



**Final submission from the  
Canadian Nuclear Laboratories**

**Mémoire définitif des  
Laboratoires Nucléaires Canadiens**

In the Matter of the

À l'égard des

**Canadian Nuclear Laboratories,  
Chalk River Laboratories**

---

**Laboratoires Nucléaires Canadiens,  
Laboratoires de Chalk River**

---

Application to amend its Chalk River  
Laboratories site licence to authorize the  
construction of a near surface disposal  
facility

Demande visant à modifier le permis du site des  
Laboratoires de Chalk River pour autoriser la  
construction d'une installation de gestion des  
déchets près de la surface

**Commission Public Hearing  
Part 2**

**Audience publique de la Commission  
Partie 2**

**May 30 to June 3, 2022**

**30 mai au 3 juin 2022**



Canadian Nuclear  
Laboratories

Laboratoires Nucléaires  
Canadiens

# Final Written Submission – Canadian Nuclear Laboratories Application for the Construction of the Near Surface Disposal Facility

**232-508760-REPT-005**

**Revision 0**

Approved by:

2023/07/05

---

Andrew Tisler

---

Date

Vice-President Central Technical  
Authority and Chief Nuclear Officer

UNRESTRICTED

This page is for Content Controls that apply to this document. If no Content Controls apply, none will be listed.

### Revision History

Rev. No.	Date	Details of Rev.	Prepared By	Reviewed By	Approved By
0	2023 July 5	Issued as Approved for Use	M. Labriola		A. Tisler
OD2	2023 June 22	Revised based on comments from D1. Issued for “Review and Comment”	M. Labriola	B. Daly G. Dolinar S. Innes J. McBrearty L. Riccoboni M. Steedman	A. Tisler P. Quinn M. Vickerd J. Willman D. Waldman
OD1	2023 May 26	Issued for “Review and Comment”.	M. Labriola	B. Daly S. Faught G. Dolinar S. Innes N. LeBlanc M. MacKay	A. Morin P. Quinn M. Vickerd D. Waldman

## Table of Contents

### Section Page

1.	Introduction .....	7
2.	Environmental Assessment and Environmental Protection .....	9
2.1	Justification for the Project.....	9
2.2	Scope of the Environmental Assessment .....	11
2.3	Alternative Means.....	12
2.3.1	Facility Location and Site Selection.....	12
2.3.2	Facility Type and Design.....	14
2.4	Environmental Protection.....	15
2.4.1	Protection of the Ottawa River .....	16
2.4.2	Biodiversity .....	17
2.4.3	Sustainable Forest Management .....	18
2.5	Environmental Assessment Follow-Up Monitoring.....	19
2.6	Public Participation and Engagement.....	19
2.7	CNL’s Concluding Remarks.....	21
3.	Long Term Safety Case.....	22
3.1	Facility Design .....	23
3.2	Post-Closure Safety Analysis.....	24
3.3	Consideration of Environmental Events .....	25
3.4	Waste Inventory.....	26
3.5	Waste Acceptance Criteria.....	27
3.6	Waste Characterization .....	28
3.7	CNL’s Concluding Remarks.....	29
4.	Indigenous Engagement and Consultation.....	30
4.1	Engagement with Indigenous Nations, Communities and Organizations .....	30
4.2	Establishment of Agreements with Indigenous Nations, Communities and	

Organizations ..... 32

4.3 Duty to Consult and Accommodate..... 32

4.4 Key Interests and Concerns ..... 34

4.5 CNL’s Concluding Remarks..... 36

5. Requested Licence Amendment ..... 38

5.1 CNL’s Concluding Remarks..... 39

6. Overall Conclusions..... 40

7. References ..... 42

Appendix A Acronyms ..... 46

Canadian Nuclear Laboratories (CNL) respectfully acknowledges that the Chalk River Laboratories site is located on the unceded and unsurrendered territory of the Algonquin Anishnaabe Nation. At CNL, we acknowledge, respect, and seek to better understand the unique Indigenous history, rights, and title on the lands where we work and develop projects. Indigenous peoples have and continue to be stewards of the land. At CNL we wish to honour and respect the importance of the relationship between Indigenous peoples and their lands, waters and territories. CNL acknowledges that it is at the beginning of its reconciliation journey. CNL is committed to establishing and maintaining relationships and meaningfully engaging with Indigenous peoples on the NSDF Project, today and in the longer term.



## 1. Introduction

Canadian Nuclear Laboratories (CNL) has applied to the Canadian Nuclear Safety Commission (CNSC or the Commission) to request a licence to construct a Near Surface Disposal Facility (NSDF or NSDF Project) for the safe disposal of solid low level waste at the Chalk River Laboratories (CRL) site in Deep River, Ontario. The NSDF Project stands to permanently clean up legacy waste, which is currently being stored temporarily not consistent with modern standards for long term storage, and address disposal for current and future low level waste, all while managing and mitigating impacts of the CRL site to human health and the environment. CNL respectfully requests that the CNSC approve the NSDF Project in order to realize these environmental benefits, considering the comprehensive Indigenous engagement and extensive mitigation measures, commitments, and other accommodation measures proposed.

The main purpose of the NSDF Project is to provide for the permanent disposal of current and future low level waste at the CRL site in a manner that is protective of both human health and the environment. Further, the NSDF Project will enable the remediation of historically contaminated lands and legacy waste management areas, as well as the decommissioning of outdated infrastructure to facilitate the CRL site revitalization.

CNL has engaged extensively with the public on the NSDF since 2016. CNL has incorporated public concerns raised throughout the environmental assessment (EA) process. Participant funding allowed members of the public, Indigenous Nations, communities and organizations to participate in the EA, licence application review, and CNSC hearing processes for the NSDF Project.

Meaningful engagement has occurred with Indigenous Nations, communities, and organizations to support the satisfaction of the Crown's duty to consult and, where appropriate, accommodate. The engagement period was extended to allow for additional information to be submitted by Indigenous Nations and communities with concerns about the NSDF Project. CNL has demonstrated through this extensive process its commitment to public engagement, transparency, and working with Indigenous Nations, communities and organizations. Taking into consideration the extensive mitigation measures, commitments, and other accommodation measures proposed, the NSDF Project is unlikely to result in any appreciable impacts on Aboriginal or treaty rights or interests.

The review process for the Project has demonstrated that the NSDF will not harm the environment. The NSDF Project is subject to environmental assessment under both the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) [9] and the *Nuclear Safety Control Act* (NSCA) [10]. The final [NSDF Environmental Impact Statement \(NSDF EIS\)](#) [14] for the NSDF Project concluded that with the identified mitigations, the implementation of the NSDF Project is not likely to result in significant adverse environmental effects.

This Commission Member Document (CMD) is presented to the Commission Registry as CNL's final written statements in respect of the [application for an amendment](#) [1] of [the Nuclear Research and Test Establishment Operating Licence for CRL](#) (NRTEOL-01.00/2028) [2] to add a new Class IB Nuclear Facility, the NSDF, to the CRL licensing basis. Previous submissions made to the Commission by CNL on this matter include:

- CMD for Licensing Decision, Chalk River Laboratories Site Licence Amendment to Authorize the Construction of the Near Surface Disposal Facility [CMD 22-H7.1](#) [3].
- Presentation for Commission Hearing – Part 1 [CMD 22-H7.1A](#) [4].
- Public Engagement Report [CMD.22-H7.1B](#) [5].
- Indigenous Engagement Report [CMD 22-H7.1C](#) [6].
- Presentation for Commission Hearing – Part 2 [CMD 22-H7.1D](#) [7].
- Canadian Nuclear Laboratories Written Submission – Near Surface Disposal Facility Procedural Direction [CMD-22-H7.1E](#) [8].

