnically stable and will minimize the effects on the receiving environment to acceptable levels in the long-term. The Fond du Lac First Nation suggested that SRC also identify hazards as they relate to traditional uses of the land and to human health.

28. CNSC staff reported having reviewed the Tailings Remediation Plan and found that the preferred tailings remediation designs meet the main EA objectives to improve surface

water quality, reduce radiation exposure, promote vegetation and suppress dust. CNSC staff found that the Tailings Remediation Plan complies with CNSC regulatory requirements and meets the objectives of the EA for the Project.

29. CNSC staff reported that the Saskatchewan Ministry of Environment (SME) also carried out a technical review of the Tailings Remediation Plan and found it to be acceptable. The SME will grant the necessary provincial approvals for the tailings remediation work. CNSC staff stated that it communicates regularly with the SME regarding the Tailings Remediation Plan, and that it will work with the SME on establishing maintenance and monitoring objectives for the Gunnar Site to ensure its long-term safety.

30. In their submission, the Saskatchewan Environmental Society requested that further analyses be made, and asked to review the final detailed design plan before a decision to remove the hold point is made. Further to that request, the Commission asked if the detailed design plan will deviate from the design proposed in the Tailings Remediation Plan. A SRC representative responded that the design described in the Tailings Remediation Plan will be the design used by SRC to remediate the tailings. The SRC representative explained that the forthcoming construction plan serves to fill gaps on operational aspects of the Project and provides more design information. The Commission asked how CNSC staff plans to oversee and review plans pertaining to the construction of the preferred design. CNSC staff described its oversight and compliance verification activities, stating that conditions in the licence ensure that the work done to support the Project meet the objectives of the EA and are in accordance with regulatory requirements. CNSC staff will also conduct an increased number of inspections during the construction phase to verify the remediation work.

3.2.3 Geotechnical Engineering and Geology

31. SRC provided summaries of borrow material volumes and material properties determined by field investigations and laboratory testing. SRC also described how they will source and analyse the suitability of waste rock material and riprap material prior to placement on the covers. SRC provided information about the design of the covers, including the proposed surface grades and slopes to ensure that the final landforms are geotechnically stable. SRC detailed construction elements to be addressed in the final detailed design information and construction plan phase, which will include construction schedule and logistics, details on the placement of cover material in various areas, dust emission reduction methods of tailings or borrow material cover to workers and the environment, and occupational health and safety provisions.

32. CNSC staff reported that it reviewed SRC's Tailings Remediation Plan to determine whether the geotechnical and hydrological aspects of the plan were in accordance with the requirements of engineering best practices for similar sites, as well as with CNSC Guidance Document G-320, *Assessing the Long-term Safety of Radioactive Waste Management*. CNSC staff stated that it will assess compliance by reviewing the final

detailed design specifications and construction plan, as well as reviewing as-built records. CNSC staff found that the geotechnical engineering and hydrological component of the remediation plan for the tailings areas satisfy the requirements of the EA and CNSC regulations.

33. The Commission enquired about the design of the Langley Bay and Back Bay covers, and asked why riprap rock does not cover tailings into Back Bay. The SRC representative reported that there will be an armoured riprap protection on the surfaces adjacent to the water in both Langley Bay and in Back Bay. The SRC representative explained that the armoured riprap protection will not cover the entire length of the tailings in Langley Bay; it will be placed on the shore where the tailings are adjacent to Langley Bay water and Back Bay shorelines.

34. In their submission, the Prince Albert Grand Council included the results of a study conducted by the University of Alberta which found that many respondents to First Nations community consultations regarding the Tailings Remediation Plan are concerned that piling large volumes of waste rock on the tailings will result in long-term problems, including seepage and pollution into Langley Bay. SRC representatives responded that SRC has completed detailed modelling as part of the conceptual model developed for the Tailings Remediation Plan which has shown that the inclusion of waste rock on the tailings as part of the landform design will not result in an increase of contaminant loading to Langley Bay. The contribution of loadings from the waste rock will be offset by the reduction in loadings from the tailings (the main mechanism of loading to Langley Bay). The SRC representative noted that the waste rock is not contaminated; it is left over rock from mining practices.

