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[22-H7.D](#)

Commission Request for Information

Demande d'information de la
Commission

**Canadian Nuclear
Laboratories
Chalk River
Laboratories**

**Laboratoires Nucléaires
Canadiens
Laboratoires de Chalk
River**

**CNSC Staff Final
Remarks: for
Commission Decision on
Application to Construct
the Near Surface
Disposal Facility**

**Remarques finales du
personnel de la CCSN :
pour la décision de la
Commission sur la
demande de construction
de l'installation de gestion
des déchets près de la
surface**

Written Submission

Soumission écrite

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CNSC Staff

Soumise par :
Le personnel de la CCSN

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Summary

- This CMD presents CNSC staff's final remarks on Canadian Nuclear Laboratories' proposed construction of a near surface disposal facility and licence application.

There are no actions requested of the Commission. This CMD is for information only

Résumé

- Ce CMD présente les remarques finales du personnel de la CCSN sur la construction proposée par les Laboratoires Nucléaires Canadiens d'une installation de gestion des déchets près de la surface et sur la demande de permis.

Aucune mesure n'est requise de la Commission. Ce CMD est fourni à titre d'information seulement.

Signed/signé le

06 June 2023

Kimberley Campbell *on behalf of* Kavita Murthy

Director General

Directorate of Nuclear Cycle and Facilities Regulation

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Direction de la réglementation du cycle et des installations nucléaires

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1 INTRODUCTION

This Commission Member Document (CMD), CMD 22.H7.E, presents CNSC staff's written final remarks on the Near Surface Disposal Facility (NSDF) project and is a synopsis of the following previous submissions from CNSC staff regarding the application from Canadian Nuclear Laboratories to amend its Chalk River Laboratories site licence to authorize the construction of a near surface disposal facility (NSDF):

- [CMD 22-H7](#), (Part 1 Hearing Written CMD)
- [CMD 22.H7.A](#), (Part 1 Hearing Presentation)
- [CMD 22-H7.B](#), (Part 2 Hearing Written CMD)
- [CMD 22-H7.C](#) and (Part 2 Hearing Presentation)
- [CMD 22-H7.D](#), (Procedural Direction Written CMD)

This CMD reiterates CNSC staff's conclusions and recommendations with respect to:

- the environmental assessment under the *Canadian Environmental Assessment Act, 2012*;
- CNL's application to amend the Chalk River Laboratories operating licence to allow the construction of NSDF; and
- whether the determination on meeting the duty to consult under section 35 of the Constitution Act, 1982 has been met for each of the above aspects.

2 ENVIRONMENTAL ASSESSMENT AND ENVIRONMENTAL PROTECTION

An environmental assessment (EA) was conducted for the proposed NSDF Project, in accordance with the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). CNSC staff conducted a comprehensive and rigorous technical assessment of the potential environmental effects of the proposed NSDF project as stated in the [EA Report](#). Based on the regulatory review and technical assessments of CNL's Environmental Impact Statement (EIS) and supporting documentation, CNSC staff found that the proposed NSDF Project is not likely to cause significant adverse environmental effects, taking into account the implementation of all identified EA regulatory commitments and follow up program measures, and recommend that the Commission conclude the same.

2.1 Consideration of Alternatives

With respect to site suitability, as outlined in Section 3.1 of CNSC staff's, [CMD 22-H7](#), CNSC staff assessed the proposed site and location of the NSDF against applicable standards. CNSC staff do not prescribe which site should be selected, rather the proponent must justify to CNSC staff why their selected site is suitable. CNSC staff found that CNL adopted a reasonable evaluation of several sites based on mandatory criteria, exclusion criteria as well as judgements about the ability to meet all safety requirements, and about the acceptability for construction of the disposal facility.

CNSC staff also assessed CNL's alternative means assessment, as documented in Section 4.2 of the EA Report. CNL's alternative means assessment considered the different technical and economical ways to carry out the designated project. CNSC staff found that CNL's alternative means assessment met the relevant requirements and guidance.

2.2 Impacts to the Ottawa River

The endpoint receiving environment for discharge from the NSDF is the Ottawa River. As discussed in Section 6.2 of the EA Report, any incremental change in concentration to Perch Creek and the Perch Lake watershed from NSDF operations are not expected to be measurable beyond existing baseline conditions in the Ottawa River and the downstream environment. As outlined in Section 6.2 of the EA Report, mitigation measures and environmental design features would mitigate effects on the aquatic environment. CNSC staff have verified and are satisfied that at the exit to the Ottawa River, contaminants would be attenuated to negligible levels and would not have a detectable impact on water quality.