CNL respectfully submits that the above submissions, together with this final submission, provide an evidentiary record for the Commission to approve the NSDF Project, including making findings that:

- (i) the proposed NSDF Project meets the requirements of CEAA 2012 [9] and is not likely to cause significant adverse environmental effects;
- (ii) the NSDF meets the requirements of the NSCA [10] and all applicable regulations and Regulatory Documents (REGDOCs) for the requested license amendment to be issued, including the requirement in section 24(4)(b) of the NSCA that the NSDF as proposed will make adequate provision for the protection of the environment and the health and safety of person; and
- (iii) engagement with Indigenous Nations, communities and organizations has been robust and meaningful, and has progressed significantly through the course of these proceedings to satisfy the Crown's duty to consult.

Oral and written submissions from 165 intervenors, including eight Indigenous Nations, communities and organizations, were submitted in advance of the Part 2 NSDF hearing. Approximately half of the interventions submitted were supportive of the NSDF Project. In CNL's view, the interventions that raised issues and concerns were similar to those heard throughout the environmental assessment process. CNL considers many already addressed, as presented during the Part 2 proceedings [7].

This submission is organized by the topics established for the Part 2 proceedings, acknowledging key assertions by intervenors, followed by CNL's assessment of the concern and CNL's concluding remarks.

## 2. Environmental Assessment and Environmental Protection

Construction, operation, closure and post-closure of a disposal facility for nuclear waste qualifies as a Designated Project and therefore requires completion of an EA, as per the requirements of:

- *Canadian Environmental Assessment Act, 2012* [9],
- REGDOC-2.9.1, *Environmental Protection: Environmental Principles, Assessments and Protection Measures* [11],
- *Generic Guidelines for the Preparation of an Environmental Impact Statement (EIS) pursuant to the Canadian Environmental Assessment Act, 2012* [12], and
- The Operational Policy Statement for *Addressing “Purpose of” and “Alternative Means” under the Canadian Environmental Assessment Act, 2012* [13].

To demonstrate that the NSDF Project will not pose a risk to human health, safety, or the environment during the entire life cycle of the facility, CNL conducted environmental and safety assessments that included a comprehensive suite of scenarios and their predicted effects on workers, Indigenous peoples, the public, and the environment as detailed in the final NSDF EIS [14] and summarized in the CMD for Licensing Decision [3]. Overall, it is CNL's conclusion that with the identified mitigations, the implementation of the NSDF Project is not likely to result in significant adverse environmental effects.

The NSDF Project has been subject to a comprehensive expert review. Through the conduct of the EA, in addition to the CNSC, other federal and provincial regulatory agencies (the Federal-Provincial Review Team) have thoroughly examined the NSDF proposal, namely Environment and Climate Change Canada, Natural Resources Canada, Health Canada, the Ontario Ministry of the Environment Conservation and Parks, and the Quebec Ministère de l'Environnement et de la Lutte contre les changements climatiques. Comments from these agencies were dispositioned, supplementary studies conducted, and EIS updated, where applicable. During the Part 2 proceedings, these agencies confirmed that their comments had been dispositioned to their satisfaction. All comments and dispositions from Federal-Provincial reviews are on the Impact Assessment Agency website (available here: [Federal-Provincial Responses](#)).

Input from Indigenous Nations, communities and organizations, and the public has also played a critical role in the regulatory process to date, with a multitude of opportunities for input. Future licensing and EA follow-up monitoring activities will provide additional opportunities for input and engagement. CNL has also committed to ongoing transparency in monitoring and has made specific commitments to share information and reflect input received.

The following sections of this submission provide an overview of the key concerns heard during the Part 2 proceedings related to the theme of Environmental Assessment and Environmental Protection.

### 2.1 Justification for the Project

Many intervenors expressed concerns about the proposed timelines associated with construction and operation of the NSDF Project, often commenting that more time for public

and Indigenous engagement is desired, or that CNL should wait for updated policies from the federal government related to managing radioactive waste before moving forward with the Project.

There are two main reasons that CNL is advancing the NSDF Project on the present schedule: to address historic waste storage practices which are not consistent with modern standards and to reduce environmental risks at the CRL site.

First, the CRL site began operations in the late 1940's. Wastes produced have been managed consistently with evolving best practices and regulations. As a responsible steward of the environment, CNL is seeking to retrieve and dispose of these wastes using modern engineering technology. Presently, some wastes are temporarily contained in waste storage systems that protect workers, the public and the environment. Other wastes are present as soils which have been impacted by legacy waste management practices or as historic building materials that require decommissioning. The practice of continuing to build additional temporary storage systems is not consistent with modern waste management principles, and a permanent disposal solution is required to ensure continued protection of surrounding environmental features, including the Ottawa River. The NSDF is a critical component for improving and modernizing the management of legacy waste that is already at the CRL site today (CNL link to Video: [Why the Near Surface Disposal Facility?](#)).

Second, regarding environmental risk, CNL is actively managing and monitoring the risk posed by legacy waste management areas, including contaminated groundwater plumes on the CRL site, which are a result of the lack of containment and isolation of the waste. Through ongoing groundwater interception and treatment methods, CNL ensures that contaminants migrating away from the waste management areas are in concentrations that are protective of human health and the environment. However, the interception and treatment of the groundwater is not a sustainable path if the source of the contamination is not addressed. The NSDF offers a solution for the remediation of source areas and disposal of materials, thereby minimizing future risk to human health and the environment.

CNL recognizes that Natural Resources Canada has recently updated Canada's Policy for Radioactive Waste Management and Decommissioning [15]. The policy guides how radioactive waste generators in Canada are to develop future projects for the management and disposal of radioactive waste. CNL's recent efforts and focus on waste management and decommissioning at sites operated across Canada, including the proposed NSDF, are in alignment with the policy.

The NSDF Project is based on the mandate of Atomic Energy of Canada Limited (AECL), a federal Crown corporation. The NSDF is an enabling facility which would allow remediation of legacy waste management areas and disposal pathway for CNL's operational waste, substantially reducing the risks associated with low level waste, as well as enabling the revitalization of the CRL site as a modern, world class science facility. CNL has a wealth of experience operating low level waste facilities (including the Port Hope and Port Granby Long-term Waste Management Facilities), and CNL is well informed of international operating experience for low level waste disposal facilities. The NSDF Project has been specifically designed as a permanent solution to

reduce environmental risk and achieve isolation and containment of the sources of contamination for the hazardous lifetime of the wastes. CNL is fully capable of implementing the NSDF Project now, to remove the burden of addressing legacy waste on future generations.

The justification for the NSDF Project is described in the CMD for Licensing Decision (Section 1.2) [3] and the final NSDF EIS (Section 2.3) [14]. CNL also presented the overall justification in Part 1 and Part 2 of the NSDF hearing [4] [7].

## 2.2 Scope of the Environmental Assessment

Intervenors expressed concern that the EA for the NSDF was subject to the requirements of CEAA 2012 [9], notwithstanding the enactment of the *Impact Assessment Act* (IAA) [16]. More specifically, concerns were raised that the EA doesn't cover all stages of the project, the EA did not use the precautionary principle, and that comments from the public were not adequately incorporated into the EIS.

In August 2019, the IAA [16] came into force, repealing CEAA 2012 [9]. The IAA [16] contains transitional provisions for environmental assessments of designated projects commenced under CEAA 2012 [9] and for which the CNSC is the Responsible Authority. The CNSC informed CNL [17] that the EA for the NSDF Project will continue under CEAA 2012 [9] in accordance with the transitional provisions of the IAA (Section 182) [16].