35. In its submission, the Saskatchewan Environmental Society stated that the Tailings Remediation Plan should not be approved until uncertainties regarding the sufficiency and the quality of borrow material are addressed, and suggested using larger volumes of waste rock in tailings landform and cover system design. The Commission requested further information from SRC regarding the intervenor's concerns. A SRC representative responded that SRC's studies have confirmed that sufficient building material for the preferred design described in the Tailings Remediation Plan is available. CNSC staff reported that it has analysed the estimates of borrow material and found that SRC has provided sufficient information to demonstrate that the required volumes of borrow material will be available. CNSC staff reported that the details will also be reviewed by CNSC staff during SRC's procurement of engineering services for construction.

36. In their submissions, the Saskatchewan Environmental Society and the Athabasca Chipewyan First Nation discussed the use of permeable reactive barriers (PRB) and phytoremediation in the remediation of the tailings. The Commission requested further information, including why PRB technology and phytoremediation are not being considered in the preferred cover designs presented in the Tailings Remediation Plan. CNSC staff explained the PRB technology. A SRC representative stated that, while these remediation techniques are not currently included in the preferred designs, SRC

will consider the value these technologies may add to the project. CNSC staff reported that the proposed design currently meets the objectives of the EA and CNSC requirements. If SRC decides it wants to deviate from their remediation plan by incorporating these remediation techniques, the changes must be reviewed by CNSC staff. The SRC representative informed the Commission that it plans to proceed with the design presented, but that slight modifications may be made in the construction plan.

37. The Commission asked how the borrow sites will be managed following the removal of material for the construction of tailings covers. The SRC representative explained that the non-mineral soils, the duff and/or growing media will be put aside and replaced on the site once the borrow material has been removed. The borrow sites will be re-graded and seeded using regional plant species in order to promote natural recovery.

3.2.4 Hydrology

38. SRC explained that it must properly manage surface waters in order to ensure the long-term integrity and performance of the reclaimed areas. Surface water drainage on the three primary tailings deposits will be designed to direct water to Langley Bay in a controlled manner in order to minimize contact between fresh water and the tailings, minimize erosion, and avoid the re-suspension of tailings, taking into consideration local conditions of climate, vegetation and soils. SRC stated that rock armoured drainage channels will be required to provide resistance to soil erosion during higher flow events.

39. SRC stated that a design storm event with a recurrence interval of 200 years was used to calculate peak flows for design of drainage channels required for the tailings remediation design. SRC detailed the design storm peak flow calculation. SRC defined areas requiring rock armouring to provide adequate protection against unacceptable erosion of areas remediated with cover system, and described the design of drainage channels. CNSC staff noted being satisfied with the selection of the 200-year design storm, provided that follow-up monitoring and maintenance programs are implemented.

40. SRC reported that surface water quantities and qualities are very well characterized at the Gunnar Site. SRC reported that site-specific remedial objectives (SSROs) have been calculated to identify constituents of potential concern (COPCs) for the Gunnar Site in surface waters being released from the Site. SRC explained its approach for calculating SSROs. SRC stated that the suggested SSROs do not apply to the pit water in its current location or to ground water and surface water that pass through areas of the Gunnar Site that do not constitute possible important areas of biological exposures.

41. SRC stated that surface runoff waters will contain elevated levels of suspended sediments until the cover surfaces stabilize and the seeded revegetation mixture adequately develops, which should occur within two to three years. A potential concern

is waters with higher total suspended solids (TSS) entering nearby streams or lakes. Where necessary, wire-backed silt fences or an equivalent product will be installed to limit sedimentation of fish-bearing waterbodies.

42. SRC provided information on subsurface and groundwater hydrology that was measured at the Gunnar Site. SRC reported that groundwater quality data for the Gunnar Site has been assessed against the Tier 2 values generated using the *Guidance Document on Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites*[10] developed for Environment Canada. Radionuclide parameters have been assessed against the *Alberta Tier 1 Soil and Groundwater Remediation Guidelines*[11].