CNL has proposed an Environmental Assessment Follow-Up Monitoring Program (EAFMP) for the NSDF Project that covers monitoring for the construction, operation, and closure phases of the NSDF Project. The EAFMP consists of an environmental monitoring plan, groundwater and effluent monitoring, including the aquatic environment, which will be integrated in the CRL site's existing environmental protection program, if the Project is approved. CNSC staff have

evaluated CNL's environmental protection program and conclude that it meets regulatory requirements.

2.3 Concerns Raised by KFN and KZA

Since the issuance of the Procedural Direction, CNSC staff met with Kebaowek First Nation (KFN) and Kitigan Zibi Anishinabeg (KZA) regularly to better understand their concerns and issues with respect to the NSDF Project. Throughout these meetings, KFN and KZA continued to indicate the requirement for additional studies to cover gaps in the EIS and indicated that these were related to the NSDF Project. KFN and KZA identified topics and species of interest that they felt could be impacted by the NSDF Project including the Eastern Wolf, Hickorynut Mussel, Lake Sturgeon, Black Bear, Milkweed and Blandings Turtle. CNSC staff verified that all these species and concerns were considered as part of CNL's EIS and therefore included as part of the regulatory review and sections 7 and 8 of the EA Report.

KFN and KZA also raised concerns with regards to CNL's site wide sustainable forest management plan and potential impacts to terrestrial biota from the proposed clearing of 33-hectares for the NSDF project. As discussed in section 6.3 of the EA Report, CNSC staff evaluated this specific concern. CNSC staff found that considering the implementation of mitigation and follow-up monitoring program measures, the identified residual effects to terrestrial biota are expected to be negligible and are not cause significant changes to the terrestrial environment.

CNSC staff conclude that, taking into consideration the implementation of mitigation and follow-up monitoring program measures, the NSDF Project will have negligible effects to all species and concerns listed above during all phases of the Project. In addition, with CNL's commitment to involve KFN and KZA in the follow-up and monitoring programs, including the sustainable forest management plan, CNSC staff conclude that the impacts to KFN and KZA's asserted governance and stewardship rights will be adequately addressed.

2.4 Concluding Remarks

CNSC staff reaffirm our conclusions related to environmental assessment and environmental protection as outlined in the EA Report. Based on the regulatory review and technical assessments to support the EA, CNSC staff have determined that the proposed NSDF Project incorporates measures to protect people and the environment; taking into account the implementation of all identified mitigation measures and follow-up program measures as well as licensing regulatory actions, the NSDF Project is not likely to cause significant adverse environmental effects to human health or the environment.

3 INDIGENOUS CONSULTATION AND ENGAGEMENT

Both the NSDF EA and licensing decisions require the Crown to satisfy the duty to consult and, where appropriate, to accommodate Indigenous Nations and communities' Indigenous and/or treaty rights that have the potential to be impacted by the proposed Project. The proposed NSDF Project is located within the traditional and treaty territories and homelands of many Indigenous Nations and communities as listed in [CMD 22-H7](#). CNSC staff's efforts and conclusions are set out in CMD 22-H7, [CMD 22-H7.B](#) and [CMD 22-H7.D](#).

3.1 Consultation and Engagement Approach

Since 2016, CNSC staff conducted a thorough consultation and engagement process for the NSDF regulatory process. CNSC staff offered many opportunities to meet, to engage, and to actively listen and learn about issues and concerns, and to seek opportunities to understand and meaningfully address the potential impacts of the NSDF project on Indigenous and/or treaty rights.

CNSC staff undertook collaborative approaches to consultation and engagement with interested Indigenous Nations and communities including the development of a Terms of Reference for consultation with the Algonquins of Pikwakanagan First Nation, KZA and the Métis Nation of Ontario. As part of these efforts, which are described in section 9.0 of the [EA Report](#), and section 3.2 of [CMD 22-H7.B](#), CNSC staff collaboratively drafted Rights Impact Assessments, gathered and included Indigenous Knowledge, collaboratively drafted sections of CNSC staff's EA Report, provided consultation arrangements and, offered flexible funding.