The EA for the proposed NSDF covers all stages of the project. Activities are planned to occur in the following phases: site preparation and construction, operations, closure, and post-closure. The current licence application is for the approval to construct the NSDF, and further regulatory approvals will be required for the NSDF Project to progress from one phase to the next.

The precautionary principle has been taken into consideration throughout all aspects of the NSDF Project, including project design and construction through to post-closure, development of mitigation measures, assessment of environmental effects, design and implementation of follow-up monitoring programs, as outlined in the final NSDF EIS [14]. In keeping with a precautionary approach, the EA identifies key sources of uncertainty and discusses how uncertainty is addressed to increase the level of confidence that effects will not be worse than predicted. CNL used quantitative methods, such as sensitivity analyses, assessment scenarios, and qualitative discussion to assess prediction confidence. For example, Section 5.8.7 of the final NSDF EIS [14] describes key uncertainties in assessing residual effects from the NSDF Project on human health and how conservatism in the analysis and assumptions addressed these uncertainties. Further discussion on long-term safety can be found in Section 3 of this submission.

Input from Indigenous Nations, communities and organizations, the public and stakeholders has played a critical role in the regulatory process to date, with a multitude of opportunities for input. CNL dispositioned 669 comments submitted in 2017 from the public, organizations, stakeholders and Indigenous Nations, communities and organizations on the [2017 draft NSDF EIS](#) [19]. These were submitted to CNSC and available on the IAA website (available here: [CNL's](#)

[Consolidated Responses](#)). Topics included environmental concerns expressed by engaged public and Indigenous Nations, communities and organizations. A number of changes to the final NSDF EIS [14] since the 2017 draft NSDF EIS [19][19] were a result of the environmental concerns being brought forward. For example, the removal of intermediate level waste from the inventory, expansion of the assessment of alternative means, project design changes, an increase in spatial boundaries to include eight (8) kilometers of the Ottawa River downstream of Perch Creek and covering the Ontario and Quebec border, and a number of additional baseline studies. How the feedback from the public and Indigenous Nations, communities and organizations were considered is outlined in the CMD for Licensing Decision (Section 2) [3], the final NSDF EIS (Section 4; Section 6) [14], the Public Engagement Report [5] and the Indigenous Engagement Report [6].

Transparency is important to build public confidence in the safety of the NSDF design and in CNL's ability to construct and operate the NSDF. In accordance with CNL's public information program requirements as outlined in the CRL site Nuclear Research and Test Establishment Operating Licence [2], CNL continues to employ a variety of methods to inform, educate, and discuss the project with stakeholders and to enable the public and Indigenous Nations, communities and organizations to provide valuable feedback on the project.

The scope of the NSDF Project is described in the CMD for Licensing Decision (Section 1.5.2) [3] and the final NSDF EIS (Section 1.4.1; 5.1.1) [14]. CNL also presented a summary in Part 1 and Part 2 of the NSDF hearing [4] [7].

## **2.3 Alternative Means**

Intervenors expressed concerns that CNL did not conduct an adequate assessment of alternative means for the project related to facility location, site selection and facility type.

The assessment of alternative means for the proposed NSDF was conducted in accordance with the requirements of the CEAA 2012 [9] and an associated Operational Policy Statement [13].

Once the purpose of the project was identified, as described in Section 2.1 of this submission, technically and economically feasible ways to achieve this purpose were considered, consistent with CEAA 2012 [9]. The following subsections briefly discuss these key concerns.

### **2.3.1 Facility Location and Site Selection**

Many intervenors raised questions regarding the location and site for the NSDF, mainly in relation to the proximity of the facility to the Ottawa River. Intervenors also asked why other federal properties were not considered as options as part of the alternative means process. There were also assertions that the site selection process was not consistent with International Atomic Energy Agency (IAEA) Near Surface Disposal Facilities for Radioactive Waste, SSG-29 [18], and the site was selected prior to the public having any input.

Since the beginning of the EA in 2016, CNL clearly identified that the alternatives for facility location only included sites under AECL ownership and operated by CNL under an existing licence from the CNSC. Three sites were evaluated in the alternative means process – the CRL

site, Whiteshell Laboratories, and Nuclear Power Demonstration. The key rationale that identified the CRL site as the preferred site is that CRL has an enduring mission, appropriate infrastructure, support for monitoring and maintenance programs, all supporting management systems, and qualified people in place for an extended period. As well, the CRL site has a long history of environmental monitoring, meaning the environment - such as the geology, groundwater pathways and biodiversity - are well understood. Furthermore, 90% of the wastes proposed for NSDF are on or will be generated at the CRL site. The assessment is consistent with CEAA 2012 [13], where the proponent (CNL) identifies, clearly explains and justifies why the alternatives for facility location meet the purpose of their project.

Subsequently, fifteen different sites at CRL were evaluated as alternative locations. The siting process included mandatory criteria, such as the space needed for the project, and exclusionary criteria, such as proximity to wetlands and presence of species at risk (Section 2.5.5 of the final NSDF EIS [14]). Intervenors noted perceived risks related to the proposed site location at East Mattawa Road, as it is located close to the Ottawa River. The East Mattawa Road site is located on a bedrock ridge that naturally forces water away from the Ottawa River. The overland distance from the proposed site to the main channel of the Ottawa River is 1.1 km, but groundwater passing below it discharges to Perch Creek before draining to the Ottawa River. However, the transit time through the groundwater portion of the flowpath is on average 7 years. In the unlikely event of changes to groundwater chemistry, CNL's monitoring activities would detect any changes and action would be taken to intercept the flowpath.

The siting process CNL followed is consistent The Operational Policy Statement for Addressing "Purpose of" and "Alternative Means" under CEAA 2012 [13], as well as with international guidance (e.g., IAEA SSG-29, Appendix I [18]), whereby one or more preferred candidate sites are selected after the investigation of a large region, the rejection of unsuitable sites, and screening and comparison of the remaining sites.

While input from Indigenous Nations, communities, organizations and the public did not result in a change of the outcome of the selected site, the feedback received did provide an opportunity for CNL to evolve engagement and information on CNL's justification of the site selection part of the EIS to provide confidence in the results of the EA, specifically that the NSDF is not likely to result in significant adverse environmental effects, with identified mitigation.

The evaluation of alternatives for facility location and site selection is outlined in the CMD for Licensing Decision (Section 3.3; 3.4) [3] and the final NSDF EIS (Section 2.5.4; 2.5.5) [14]. CNL also presented a summary of the alternative means in Part 1 and Part 2 of the NSDF hearing [4] [7].

### 2.3.2 Facility Type and Design

Many intervenors questioned why other facility types and designs were not considered for the NSDF.

For facility type, CNL evaluated four options – ongoing waste storage, near surface disposal, geologic disposal and a very low level waste facility. CNL added ongoing waste storage and the very low level waste facility to the assessment as a direct result of public comments on the 2017 draft NSDF EIS [19][19]. Ongoing waste storage was not considered technically feasible, as the historic waste management areas have no engineered barriers which is not in alignment with current regulatory requirements in REGDOC-2.11.1, *Waste Management, Volume III: Safety Case for the Disposal of Radioactive Waste* [20]. A very low level waste facility did not meet the project's purpose, and was not considered technically feasible or economical, as two disposal facilities would then be required. Both the near surface disposal and geologic waste management facility alternatives met CNL's overall need and are environmentally feasible options. Geologic waste management facilities are most typically proposed for high level waste and intermediate level waste, which are not the waste types proposed for disposal in the NSDF. Near surface disposal facilities, as proposed for the NSDF Project, have been demonstrated globally to be an effective disposal solution for low level waste. The facility design selected is commensurate with the risk the inventory poses, thus geologic barriers for low level waste are not necessary and the engineered barriers of a near surface facility are appropriate. Therefore, through the alternative means process CNL determined the NSDF is the most feasible and most favourable facility type for the low level waste.