43. CNSC staff reported having reviewed SRC's tailings remediation plan to determine whether its hydrological aspects were in accordance with the requirements of engineering best practices, as well as with CNSC Guidance Document G-320. CNSC staff stated that it will verify compliance by reviewing the design specifications of the surface draining system, the detailed follow-up monitoring program, as well as the detailed soil cover maintenance program to assure the long-term stability of the cover system. CNSC staff reported that it is satisfied with the hydrological component of the remediation plan for the tailings areas and that it satisfies the requirements of the EA.

44. The Commission enquired about climate change scenarios for the Gunnar Site. A SRC representative stated that a one in 200-year storm event was used as a climate change scenario, which SRC assessed as being a reasonable scenario. The Commission asked why a one in 200-year event was chosen, even though a one in 1000-year event was assessed. A SRC representative explained the changes that would be required to the channel designs to protect against a one in 1000-year rainfall event, and confirmed that a one in 200-year event is an appropriate model for the Gunnar Site. The Commission enquired about the response that would be required should a one in 1000 year event occur if the site is designed to a one in 200-year event. A SRC representative explained that the ICP provides the ability to mitigate the Gunnar Site following a one in 1000-year event to meet regulatory requirements.

45. In their submission, the Métis Nation Saskatchewan suggested that two creeks flowing through the Gunnar Site be diverted. A SRC representative reported that the two creeks mentioned by the intervenor are outside of the tailings area footprint and would, therefore, not require diversion. The SRC representative noted that SRC's assessment of the Gunnar Site found that the two creeks are not contaminated but will continue to be monitored during remediation, post-remediation and possibly through ICP.

3.2.5 Radiation Exposure and Radiation Protection Measures

46. SRC reported that remediation performance criteria established for the Gunnar Site

[10] Esdat Environmental Database Management Software (May 2010)
[11] Alberta Environment (December 2010)

require that areas demonstrating average gamma dose rates in excess of 1.0 microsievert per hour (µSv/h) above background radiation (averaged over one hectare of surface area), or with a maximum spot dose in excess of 2.5 µSv/h above background radiation will be remediated. This is based on the CNSC and SE cumulative dose limit of one millisievert (mSv) per year.

47. CNSC staff reported that, through updated gamma surveys from the Phase I work, SRC provided measurements of gamma radiation on the tailings at the Gunnar Site. CNSC staff reported that it reviewed the updated gamma surveys, along with the proposed cover design, to ensure that the cover is capable of controlling all sources of radiation exposure. Many intervenors expressed concerns regarding the proposed thickness of the tailings covers. CNSC staff determined that the thickness and composition of soil cover is sufficient to control radiation impacts including gamma radiation, radon exhalation and releases of radioactive dust. The cover design is consistent with best practices for uranium mine tailings at similar sites. CNSC staff confirmed that SRC has a verification program in place to confirm protection from gamma radiation, radon gas emissions and radioactive dust emissions.

48. SRC stated that waste rock emitting gamma radiation at higher levels will be placed in deeper parts of Mudford Lake or Beaver Pond. SRC also presented the current state of the various parameters at the Gunnar Site and the expected parameters post remediation, and compared the data against the criteria of the site. SRC reported that the proposed design will meet all of the criteria presented in the EA Report.

49. CNSC staff reported that it reviewed the inventory of the tailings that was presented in the EA including updated gamma surveys from the Phase 1 work, along with the proposed cover design to ensure that the covers are capable of controlling all sources of radiation exposure. The covers were evaluated against best engineering practices and internationally accepted methods for decommissioning tailings sites. CNSC staff stated that the proposed material and thickness of the covers are sufficient to reduce gamma radiation below the remediation performance criteria. CNSC staff also stated that the proposed cover design will ensure the exposure due to the tailings following remediation will meet the regulatory public dose limit of 1 mSv/year. With a minimum thickness of 0.6 metres over the tailings surface, the proposed soil cover is expected to reduce radon gas exhalation to background radiation levels at the ground surface. The cover will reduce wind-blown radioactive dust and protect against erosion to help minimize future releases of dust. SRC has a verification program in place to confirm protection from gamma radiation, and from radon gas and radioactive dust emissions. SRC must implement a quality assurance and control program for construction to ensure that the cover is constructed as per design specifications.