Further, CNSC staff also monitored and evaluated CNL's engagement activities in accordance with CNSC's REGDOC-3.2.2 Indigenous Engagement and have confirmed that CNL has met the requirements as stated in [CMD 22-H7.B](#).

3.2 Participant Funding Awarded

The CNSC supported the participation of all identified Indigenous Nations and communities through the CNSC's Participant Funding Program (PFP). Since 2016, out of a total of \$1,072,436 of Participant Funding awarded for the NSDF Project, over \$928,526 was awarded to Indigenous Nations and communities including \$144,838 provided as part of the Procedural Direction phase. This funding supported their participation throughout the regulatory review process including consultation and engagement activities, the gathering of Indigenous Knowledge and community input and perspectives, and participation in Commission hearings, both orally and in writing. The CNSC also provided funding to support the incorporation of data and teachings gathered through multiple Indigenous Knowledge and Land Use studies into the EA Report, and into Rights Impact Assessments conducted for the NSDF Project.

3.3 Engagement and Consultation Following the Commission's Procedural Direction

In July 2022, the Commission issued a Procedural Direction leaving open the record for additional evidence and information concerning CNSC staff's consultation and engagement with KFN and the KZA for the NSDF Project. CNSC staff undertook this work in a constructive, open and meaningful way with the two First Nations, while remaining open and responsive to shifting requests and priorities presented and requested by the First Nations. These consultation and engagement activities included the provision of additional Participant Funding (as stated above), community engagement activities, multiple meetings, and discussions with representatives and leadership from each First Nation and culminated in CNSC staff providing the Commission with additional information on the consultation and engagement efforts, including updated Rights Impact Assessments completed with KFN and KZA in CMD 22-H7.D.

3.4 Concluding Remarks

CNSC staff conclude that following extensive engagement and consultations with Indigenous Nations and communities over the past 7 years, the NSDF Project is unlikely to result in any new impacts on Indigenous and/or treaty rights when taking into consideration the extensive mitigation measures, commitments and accommodation measures proposed by CNL, Atomic Energy of Canada Limited and CNSC staff as stated in multiple sections of the EA Report. Therefore, CNSC staff conclude that the consultation and engagement process for the NSDF Project has upheld the honour of the Crown and meets the CNSC's duty to consult obligations under section 35 of the *Constitution Act, 1982* for both the EA and licensing decisions for the NSDF Project.

4 LONG TERM SAFETY

Concerns regarding long-term safety were raised by members of the public and Indigenous nations/communities, including KZA, throughout the NSDF regulatory process. The fundamental objective of a radioactive waste disposal facility is to provide safety with a minimal degree of human intervention for long periods of time which can range from a few hundred years (near surface disposal facility) to millions of years (deep geological repository).

CNSC staff assessed the operational and long-term (post-closure) safety, as part of the licensing assessment of the NSDF, in accordance with the requirements and guidance in both CNSC regulatory documents and international standards. Specifically, CNSC staff assessed the NSDF safety case, potential long-term impacts, design and the waste acceptance criteria as foundational components for CNL's demonstration of long-term safety for the NSDF and all supporting information.

4.1 Safety Case

The safety case uses multiple lines of reasoning and evidence to demonstrate that the NSDF would be constructed, operated and closed in such a manner to protect people/workers' health and safety and the environment during both the pre-closure and post closure periods. That protection would be achieved by containment and isolation of the waste, and control of contaminant release by both passive and active means during the pre-closure phase and mainly by passive means during the post closure phase.

CNSC staff conclude that CNL has presented sufficient evidence to demonstrate the safety of the proposed NSDF Project during construction, operation, closure and post closure and the protection of people and the environment, including the Ottawa River as stated in section 3.6 of [CMD 22-H7](#). The evidence and arguments integrated in the safety case are comprehensive, transparent, and traceable. Furthermore, the NSDF Safety Case meets the applicable regulatory requirements and is in line with international and industry best practices for the proposed disposal of solid low-level radioactive waste. Appendix E.1 and E.2 of CMD 22-H7 maps CNSC regulatory requirements and IAEA SSR-5 *Disposal of Radioactive Waste* to the NSDF technical documentation submitted by CNL, including the safety case.