Several intervenors raised concerns about the facility design, asserting that other types of facilities should be explored in more detail. Alternative facility designs were evaluated as part of the alternative means, including the use of shallow caverns and above ground vaults.

Wastes placed into shallow caverns on the CRL site are more likely to come into contact with groundwater quickly, providing a shorter flowpath for the migration of radionuclides into the environment. Thus, the shallow cavern facility design at the CRL site does not align with IAEA guidance [21], and therefore was not considered suitable or technically feasible.

Engineered containment mound and above ground concrete vault alternatives were considered technically and environmentally feasible. The engineered containment mound is expected to be more resilient to seismic events because it is a single continuous structure, as compared to a series of discrete, rigid vaults. Above ground vaults are expected to have higher greenhouse gas emission because of the production of concrete. In addition, the footprint required for the above ground concrete vault is 1.5 to 2 times that required for an engineered containment mound due to the need to package all waste for an above ground concrete vault and constraints on the stacking of waste packages.

Based on the alternative means assessment, which was conducted in alignment with regulatory requirements and guidance, the most favourable facility type and design for the NSDF is an engineered containment mound, and accordingly is proposed as such.

The evaluation of alternatives for facility type and design is outlined in the CMD for Licensing Decision (Section 3.1; 3.2) [3] and the final NSDF EIS (Section 2.5.2; 2.5.3) [14]. CNL also presented a summary of the alternative means in Part 1 and Part 2 of the NSDF hearing [4][7].

## 2.4 Environmental Protection

Several intervenors raised concerns about environmental protection, as detailed in the sections below. CNL asserts that with the identified mitigation, the NSDF will not have significant adverse environmental effects and will be adequately protective of the environment as required by CEAA 2012 [9] and the NSCA [10].

As outlined in the CMD for Licensing Decision (Section 6.9) [3] CNL has a well-established Environmental Protection Program to ensure environmental compliance at all CNL-operated sites in Canada. The program is registered under ISO 14001 and is designed to provide protection of the environment and the public in relation to CNL's activities.

The following are features of the Environmental Protection Program:

- Conforms to CNSC REGDOC-2.9.1, *Environmental Protection – Environmental Principles, Assessments and Protection Measures*, Version 1.1 [22]
- Integrated environmental monitoring program that meets the requirements of CSA N288.4, *Environmental monitoring programs at Class I Nuclear Facilities and Uranium Mines and Mills* [23]
- Effluent monitoring program that meets the requirements of CSA N288.5-11, *Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills* [24]
- Scope and complexity of monitoring programs, including effluent and environmental monitoring programs, are based on an environmental risk assessment performed according to the CSA N288.6-12, *Environmental Risk Assessment at Class I Nuclear Facilities and Uranium Mines and Mills* [25]; which include updated Derived Release Limits that were calculated in accordance with CSA N288.1, *Guidelines for Calculating Derived Release Limits for Radioactive Material in Airborne and Liquid Effluents for Normal Operation of Nuclear Facilities* [26]
- Groundwater protection and monitoring program that meets the requirements of CSA N288.7-15, *Groundwater Protection Programs at Class I Nuclear Facilities and Uranium Mines and Mills* [27]
- Established and implemented action levels to control releases to the environment from nuclear facilities in compliance with CSA N288.8-17, *Establishing and Implementing Action Levels to Control Releases to the Environment from Nuclear Facilities* [28]

Compliance with the Environmental Protection Program ensures that CNL's operations are performed in a manner that is protective of the environment. Should the NSDF Project proceed, activities will be conducted in compliance with this well-established program.

### **2.4.1 Protection of the Ottawa River**

During the public hearing process, CNL heard concerns from intervenors with respect to the protection of the Ottawa River.

The legacy waste management areas at the CRL site lack robust containment, which in some instances has led to contamination of the surrounding environment. The main engineering features of NSDF represent an increase in safeguards to protect the Ottawa River and the environment. These safeguards include, but are not limited to, the following:

- The main containment features of the proposed facility are the natural and synthetic barriers – in both the base liner and cover systems – which are designed to work together to isolate the waste materials from the environment for hundreds of years, after which the radioactivity of the waste will have decayed to levels found naturally in the environment.
- The dedicated wastewater treatment facility will remove contaminants from any leachate or wastewater collected during the operational period. Effluent discharge targets for all contaminants, including tritium, are protective of human health and aquatic biota.
- The discharge to the environment during the operational period is controlled and only occurs after the treated effluent has been confirmed to meet the discharge criteria, which are reflective of the federal and provincial water quality guidelines and ensure protection of the Ottawa River and surrounding environment.

CNL has repeatedly stated that purpose of the NSDF is to provide a safe, permanent solution at the CRL site for disposal of legacy waste, which is currently placed in interim storage (Section 2.3, final NSDF EIS [14]). The NSDF has been designed with safety, including protection of human health and the Ottawa River, in mind at every stage of the NSDF Project (Section 2.4, final NSDF EIS [14]). CNL views the NSDF proposal as an improvement over the current environmental conditions at the CRL site, which will protect the Ottawa River.

CNL employees also value the Ottawa River – most of our staff live and work beside the river, drink the water and use the river recreationally. The final NSDF EIS [14] concludes that with identified mitigation, changes in hydrology and surface water quality are not expected to result in significant adverse effects to other valued components (e.g., human health and aquatic biodiversity).

CNL is committed to the cleanup mission at the CRL site, which requires removal of the existing sources causing contamination in the environment and placing the waste in modern engineered containment which is the purpose of the NSDF; thus, the NSDF Project is a critical part of that mission as an enabling facility. The NSDF will provide modern engineering features to contain and isolate the waste, which means the proposed project will enhance the level of protection of the Ottawa River.

The protection of the Ottawa River is outlined in the CMD for Licensing Decision (Section 4) [3] and the final NSDF EIS [14]. CNL also presented how the Ottawa River will be protected in Part 1 and Part 2 of the NSDF hearing [4][7].

#### **2.4.2 Biodiversity**

Intervenors raised concerns about the displacement of habitat for some species on the CRL site, including large mammals and species at risk.

CNL acknowledges that during all phases of the NSDF Project, there are some activities such as the clearing of vegetation, use of heavy equipment, and discharge of treated effluent, that – without mitigation – have the potential to affect vegetation and wetland communities, and/or wildlife habitat, influencing abundance and distribution, or survival and reproduction. Activities that cause changes to other valued components, such as surface water quality, soils and vegetation communities (including wetlands), could in turn affect wildlife habitat availability and distribution, and survival and reproduction. Construction activities could also result in injury or mortality to wildlife. These effects may apply to terrestrial species at risk and their habitats as well. Examples of mitigation practices that have been and will be implemented to limit residual effects to terrestrial biodiversity include:

- Avoiding activities with the highest levels of noise and habitat disturbance during the most sensitive phase of life (i.e., breeding and nesting for birds and bats) to limit effects on nesting birds.
- Implementing a detailed Blanding’s Turtle Road Mortality Mitigation Plan that seeks to eliminate road mortality at the CRL site and increase connectivity between habitats. Implementation of this plan has started as it is a plan for the entire CRL site. The plan will continue to be implemented during the NSDF Project.
- Implementing a comprehensive Sustainable Forest Management Plan at the CRL site to ensure the long-term retention of trees serving as maternity roosts for bat species and the sustainable presence of large mammals such as moose, deer, and black bears at the CRL site by ensuring a continuous habitat to fulfill all stages of their life cycles.