50. The Commission enquired about concerns raised by the Saskatchewan Environmental Society in their submission regarding uncertainties in tailings volumes estimates. A SRC representative responded that an increase in tailings volumes would not impact the tailings remediation design and borrow material volumes required since the tailings footprints are known and will not change, and changes in tailings loading volumes

would not have a significant impact on loading estimates.

51. Regarding air quality, SRC reported that the Project has been designed to realize an overall net positive effect on air quality; windblown contaminants in the region will be greatly reduced or eliminated by removing accessibility to the source. Closure activities may emit airborne particulate matter from road dust, diesel combustion, and the disturbance and transportation of soils. Relocation of temporarily stored asbestos containing material could also result in the release of particulate matter. SRC stated that mitigation measures will be used to minimize ambient air particulate concentrations. A review of the tailings inventory in the EA led to CNSC staff concluding that covering the tailings would reduce wind-blown radioactive dust, and that additional aspects of the cover design, such as erosion protection, would help minimize future releases of dust. CNSC staff also confirmed that the proposed soil cover is expected to reduce radon gas exhalation to background levels.

52. CNSC staff stated that the impact of air contaminant emissions resulting from remediation activities of the tailings areas is very low and will not result in an adverse impact to the health and safety of persons and the environment. Dust and radon emissions will be monitored by SRC throughout remediation activities and reported to the CNSC for evaluation.

53. The Commission enquired about Athabasca Chipewyan First Nation's request for physical barriers to prevent fish from entering or leaving contaminated areas of Zeemel Bay, Langley Bay and Back Bay. SRC representative explained that fish barriers may disrupt fish habitat and that using localized fish consumption advisory is a better alternative and management tool.

54. In their submission, the Fond du Lac Denesuline First Nation commented on the prevalence of certain cancers in the neighbouring communities. CNSC staff explained that, according to the EA, the dose estimates for members of the public that occupy the Gunnar Site and carry out activities such as consuming local food and water were much lower than the levels that could produce noticeable health effects. CNSC staff explained that public health issues have been extensively studied in northern Saskatchewan and that no relationship between the health of northern communities and uranium mining activities has been found. These health studies are ongoing and community members have access to this information through public health officials.

55. The Commission asked if waste of buildings demolished on the Gunnar Site pose a radiation risk to workers or the environment, and asked how waste from these demolished buildings will be removed from the site. A SRC representative responded that SRC is currently focussing on the remediation of the tailings, and SRC is working with CNSC staff to develop options for remediating other site aspects, including debris. Debris has been contained to ensure that contamination risks are managed until a disposal option is determined.

3.2.6 Maintenance and Monitoring Programs

56. SRC reported that a conceptual model of cover system performance has been developed as it relates to four critical aspects of performance:

- radiation protection
- water balance fluxes
- propensity for solute uptake
- anticipated reduction of COPC loadings to aquatic receiving environment

57. SRC reported that it will use direct measurement of field performance to demonstrate that the covers are performing as intended. The minimum level of monitoring will include climatic conditions (for determination of potential evaporation rates), site-specific precipitation, cover material moisture storage changes, watershed or catchment area surface runoff, vegetation growth, and erosion. SRC recommended that a performance monitoring system be designed and installed on the remediated primary tailings deposits at the Gunnar Site. Recommendations for surface and groundwater monitoring will be provided in the detailed design report. Details related to monitoring locations, parameters that will be measured and their frequency will be outlined in the final detailed design information and construction plan report. The performance monitoring system will be dependent on the final landform and cover system for each tailings deposit.

58. SRC reported that maintenance of the landforms will also be required to assure long-term stability. SRC recommended that the cover system surfaces be inspected for erosional features such as rills and gullies annually after spring melt and prior to the first snowfall, as well as after large rainfall events. Erosion maintenance work would likely consist of infilling of deep rills and gullies with cover system material. Areas showing signs of settlement will also require filling with cover system material. SRC recommended that SRC personnel collect data and verify the performance monitoring system at the Gunnar Site on a monthly basis. Further details on the maintenance program will be outlined in the final construction plan report for the tailings remediation plan, as the maintenance program is closely related to the monitoring program.