4.2 Post-Closure (Long Term Safety) Safety Assessment

The post-closure safety assessment (PCSA) analyzes the expected evolution of the disposal system, which includes the waste, engineered and natural barriers, as well as the impact of disruptive events on the ability of the disposal system to isolate and contain the waste. The PCSA results are compared to regulatory acceptance criteria found in CNSC REGDOC 2.11.1 Volume III, *Safety Case for the Disposal of Radioactive Waste*. The PCSA forms a crucial part of the NSDF safety case and as a result is subject to detailed scrutiny by CNSC staff. CNSC

staff assessed the underlying development of the PCSA and the results generated from the model for a variety of anticipated and disruptive event scenarios.

Based on CNSC staff's assessment of CNL's licence application and supporting documentation with respect to the PCSA, CNSC staff conclude CNL's NSDF PCSA aligns with Canadian and international regulatory requirements and guidance as stated in section 3.5 of CMD 22-H7. The PCSA, through the use of mathematical modelling, analyzed the impact of a variety of scenarios, the normal evolution, disruptive events, human intrusion, and other worst case "what if" scenarios, and evaluated radiological doses and risks to be compared with relevant criteria and standards during an assessment timeframe of 10,000 years. CNSC staff assessed both the methodology and the results of the PCSA against Canadian and international requirements and guidance and have found that the predictions for long term impacts from the NSDF will comply with regulatory acceptance criteria. As a result, CNSC staff conclude that people and the environment will be protected.

4.3 Design

The engineered containment mound design has multiple barriers with multiple safety functions to contain and isolate the waste beyond its hazardous life. The post closure period is planned to begin in ~ the year 2100 which is followed by the 300-year institutional control period. The 550-year design life of the liner and cover system encompasses this time allowing the waste to decay to near background levels before the liner has degraded. The engineered containment mound encapsulates the waste and meets CNSC's requirements and international standards for a radioactive waste disposal facility as stated in section 3.6 of CMD 22-H7.

CNSC staff concludes, following the assessment of the licence application that, at all times, contaminants in potential leaks through the base liner would be attenuated by sorption, and dispersion along their flow path towards Perch Swamp and Perch Creek before reaching the Ottawa River. As a result, by the time contaminants reach the Ottawa River, their concentrations would be attenuated to negligible levels and would not have a detectable impact on water quality. Modelling performed by CNL and reviewed by CNSC staff as well as independent modelling by CNSC staff confirm that the impact on the Ottawa River from potential leaks would be negligible at all times.

4.4 Waste Characterization and Acceptance Criteria

The NSDF waste acceptance criteria (WAC) document controls the waste accepted for disposal in the NSDF. CNL's waste characterization programs are required to comply with CNSC REGDOC 2.11.1 Waste Management, Volume I: *Management of Radioactive Waste* and CSA N292.8 *Characterization of radioactive waste and irradiated fuel*, which set out the requirements for radioactive waste characterization. The WAC is a foundational licensing basis document that has been reviewed extensively and accepted by CNSC staff.

The WAC contains limits on the concentration of radionuclides in waste that could be accepted for emplacement in the NSDF. These concentrations align with Canadian and international definitions for low-level radioactive waste and affirm that near surface disposal is an acceptable solution for this waste.

CNSC staff have assessed the WAC and post-closure safety assessment, and determined that they are conservative and protective of people and the environment as stated in sections 3.5 and 3.6 of CMD 22-H7. The WAC complies with all requirements and guidance for the disposal of low-level radioactive waste in a near surface disposal facility and ensures that the waste accepted for disposal in the NSDF is appropriately classified and characterized. In addition, CNSC staff have assessed the NSDF proposed inventory and determined that it is suitable for disposal in a near surface facility through reviews of the safety case and post closure safety assessment.

4.5 Concluding Remarks

Concerns regarding long-term safety were raised by members of the public and Indigenous nations/communities, including KZA, throughout the NSDF regulatory process. CNSC staff assessed those concerns in detail against both the regulatory requirements and CNL's submissions. CNSC staff's conclusion is that all concerns have been addressed through the documentation submitted for long-term safety.

CNSC staff have determined that the results and conclusions of CNL's post-closure safety assessment are appropriate and acceptable. Furthermore, long term safety of the NSDF is assured using both engineered and natural barriers inherent to the design of the facility, the suitability of the site, and the class and characteristics of the wastes qualified for emplacement in the NSDF in compliance with the facility WAC.