As stated in the final NSDF EIS (Section 1.4.1) [14], a permit from Environment and Climate Change Canada will be required under Section 73 of the *Species at Risk Act* (SARA) [29]. It is noted that the terms and conditions related to the SARA permit are being finalized in parallel with the completion of the EA process. While the final NSDF EIS [14] does include mitigation measures for the protection of species at risk, the terms and conditions of the finalized SARA permit will be the overarching requirements.

With the implementation of appropriate mitigation measures, residual effects of the NSDF Project on the terrestrial environment (vegetation communities and wildlife species) are not significant.

Discussions on biodiversity and species at risk are outlined in the CMD for Licensing Decision (Section 4.6.5) [3], the final NSDF EIS (Section 1.4.1; Section 5.6) [14], and CNL’s Procedural Direction written submission [8].

### **2.4.3 Sustainable Forest Management**

Some intervenors raised concerns about the loss of forested area on the CRL site and its potential impact on the local wildlife.

The CRL site is approximately 4,000 hectares in size, of which approximately 72% is forested area - predominately mixed wood and deciduous (see Section 5.6.4.1 and Figure 5.6.4-1 of the final NSDF EIS [14]). The removal of trees because of the NSDF Project represents less than 1% of the forest land on site. Although the loss of forest from the NSDF footprint is permanent, the forest types are abundant in the Regional Study Area. Vegetation communities in the Regional Study Area are abundant, well-connected, and in good condition. As a result, forest communities are expected to have the capacity to adapt and be resilient to existing natural and human-related disturbances.

CNL engaged the Petawawa Research Forest in early 2020 to develop a Sustainable Forest Management Plan for the CRL site. The development of a Sustainable Forest Management Plan will ensure a sustainable representation through time of a mosaic of forest composition to accommodate a large range of species including species such as deer, bear and species at risk. The NSDF development footprint is approximately 37 hectares, 33 hectares of which are forested. The permanent loss of forested vegetation communities to enable construction of the NSDF is predicted to have little influence on ecological structure and function; 99% of forest and wetland ecosystem present are predicted to remain and be enhanced during the application of the Sustainable Forest Management Plan. For example, modelling demonstrates that in absence of the implementation of a Sustainable Forest Management Plan, habitat for bat species would disappear in 100 years. Habitat for bears, such as spring or summer habitat would be enhanced over a 100 year period with the implementation of forest management practices.

The implementation of the Sustainable Forest Management Plan will create a good balance of forest able to store carbon by increasing the representation of old-growth forest and provide better conditions to sequester carbon by having an increase in young forests. The implementation of the Sustainable Forest Management Plan will increase carbon storage and carbon sequestration over a planning horizon of 150-years. As stated in Section 5.6.4.8 of the final NSDF EIS [14], input will be solicited from the public and Indigenous Nations, communities and organizations on the Sustainable Forest Management Plan.

Discussions on sustainable forest management are outlined in the CMD for Licensing Decision (Section 4.6.5) [3], the final NSDF EIS (Section 1.4.1; Section 5.6) [14], and CNL’s Procedural Direction written submission [8].

## **2.5 Environmental Assessment Follow-Up Monitoring**

Intervenors expressed concerns regarding the scope of environmental monitoring for the NSDF and the transparency of the results.

A comprehensive and detailed [Draft Environmental Follow-up Monitoring Program \(EAFMP\) for the Near Surface Disposal Facility](#) [30] has been developed and will be finalized pending a Commission decision. CNL has solicited feedback from the Federal-Provincial Review Team, the public and Indigenous Nations, communities and organizations.

The EAFMP will include environmental, effluent verification, and groundwater monitoring to ensure that releases and subsequent environmental concentrations of potential contaminants are below the relevant guidelines. The EAFMP will follow the systematic informed planning process outlined in CSA Standards for environmental (N288.4) [23] effluent (N288.5-11) [24], and groundwater monitoring (N288.7-15) [27]. It is expected that regulatory oversight of the EAFMP and its results will be maintained as it becomes pertinent for the duration of the institutional control period of the NSDF Project. The EAFMP will provide an avenue to continuously verify assumptions and predictions while reassessing uncertainties expressed in the final NSDF EIS [14]. If advancements in technology challenge any assumptions or modeling predictions made for the NSDF, CNL will follow adaptive management processes and re-evaluate and adjust accordingly at such time.

The final NSDF EIS [14] concluded that that with the identified mitigation, the implementation of the NSDF Project is not likely to result in significant adverse effects. The EAFMP will verify the accuracy of the EA predictions and the effectiveness of the mitigation measures. CNL is committed to informing the public about our monitoring results and mitigation measures. CNL is also committed to including Indigenous Nations, communities and organizations in our environmental monitoring planning and implementation.

Discussions on the EAFMP are outlined in the CMD for Licensing Decision (Section 4.6.57) [3], the final NSDF EIS (Section 11) [14], and CNL's Procedural Direction written submission [8]. CNL also presented a summary of the EAFMP in Part 1 and Part 2 of the NSDF hearing [4] [7].

## **2.6 Public Participation and Engagement**

Several intervenors expressed concern about their perceived exclusion from CNL's public engagement process.

CNL believes that the record is clear that CNL's public engagement was extensive in terms of its content, scope and duration and that it was appropriately focussed on the geographical area where impacts could reasonably be expected, while remaining open and willing to provide information about the project to any member of the public.

CNL engaged with the public in a manner that provided reasonable opportunities for the public to understand the NSDF Project, participate in the EA process and raise any concerns. CNL's public engagement provided an important opportunity to ensure that all the issues and

potential impacts that were of concern to the public were addressed through the EA process. That engagement process continues, notwithstanding where the licensing process stands.

Public engagement began in 2016 with the submission of the [NSDF Project Description](#) [41]. Since that time, CNL has carried out a comprehensive and multi-faceted public engagement program to engage with those in the region and more broadly throughout eastern Ontario and Western Québec. Communication has focussed on topics raised by the public. CNL provided information on how CNL addressed input and concerns in Section 4 of the final NSDF EIS [14], as well as offered opportunities for questions. CNL has also engaged repeatedly with high schools and universities, federal, provincial and municipal authorities, including the elected councils in Renfrew County and County Regional Municipalities Pontiac, many of whom made submissions to the Commission.

CNL's methods have helped to establish productive discussions aimed at informing and educating the public and stakeholders, thereby enabling valuable feedback into the NSDF Project. The feedback received from the public on the NSDF Project resulted in changes to the project, including, but not limited to, the following:

- Increasing the robustness of the facility through design changes.
- Analyzing additional alternative means (e.g., facility types, effluent discharge locations, final grade of the facility).
- Conducting additional baseline studies (e.g., songbird surveys, bat telemetry).
- Expanding the regional study areas, to include 8 km of the Ottawa River downstream from Perch Creek, including both the Ontario and Quebec shorelines.
- Reducing the radiological waste inventory to include only low level waste.
- Conducting assessments of more far-reaching scenarios that reflect areas of public interest.
- Adapting and evolving communication methods.

In order to continue engagement with the public beyond the NSDF licence application phase, CNL will maintain open channels of communication and address project-specific concerns through [CNL's Public Information Program](#) [31], as required by the CRL site operating licence [2]. Through many forms of feedback CNL will continue to evaluate and analyze to what extent stakeholders understand and engage CNL's communication with respect to the NSDF Project. CNL will continue to evolve its program through best practice and methods over the life cycle of the project.

Discussions on public engagement are outlined in the CMD for Licensing Decision (Section 2.2) [3], the final NSDF EIS (Section 4) [14] and the Public Engagement Report [5]. CNL also presented a summary of the public engagement for the NSDF in Part 1 and Part 2 of the NSDF hearing [4] [7].