59. CNSC noted that it considers the follow-up monitoring and maintenance programs to be sufficient to ensure long-term performance. CNSC staff stated that it will verify compliance by reviewing the final detailed design specifications and the construction plan, as well as reviewing as-built records to ensure the long-term integrity of the landscape and cover system.

60. In their submissions, the Saskatchewan Environmental Society and the Fond du Lac Denesuline First Nation expressed concerns regarding the long-term stability of the tailings cover design presented in the Tailings Remediation Plan. The Commission enquired about the intervenor’s request for a design that ensures the stability of the tailings for thousands of years. CNSC staff responded that the design is limited by the

quantity of borrow material available, but that the proposed design includes measures to control erosion. CNSC staff explained that, once the vegetation cover is well established, the potential for erosion will be greatly reduced and the cover will be stable for upwards of one thousand years. Until the vegetation cover is established, the monitoring program will be important for erosion control. Long-term institutional control will only be considered once CNSC staff is satisfied that monitoring is no longer required. CNSC staff stated that provisions are in place within the CNSC licensing and compliance program to ensure the licensee implements changes to the cover as required should the cover not behave as expected.

61. Further to concerns regarding the long-term stability of the Gunnar Site, the Commission asked if the site will be transferred into the provincial ICP by the forecast 2030 date. CNSC staff responded that the 2030 transfer date is for planning purposes and that the Gunnar Site would not be transferred into the ICP until all of the EA objectives are met and long-term stability of the tailings covers is proven. CNSC staff confirmed that the Commission and the SME must both confirm the readiness of the Gunnar Site for release into the ICP. A representative from the Saskatchewan Ministry of the Economy explained the unforeseen events fund that will be created when the Gunnar Site is transferred into the provincial ICP to ensure long-term care of the site and to ensure funds are available to mitigate changes in the site that may occur following its transfer to the province. The Commission asked if it would be difficult to access the site following transfer into the ICP should problems arise. The representative from the Saskatchewan Ministry of the Economy responded that, given the unforeseen events fund, a maintenance and monitoring fund will provide the money required to enable long-term monitoring and maintenance.

62. In reference to the submission from the Athabasca Chipewyan First Nation, the Commission asked if SRC and the CNSC have the necessary experience to ensure the plan is executed as intended, monitored appropriately, and to ensure early detection of problems or possible deviations from the plan. CNSC staff responded that it has acquired the necessary experience from compliance and verification activities conducted at other remediated sites. CNSC staff confirmed that it always uses staff of appropriate experience to oversee and monitor work. CNSC staff will ensure the licensee carries out the activities in a safe and compliant manner. A SRC representative stated that SRC has an experienced team of experts in the field of legacy mine and mill site management. SRC also regularly interacts with world leading experts to help deliver their projects. SRC noted that SRC and its contractors have participated in asbestos abatement training, safety training, radiation protection training, essential skills training, driver’s licence training and heavy equipment operation training. SRC stated it will continue to expand their training program using inputs from community members.

63. In their submission, the Athabasca Chipewyan First Nation recommended that people be discouraged from frequenting the Gunnar Site area. The Commission enquired about the end objective of the Site post-remediation. A SRC representative stated that the end objective is to allow traditional use of land adjacent to the Gunnar Site. Access

to the site will be restricted following its release into the ICP. The SRC representative reminded that the intent of the remediation work is to isolate the contaminants.