CNSC staff reaffirm our conclusions made in CMD 22-H7 and [CMD 22-H7.B](#) that the proposed NSDF provides for long-term safety and meets Canadian and international regulatory requirements and guidance for disposal facilities.

5 LICENCE AMENDMENT

The NSDF proposal is considered a new Class IB nuclear facility and therefore triggers an amendment of the current CRL site licence. If the Commission authorizes the construction of the proposed NSDF, CNSC staff have recommended the inclusion of the following two new conditions, as provided in Part 2 of [CMD 22-H7](#):

- Licence Condition G.7: Construction licensing requirements: The licensee shall implement the licensing regulatory actions prescribed by the Commission. Review and closure of the licensing actions is administered by the Commission, or a person authorized by the Commission.
- Licence Condition G.8: Environmental assessment commitments: The licensee shall implement the EA regulatory commitments prescribed by the Commission. Review and closure of the EA regulatory commitments is administered by the Commission, or a person authorized by the Commission.

CNSC staff would amend the associated licence conditions handbook (LCH) accordingly to include two new licence conditions and the associated compliance verification criteria.

Additionally, if the Commission authorizes construction of the NSDF, CNL's licence application and supporting documents will become part of the licensing basis and will be added to the LCH. The licensing basis sets the boundary conditions for acceptable performance of the facility and establishes the basis for the CNSC's compliance program. CNSC staff will conduct compliance verification activities to confirm that the requirements associated with the CRL operating licence and the associated LCH including the proposed two licence conditions are met.

Operation of the NSDF is not considered in this amendment. CNL will require a future authorization by the Commission to operate the NSDF if current application to construct is approved by the Commission. CNSC staff's assessment of that application will include, among other things, a verification that CNL has fulfilled their commitments as well as an assessment of all other compliance activities carried out by CNSC staff.

CNSC staff consider that the draft licence and LCH submitted to the Commission in an Annex (p. 172-176) of CMD 22-H7 remain valid and appropriate for the licensing actions, commitments, and regulatory oversight for construction of the NSDF.

6 OVERALL CONCLUSIONS

CNSC staff have determined that the proposed NSDF Project is not likely to cause significant adverse environmental effects, taking into account the implementation of all identified EA regulatory commitments. CNSC staff also consider that consultation and engagement with identified Indigenous Nations and communities for the NSDF Project was meaningful and upheld the honour of the Crown and that potential adverse impacts to asserted or established Indigenous and/or treaty rights as a result of the NSDF Project have been addressed and accommodated to the extent possible. Furthermore, CNSC staff conclude that CNL's licence application to construct the NSDF at the CRL site complies with all applicable regulatory requirements.

Based on CNSC staff's assessment and work, CNSC staff are of the view that:

- the NSDF Project, as proposed, is not likely to cause significant adverse environmental effects, taking into account the implementation of all identified mitigation measures and follow-up program measures;
- the NSDF Project, as proposed, meets all regulatory requirements and would be protective of people and the environment;
- the duty to consult under section 35 of the *Constitution Act, 1982* has been met.

Given the above, CNSC staff conclude that there are no impediments to the Commission approving CNL's application to construct the NSDF and amending the CRL operating licence.

GLOSSARY

For definitions of terms used in this document, see [REGDOC-3.6, Glossary of CNSC Terminology](#), which includes terms and definitions used in the Nuclear Safety and Control Act and the Regulations made under it, and in CNSC regulatory documents and other publications.

Additional terms and acronyms used in this CMD are listed below.

| | |
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| CEAA | Canadian Environmental Assessment Act |
| CMD | Commission Member Document |
| CNL | Canadian Nuclear Laboratories |
| CNSC | Canadian Nuclear Safety Commission |
| EA | Environmental Assessment |
| EAFMP | Environmental Assessment Follow-up Monitoring Program |
| EIS | Environmental Impact Statement |
| KFN | Kebaowek First Nation |
| KZA | Kitigan Zibi Anishinabeg |
| LCH | Licence Conditions Handbook |
| NSDF | Near Surface Disposal Facility |
| PCSA | Post Closure Safety Assessment |
| PFP | Participant Funding Program |
| WAC | Waste Acceptance Criteria |