## **2.7 CNL's Concluding Remarks**

As a prerequisite to the licence amendment decision, the Commission must make an EA decision to determine whether the proposed project activities are likely to cause significant adverse environmental effects. The significance of the likely environmental effects of the NSDF Project have been assessed in the final NSDF EIS [14] in accordance with the requirements of CEAA 2012 [9]. Residual adverse effects were identified for air quality (including greenhouse gases), hydrogeology, hydrology, surface water quality, terrestrial biodiversity, ecological health, human health, and socio-economics (including economic benefits). Beneficial effects were identified for socio-economics (labour market, economic development, Indigenous). Overall, it is CNL's conclusion that with the identified mitigation measures implemented, the NSDF Project is not likely to cause significant adverse environmental effects.

Should the NSDF Project proceed, CNL will expand its already extensive environmental monitoring of the CRL site to include the NSDF. Details will be further developed in the monitoring and follow-up programs as the EA decision is made, with input from the public, Indigenous Nations, communities and organizations, and regulatory agencies.

### 3. Long Term Safety Case

The NSDF Project has been specifically designed as a permanent solution to reduce environmental risk and achieve isolation and containment of low level waste for a sufficiently long period, according to the requirements set forth in, but not limited to:

- NSCA [10] and associated regulations, including the *Class I Nuclear Facilities Regulation* [32] and the *General Nuclear Safety and Control Regulations* [33]
- *REGDOC-2.11.1 Waste Management, Volume III: Safety Case for the Disposal of Radioactive Waste* [20]
- IAEA SSR-5: *Disposal of Radioactive Waste* [21]

The NSDF [Safety Case](#) [35] presents the integrated collection of safety arguments and evidence to demonstrate the safety of the NSDF and was prepared utilizing international guidance (e.g., IAEA SSG-23 [36]). The NSDF design, controls, and processes are adequate for the radiological protection of workers, the public and Indigenous peoples, as well as the environment. While some intervenors have asserted that the NSDF is not aligned with international standards and guidelines, CNL has demonstrated the suitability of the disposal system within the NSDF Safety Case [35]. Appendix B of the Safety Case [35] presents several tables that show how CNL documentation relates to the requirements. Additionally, Section 3.1.1.1 of the final NSDF EIS [14], summarizes how the key safety features of the NSDF have addressed the design principles for radioactive waste disposal from IAEA SSR-5 [21].

The following key safety arguments developed in the NSDF Safety Case [35] were presented during the Part 2 proceedings:

- The radiological inventory intended for disposal in the NSDF is only low level waste.
- The NSDF is designed for the radiological inventory and the physical characteristics of the site.
- The proposed site is appropriate for the NSDF.
- The NSDF supports environmental sustainability, reduces environmental risk and liability, and is protective of the Ottawa River.
- The inputs and models used in the Post-Closure Safety Assessment [37] are conservative and overestimate the risk to the public, Indigenous peoples, and the environment.
- The NSDF is designed to isolate the waste for hundreds of years into the future. Measures are in place to reduce the probability and limit any consequences of human intrusion to within the dose acceptance criteria of 1 mSv/yr.

The following sections of this submission provide an overview of the key concerns from intervenors heard during the Part 2 proceedings related to the theme of Long-Term Safety.

### 3.1 Facility Design

The NSDF Project has been designed in accordance with regulatory and international design principles for radioactive waste disposal. This includes the incorporation of multiple safety functions, containment and isolation of the radioactive waste, surveillance and control of the passive safety features. The long-term safety performance of the NSDF Project is enhanced by many safety features, including engineered barriers such as the base liner system, the final cover system, and the perimeter berm. The base liner and final cover systems are composed of a combination of natural materials (e.g., a compacted clay liner) and synthetic materials (e.g., high-density polyethylene geomembranes) designed to work together to prevent the release of contaminants into the environment. As a near surface facility, the design is not reliant on the geology as a safety barrier. Long term safety is assured by limiting the waste to low level only and by containing it for longer than its hazardous lifetime with engineered barrier systems.

Intervenors expressed concerns with respect to the suitability of the facility design for disposal of low level waste, asserting that the facility was a “landfill” design where only very low level waste is suitable for disposal. As CNL stated during the Part 2 proceedings, the term ‘near surface disposal’ is used in Section 1.11 of IAEA SSG-29 [18] “to refer to a range of disposal methods, including the emplacement of solid radioactive waste in earthen trenches, above ground engineered structures, engineered structures just below the ground surface and rock caverns, silos and tunnels excavated at depths of up to a few tens of metres underground”. The NSDF design is an engineered containment mound to be built on a bedrock ridge at the CRL site thus meeting this definition.

Both Canadian and international guidance requires that any disposal system shall provide containment until the radioactive decay of the inventory has significantly reduced the hazard posed by the waste. The engineered containment mound design life of 550 years has been established to meet the required period to allow for radiologic decay of the waste inventory. CNL has also provided technical evidence that the barrier systems are anticipated to perform longer than their design life.

There were concerns from intervenors about the degradation of the barrier system at the end of the 550 year design life, in that contamination would then be released to the surrounding environment. Since the proposed inventory for the NSDF is low level waste, most of the radiological decay will occur within the first 100 years after facility closure, and the concentration of remaining radionuclides will approach the natural background levels. The risk of the presence of long-lived radionuclides has been studied in detail in the Post-Closure Safety Assessment [37], which also assumes conservative degradation rates of the barrier systems. The calculated dose consequence and environmental concentrations meet the dose acceptance criteria and environmental quality standards.

Discussions on the facility design are outlined in the CMD for Licensing Decision (Section 4.2) [3], the final NSDF EIS (Section 3.4) [14], and the NSDF Safety Case (Section 3.2) [35]. CNL also presented the facility design in Part 1 of the NSDF hearing [4].

### 3.2 Post-Closure Safety Analysis

The [NSDF Post-Closure Safety Assessment](#) [37] provides the long-term safety analysis to demonstrate that the facility will not pose an unreasonable risk to human health and the environment including a reasonable assurance that the regulatory radiological dose limit for human exposure will not be exceeded.

Several intervenors raised concerns about the long-term safety of the facility, including the credibility and methodology of the modeling as well as the selection of the acceptance criteria utilized to demonstrate safety. Evaluating long-term safety requires projections of the future condition of the NSDF and its environment and how people might interact with the facility. Approaches have been developed to undertake such evaluations, centred on a system analysis method. This involves representing the facility, the contaminants present, and all potentially relevant media, with mathematical models to represent the key processes that may occur (e.g., release from wastes, dissolution into groundwater, and uptake by plants, etc.). It is essential that the models are relevant, well-grounded in science and transparent. This is achieved through a systematic approach. The international nuclear industry has developed best practice guidance on the process, which is documented in a report of the IAEA *Improving Safety Assessment Methodologies* programme [38]. This process has been applied internationally since its publication, is consistent with current Canadian regulatory requirements and guidance (e.g., REGDOC-2.11.1 Vol. III [20]), and underpins the long-term safety assessment of the NSDF, also referred to as the Post-Closure Safety Assessment [37].

As a disposal facility, the acceptance criteria and radiological dose limits are defined in REGDOC-2.11.1 Vol. III [20]. A radioactive waste disposal facility is designed specifically for the waste inventory with long-term safety in mind and will have associated monitoring and institutional control programs. For these reasons, the limits for radiological clearance are not applicable to the disposal of radioactive waste in a Class 1B licenced facility.