3.3 Aboriginal Engagement and Public Information

3.3.1 Participant Funding Program

64. In May 2015, the CNSC announced that it was offering up to $20,000 to assist members of the public, Aboriginal groups and other stakeholders in reviewing SRC's detailed remediation option plans and submitting comments to the Commission. The CNSC awarded up to $47,790.32 in participant funding through its Participant Funding Program (PFP) to the following four applicants, all of which provided written interventions at the Commission hearing:

- Athabasca Chipewyan First Nation and Mikisew Cree First Nation
- Prince Albert Grand Council (Representing Black Lake Denesuline First Nation, Fond-du-Lac Denesuline First Nation, and Hatchet Lake Denesuline First Nation)
- Saskatchewan Environmental Society
- Métis Nation – Saskatchewan Northern Region 1 (Representing Uranium City Métis Local #50, Stony Rapids Métis Local #80, and Camsell Portage Métis Local #79)

3.3.2 Public Information

65. CNSC staff reported that it informed the public of SRC's application to remove the Project Phase 2 hold point via the CNSC website and other methods. CNSC staff also reported that SRC posted the remediation plan on its website in July 2015 for public review. CNSC staff stated that it has encouraged the public to participate in the Commission's public hearing, and that it has provided assistance to interested members of the public, Aboriginal Groups and other stakeholders, through the PFP, to prepare for and participate in the Commission's public hearing by written interventions.

3.3.3 Aboriginal Engagement

66. The common law Duty to Consult with Aboriginal peoples applies when the Crown contemplates actions that may adversely affect established or potential Aboriginal and/or treaty rights pursuant to section 35 of the *Constitution Act, 1982*[12]. The CNSC, as an agent of the Crown and as Canada's nuclear regulator, recognizes and understands the importance of building relationships with Canada's Aboriginal peoples. The CNSC ensures that licensing decisions under the NSCA meet these responsibilities through Aboriginal consultation activities.

67. SRC provided details of its engagement activities with Aboriginal communities and organizations, and also introduced the key methodologies proposed for assisting with consultation activities for the tailings cover system design project. SRC stated that they

[12] *Constitution Act, 1982*, Schedule B to the *Canada Act 1982*, 1982, c. 11 (U.K.)

communicated with community members using various means. SRC noted that their engagement efforts involved numerous meetings and workshops, as well as studies and interviews. SRC stated that it also conducted site tours with interested individuals and groups. SRC reported that the protection of cultural places and wildlife habitat at the Gunnar Site is paramount. SRC provided a summary of community engagement meetings they led in 2014. SRC also described its current engagement activities. SRC stated that private industries, Aboriginal groups and government officials have all found SRC to have an industry leading community engagement strategy, and SRC has maximized local involvement and sustainable development opportunities.

68. SRC stated that it provided opportunities for community members to actively contribute to the project, and explained how community input has and will continue to influence the project. SRC noted that it will continue its community engagement activities and will implement a community environmental monitoring program and Aboriginal site supervisor program. The Fond du Lac Denesuline First Nation stated that a community monitoring program is important to strengthen community confidence throughout the Project.

69. CNSC staff reported that, since the Commission hearing held on November 6, 2014, it continued to provide all identified Aboriginal groups with project updates and participated in consultation activities. As a follow up to the June 2015 working group meeting organized by SRC, CNSC staff and SRC jointly organized a Gunnar Remediation Options Workshop on July 28, 2015 to bring community representatives together to discuss SRC's proposed remediation plans for the tailings area and other Gunnar Site aspects, and to solicit feedback from community representatives. CNSC staff stated that the workshop was successful, and community representatives provided valuable feedback on the tailings remediation plan directly to SRC and its engineering consultants. Follow-up items identified included the need for more information on the vegetation plan for the cover, providing meeting materials in Dene and providing more details on the cover design. SRC responded to the requests by supplying additional information and translating the presentations into Dene. CNSC staff reported that, although the issues raised to date are important, CNSC staff has been made aware of any concerns related to the tailings remediation process that may adversely impact identified potential or established Aboriginal and/or treaty rights. CNSC staff also stated that it found that Aboriginal consultation activities conducted to date have been adequate and CNSC staff is committed to ongoing consultation with the identified Aboriginal groups as the project proceeds.

70. CNSC staff reported that Aboriginal groups with potential interest in the project were identified early in the review process, provided with information about the project, given an opportunity to comment on key documents throughout Phase 1 of the Project, and encouraged to submit comments as part of the Commission's hearing process and to inform the Commission of any outstanding issues or related interest regarding the project.

71. CNSC staff also reported that, throughout all phases of the project, SRC and the federal

and provincial governments have met with Aboriginal groups and organizations to provide information about the Project, discuss the potential environmental effects, encourage participation in the regulatory review process, seek input on remedial options, and request information as to how the Project, as proposed, could cause adverse impacts to potential or established Aboriginal and/or treaty rights.

72. CNSC staff stated that the identified Aboriginal groups will continue to have an opportunity to submit comments to the CNSC regarding the technical remediation plans for the other site aspects. CNSC staff will continue to inform and engage the identified Aboriginal groups and organizations about the project activities including the remediation activities and EA follow-up program through Phases 2 and 3 of the Project.

73. The Saskatchewan Environmental Society and the Métis Nation Saskatchewan stated that they were pleased with SRC's willingness to consult with Aboriginal groups.

74. Regarding the submission from the Athabasca Chipewyan First Nation, the Commission asked if the Aboriginal community will be involved in the site monitoring activities. A SRC representative stated that they have a program in place which will provide local Aboriginal community members the opportunity to be involved during remediation activities, and that they will provide them with a training program so that when SRC hands the site to the ICP, local community members will have the capacity to monitor the program in the long-term.

75. In their submissions, the Prince Albert Grand Council (PAGC) and the Fond du Lac First Nation stated that they found SRC's consultation process to be deficient. The Commission enquired on the consultation process. The SRC representative described its consultation efforts, noting that it will continue to have discussions with the identified Aboriginal groups as the project unfolds and that it will address their concerns where feasible.

76. The Commission asked SRC if comments made by various individuals interviewed by the University of Alberta (presented in PAGC's submission) regarding the Tailings Remediation Plan were taken into consideration. A SRC representative responded that SRC listens to all comments and incorporates suggestions into its programs where appropriate.

77. In their submission, the Fond du Lac Denesuline First Nation expressed concerns regarding potential negative impacts on cabins and traditional uses close to the project site, as well as concerns over prevailing winds that may bring project effects into the cabin areas. A SRC representative has confirmed that cabins in close proximity to the Gunnar Site are seldom used, but that SRC communicates with neighbouring communities and determines potential impacts if there are people in the area to ensure people are aware of the plan and continue to communicate with SRC. During remediation, safety and environmental factors would be managed through SRC's management system. The neighbouring cabins may be subject to a very short-term

impact during the work itself, but the risk is low since they are not or rarely occupied.

78. The Commission enquired about consultation efforts between SRC and the Fond du Lac Denesuline First Nation. A SRC representative described its consultation efforts with the Fond du Lac Denesuline First Nation, noting that they were a regular part of SRC's community consultations and will continue to be throughout the remediation work. Regarding the intervenor's request for design modifications of the Tailings Remediation Plan, CNSC staff explained that the EA process considered the options, and analyses were conducted to determine the preferred option.

79. Results of community consultations regarding the Tailings Remediation Plan presented in PAGC's submission show that many respondents are of the opinion that SRC did not provide adequate employment opportunities to Aboriginal people during the Lorado site remediation. A SRC representative explained that SRC's procurement process requires local and direct contractor involvement in the Project. The SRC representative explained SRC's efforts to support local Aboriginal people, but stated that it is not possible for SRC to meet all of the existing needs of local communities. The Commission asked if an Impact and Benefit Agreement[13] (IBA) could be used to ease concerns of local Aboriginal communities. The SRC representative stated that IBA is an effective tool for operating mines, but that, since the remediation project is short lived, SRC has instead evaluated existing IBAs to determine how components of those agreements can be applied informally to ensure the Project benefits local communities. SRC noted improvements made in the last three years to better serve local communities and stated that SRC will continue to try to ensure the Project benefits local communities.

80. In regards to the submission from the Fond du Lac Denesuline First Nation, the Commission enquired about the archeological and cultural importance of the borrow sites. An SRC representative responded that determining the archeological and cultural importance of borrow sites is an important factor that was assessed. Traditional land use and traditional knowledge studies were conducted for the Gunnar Site as part of the EA. All work on borrow areas are investigated and cleared by provincial authorities prior to the start of work.