Several intervenors were concerned with how uncertainties can be managed when assessing the evolution of the NSDF for thousands of years into the future. Regulatory requirements and international guidance recognize that the process of a post-closure safety assessment inherently involves uncertainties, such that absolute measures of safety cannot readily be applied. Consequently, there is an emphasis on building confidence in safety through a variety of methods which, together, provide a robust case that the NSDF will be safe in the future. The Post-Closure Safety Assessment [37] contains many instances where assumptions are made, or data are selected, with the intention of being conservative. Doing so helps build confidence that the assessment overestimates rather than underestimates potential doses. Examples of conservative assumptions made by CNL include:

- The durability of the cap and liner system is towards the lower end of the range of the expected long-term performance (based on geomembrane research).
- All institutional controls are lost immediately at 300 years post closure of the facility.
- The inclusion of basic human intrusion (e.g., farmer living on top of the facility) as part of the normal evolution of the site.

Numerous other examples of conservative assumptions are provided in Section 8.1.7 of the NSDF Safety Case [35].

The concept of abandonment was a reoccurring concern from intervenors. Some of this concern may have been because the Post Closure Safety Assessment [37] assumes that institutional controls are lost after 300 years. This modelling assumption is deliberately conservative to demonstrate that long term safety is not reliant on long term controls. AECL is committed to controlling and restricting the land use of the NSDF footprint for as long as necessary. While other areas of the CRL site may be re-used, the NSDF Project site will continue to be restricted as a waste disposal facility. CNL reaffirms that disposal is not synonymous with abandonment.

As described in Section 1.4 of CNL's CMD for Licensing Decision [3], NSDF Project activities are planned to occur in the following phases: construction and commissioning, operations, closure and decommissioning, and post-closure. Regulatory approval will be required for the NSDF to progress from one phase to the next. At some distant point in the future, it may be determined by the CNSC that the facility no longer requires licensing under the NSCA [10]. This does not mean that the facility is "abandoned", rather, it means that the responsibility for enforcing institutional controls and monitoring could potentially shift to a different agency.

Several intervenors raised concerns about the perceived risk from the presence of the non-radiological contaminants present in the NSDF. Non-radiological contaminants were also studied as part of the overall NSDF Safety Case [35], but the analysis was performed using a graded approach. A comprehensive and quantitative analysis of the risks posed by all non-radiological contaminants was not necessary to demonstrate safety at the NSDF. This is largely because the [Waste Acceptance Criteria](#) [39] utilizes limits for non-radiological contaminants for land disposal in Ontario prescribed in *Ontario Regulation 347* [40], which are set at levels that are protective of the environment. Adhering to the established limits ensures that the non-radiological risk posed by the NSDF is small, and no greater than the risk posed by any other land disposal facility in Ontario.

Discussions on long term safety and the post-closure assessment are outlined in the CMD for Licensing Decision (Section 5.5) [3], the final NSDF EIS (Section 5.7) [14], and the NSDF Safety Case (Sections 4.1 and 4.4) [35]. CNL also presented the post-closure safety assessment in Part 1 of the NSDF hearing [4].

### **3.3 Consideration of Environmental Events**

Intervenors expressed concerns with respect to the integrity of the facility during environmental events (e.g., flooding and earthquakes) as well as consideration of climate change or even terrorist attacks.

As presented in CNL's CMD for Licensing Decision [3] the NSDF Project has considered how changes to the environment could adversely affect the facility. For example, temperature and precipitation increases associated with climate change are accounted for in the Post-Closure Safety Assessment [37]. To ensure the effects of the NSDF Project are minimized, the design

basis of the NSDF accounts for expected and extreme environmental conditions of the site through passive design of the engineered containment mound. This specifically includes the ability to withstand a 1-in-10,000 year seismic event and contain the inventory during back-to-back 1-in-100 year storm events including peak monthly rain and accumulated snowmelt. The base elevation of the engineered containment mound is 163 meters above sea level, whereas the maximum flood level due to upstream dam breaks is 122 meters above sea level [35]. Therefore, the facility is well above the worst case flood level of the Ottawa River. CNL has the capability and resources to actively respond to any unplanned events at the CRL site, including emergency response measures for severe winds or tornados or events of a security threat.

All extreme events were assessed in the above referenced documents and either deemed not credible or the effects to human health and the environment were within regulatory limits.

Discussions on environmental effects are outlined in the CMD for Licensing Decision (Section 4.5) [3], the final NSDF EIS (Section 5) [14], and the NSDF Safety Case (Section 4) [35]. CNL also presented information on how environmental events were considered for the NSDF Project in Part 1 and Part 2 of the NSDF hearing [4][7].

### **3.4 Waste Inventory**

Through the engagement that the EA process fostered, CNL has refined the design of the NSDF Project based on input received from regulatory authorities as well as the public and Indigenous peoples. Specifically, the waste inventory proposed for disposal in NSDF was revised to eliminate intermediate level waste. The NSDF will hold only low level waste, which contains primarily short-lived radionuclides and limits the amount of long-lived radionuclides. CNL's definition of low level waste is consistent with REGDOC-2.11.1 *Waste Management, Volume 1: Management of Radioactive Waste* [34], CSA N292.0 *General principles for the management of radioactive waste and irradiated fuel* [51] and IAEA GSG-1 *Classification of Radioactive Waste* [43]. However, some intervenors have expressed concerns with the inclusion of long-lived radionuclides in the NSDF inventory, asserting that their presence represents an unacceptable risk to the public. Long-lived radionuclides are included in the NSDF inventory as they are intrinsically part of the radiological fingerprint of waste streams at CRL and at other CNL sites. This includes radioisotopes of plutonium and uranium which are present as residual contamination only. The concentrations of long-lived radionuclides that are proposed in the NSDF inventory are in limited concentrations consistent with the CSA and IAEA guidance mentioned above. The radiological inventory proposed for the NSDF, combined with the facility design, must ensure that doses to the public and risk to the environment remains below the regulatory limits. The risk of the presence of long-lived radionuclides have been studied in detail in the Post Closure Safety Assessment [37]. The calculated dose consequences are well below the regulatory requirements, thus do not pose an unacceptable risk to the public. Radiological dose and environmental risk from these long-lived radionuclides are also summarized in Sections 5.7 and 5.8 of the final NSDF EIS [14]. Furthermore, CNL acknowledges that the perception of risk about certain radionuclides can be mitigated through CNL's Public

Information Program [31], which describes how CNL will continue to employ a variety of methods to inform and educate the public about CNL's operations, including, without limitation, safety of the public.

There were also concerns from intervenors that the radiological inventory presented by CNL was incomplete or missing radionuclides. CNL has been transparent that there are over 200 radionuclides in CNL's waste inventory database. The full list of radionuclides can be found in Appendix A of the Reference Inventory [44]. As discussed in Section 3.7 of the Reference Inventory [44], many of these 200 radionuclides are present at low activities or have very short half-lives, such that they cannot contribute significantly to the radiological impact. The reference inventory used to inform the NSDF safety basis included the most significant radionuclides in terms of overall quantities, potential for radiological dose consequences, and mobility in the environment. To ensure that the total radionuclide inventory is properly accounted for in the NSDF, the Waste Acceptance Criteria [39] specifies minimum reporting requirements for all radionuclides with half-lives greater than 5 years. Therefore, the tracking of radionuclides emplaced within the NSDF will include the 30 significant radionuclides and all others with half-lives greater than 5 years.

CNL understands transparency is important to the public and Indigenous peoples in order to build trust in CNL's safe operation of the NSDF. As such during Part 2, CNL committed to transparent reporting of the inventory ultimately received in the NSDF, if the project is authorized to proceed.

Discussions on the waste inventory are outlined in the CMD for Licensing Decision (Section 4.1) [3], the final NSDF EIS (Section 3.3) [14], and the NSDF Safety Case (Section 3.3) [35]. CNL also presented information on the waste inventory in Part 1 and Part 2 of the NSDF hearing [4][7].