3.3.4 Conclusions on Aboriginal Engagement and Public Information

81. In the *Record of Proceedings, including Reasons for Decision* published on January 14, 2015, the Commission required that intervenors be given the opportunity to participate in the review of SRC's request to release the hold point for Phase 2 of the Project. The Commission concludes that members of the public, Aboriginal groups and other stakeholders have been encouraged to participate in the review of SRC's request to release the hold point for Phase 2 Project activities relating to the remediation of the Gunnar Site tailings. Furthermore, assistance has been offered to prepare for and participate in the

[13] A formal contract outlining the impacts of the project, the commitment and responsibilities of both parties, and how the associated Aboriginal community will share in benefits of the operation through employment and economic development.

Commission's public hearing through the CNSC Participant Funding Program (PFP).

82. The Commission acknowledges SRC's efforts and commitments made in relation to Aboriginal engagement and the legal duty to consult. The Commission also acknowledges the efforts made by CNSC staff in relation to the CNSC's obligations regarding Aboriginal engagement and the legal duty to consult.

83. Based on this information, the Commission is satisfied that SRC's public information program meets regulatory requirements and is effective in keeping Aboriginal people as well as the public informed on project operations.

84. The Commission is also satisfied that Aboriginal communities and the public have had adequate opportunity to participate in this public proceeding to consider Phase 2 of the Project pertaining to the remediation of the tailings deposits at the Gunnar Site. The Commission will consider other Phase 2 components at a later date, and the Aboriginal communities and the public will have an opportunity to participate.

85. Based on the information presented, the Commission concludes that Aboriginal engagement is acceptable for the purpose of the current request for the partial release of the Project Phase 2 hold point regarding the design plan and options for the remediation of the tailings deposits at the Gunnar Site. The Commission is satisfied that the proposed removal of the hold point pertaining to the remediation of the tailings deposits at the Gunnar Site will not cause any adverse impacts to any potential and/or established Aboriginal or treaty rights and that the engagement activities undertaken for the review of Phase 2 tailings remediation activities were adequate[14].

4.0 CONCLUSION

86. The Commission has considered the information and submissions from the applicant, CNSC staff and all participants as set out in the material available for reference on the record, as well as the oral and written submissions provided by the participants at the hearing.

87. The Commission is satisfied that SRC has provided the necessary information to demonstrate that they can remediate the tailings deposits at the Gunnar Legacy Uranium Mine Site in compliance with the NSCA. Based on its consideration of the matter, the Commission is satisfied that SRC, as it proceeds with the remediation of the tailings deposits, will continue to make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.

88. Therefore, the Commission removes the Gunnar Remediation Project Phase 2 hold point regarding the remediation of the tailings deposits at the Gunnar Legacy Uranium

[14] *Rio Tinto Alcan v. Carrier Sekani Tribal Council*, 2010 SCC 43[2010] 2 S.C.R. 650 at paras 45 and 49.

Mine Site.

89. The hold point for remediation of the other site components, including waste rock, the open pit and the mine shaft, remains in place and will be considered by the Commission at a later date, where the public will be invited to participate.

90. With this decision, the Commission delegates the review and approval of the detailed design description report and project schedule for the remediation of the tailings deposits at the Gunnar Site prior to the start of remediation activities to the Director General of the Directorate of Nuclear Cycle and Facilities Regulation or the Executive Vice President of the Regulatory Operations Branch.

M. Binder NOV 2 7 2015

Michael Binder Date
President,
Canadian Nuclear Safety Commission

Appendix A – Intervenors

Intervenors	Document Number
Saskatchewan Environmental Society	CMD 15-H10.2 CMD 15-H10.2A
Athabasca Chipewyan First Nation	CMD 15-H10.3 CMD 15-H10.3A
Métis Nation Saskatchewan	CMD 15-H10.4
Prince Albert Grand Council	CMD 15-H10.5 CMD 15-H10.5A
Fond du Lac Denesuline First Nation	CMD 15-H10.6 CMD 15-H10.6A