### **3.5 Waste Acceptance Criteria**

CNL has developed Waste Acceptance Criteria [39] for the proposed NSDF Project to ensure all waste received for disposal complies with the design and licensing basis for the facility. For example, as a near surface disposal facility, the Waste Acceptance Criteria [39] must be established to limit the concentration and potential hazard of the radioactive material, thus limiting the consequence of human intrusion. Waste shall comply with all the criteria in the Waste Acceptance Criteria [39] to be considered acceptable for disposal in the NSDF. In addition, there are two upper limits to the amount of waste that the NSDF can accept. Neither the maximum cumulative radioactivity of each radionuclide, as per the licensed inventory, nor the total volume of 1 million m<sup>3</sup> may be exceeded.

Intervenors asserted that the waste inventory developed for the NSDF was intermediate level waste, and not low level waste, based on the presence and quantities of Cobalt-60. Cobalt-60 is generated through the activation of steels, or as a result of medical isotope research and production at the CRL site, which has been for the benefit of Canadians. Thus Cobalt-60 can potentially be present as contamination on waste or as a disused source. With a half-life of 5.27

years, Cobalt-60 is a short-lived radionuclide (i.e., half-life is < 30 years) and is therefore not a long-term hazard.

Disused sources shall only be applicable for disposal in the NSDF if they meet the requirements of the Waste Acceptance Criteria [39], which specifically relies on IAEA guidance that disused sources disposed of in near surface facilities should be short-lived and relatively low activity. Adherence to the Waste Acceptance Criteria [39] ensures that disused sources will decay to exemption quantities within 100 years of closure of the disposal facility. At the Part 2 proceedings, CNL committed to updating the Waste Acceptance Criteria [39], prior to operations, to be more specific on this point.

Concerns were raised about the direct disposal of intermodal shipping containers into the NSDF. At the Part 2 proceedings, CNL clarified waste diversion is a key aspect of CNL's waste management program. Specifically, CNL will continue to apply the waste hierarchy and treat disposal as the least desirable option. For example, to ensure the intermodal shipping containers remain reusable, CNL utilizes engineered waste bags or liners as the primary containment of the waste to prevent contamination of the container. As the contents of the intermodal containers are emplaced into the NSDF, the intermodal shipping containers would be available for re-use.

Discussions on the waste acceptance criteria are outlined in the CMD for Licensing Decision (Section 4.1) [3], the final NSDF EIS (Section 3.3.3) [14], and the NSDF Safety Case (Section 5.6) [35]. CNL also presented information on waste acceptance criteria in Part 1 and Part 2 of the NSDF hearing [4][7].

### **3.6 Waste Characterization**

Several intervenors raised concerns about CNL's waste characterization program, and CNL's ability to characterize and quantify the wastes proposed for inclusion in the NSDF.

CNL procedures follow the relevant CSA guidance required by the CRL Licence Condition Handbook [45]. CNL implements a standardized waste characterization approach across CNL operated sites to ensure that waste meets the waste acceptance criteria for current and planned storage or disposal facilities. CNL is also applying the recently released CSA N292.8 *Characterization of Radioactive Waste and Irradiated Fuel* [42] to its waste characterization approach. Over the last few years, CNL has invested in its capabilities to ensure waste characterization resources are appropriate for supporting waste disposal. All waste intended to be emplaced in the NSDF, including legacy waste, shall be characterized and segregated according to modern standards and practices to ensure compliance with the Waste Acceptance Criteria [39].

Discussions on waste characterization are outlined in the CMD for Licensing Decision (Section 6.11) [3], the final NSDF EIS (Section 3.3) [14], and the NSDF Safety Case (Section 6.2) [35]. CNL also presented information on waste characterization in Part 1 and Part 2 of the NSDF hearing [4] [7].

### **3.7 CNL's Concluding Remarks**

The long term safety case has demonstrated the facility will not pose an unreasonable risk to human health and the environment including a reasonable assurance that the regulatory radiological dose limit for human exposure will not be exceeded. Potential effects of the NSDF Project on the environment are limited because the inventory is restricted to only low level waste, the facility has been designed with consideration of site-specific characteristics, the facility suitable for the proposed inventory, and it will safely contain the wastes for the hazardous lifetime of the wastes. Waste containment and isolation is achieved through the facility's design and is based on passive safety features and multiple barriers providing defence-in-depth and controlling the facility's operational releases to the environment. The safety of the NSDF during post-closure is provided by means of passive features that will end the need for active management, in alignment with CNSC requirements and IAEA guidance.

CNL is confident that the NSDF will effectively isolate both radiological and non-radiological materials for the long-term, while remaining protective of human health and the environment during all project phases.

#### 4. Indigenous Engagement and Consultation

Both the EA and licensing decisions trigger the Crown's duty to consult, and where appropriate, to accommodate Indigenous peoples who have asserted or established Aboriginal and/or treaty rights<sup>1</sup> and have the potential to be impacted by the proposed government action, under Section 35 of the *Constitution Act, 1982* [53]. In the case of the NSDF Project, the CNSC is responsible for the procedural and substantive aspects of the duty to consult. CNL appreciates that, while it is the Commission's responsibility to ultimately determine that the Crown's duty to consult is being discharged, the Commission may rely on CNL's record of engagement with Indigenous Nations, communities and organizations to fulfil such duties. CNL has sought to engage and build meaningful relationships with Indigenous Nations, communities and organizations while gaining an understanding of the history and cultural knowledge of Indigenous peoples.

CNL, with assistance of the CNSC staff, identified a list of Indigenous Nations, communities and organizations based on the proximity of their communities, treaty areas or unceded traditional territories to the NSDF Project, as well as those that expressed interest in the NSDF Project or CNL's activities who may have rights or interests in the project. CNL's engagement with each Indigenous Nation, community or organization, and the results of such engagement, is described in the CMD for Licensing Decision [3], final NSDF EIS [14], Indigenous Engagement Report [6], and Procedural Direction written submission [8]. The Procedural Direction written submission further identifies and distinguishes which Indigenous Nations, communities and organizations are rights bearing and non-rights bearing.

The following sections provide an overview of the engagement with Indigenous Nations, communities and organizations and interests and concerns CNL heard expressed by Indigenous Nations, communities and organizations during the Part 2 proceedings and the time afforded by the Procedural Direction [46].

##### 4.1 Engagement with Indigenous Nations, Communities and Organizations

Engagement with Indigenous Nations, communities and organizations regarding the NSDF Project started in 2016. As part of CNL's engagement activities, CNL sought to understand the interests and concerns of Indigenous Nations, organizations and communities while also building awareness and understanding of NSDF Project activities. CNL sought to reach a mutual understanding of the potential effects of NSDF Project activities on the environment and any potential impacts on Aboriginal and treaty rights and interests. As part of its engagement efforts, CNL shared information with, and requested and received information from, interested Indigenous Nations, communities and organizations and engaged collaboratively with those that expressed interest. CNL endeavors generally, and specifically in respect of the NSDF, to identify opportunities for collaboration and participation with Indigenous Nations, communities

---

<sup>1</sup> The term "Aboriginal" is used when referring to the Crown's duty to consult as that is the term used in Section 35 of the *Constitution Act, 1982*. CNL acknowledges that the term "Indigenous" is preferred and is therefore used in all other instances in this submission.

and organizations, which includes incorporation of Indigenous Knowledge Systems, values and perspectives when considering project activities and mitigation strategies.

The scope and frequency of engagement has varied significantly between Indigenous Nations, communities and organizations, with some actively engaging early in the NSDF Project, and others only more recently, as has been described in CNL's previous submissions to the Commission and at the Part 2 proceedings. CNL has had the opportunity to learn that relationships evolve, and it is important to regularly validate that engagement is being conducted with the correct representatives. CNL now understands the importance of establishing a relationship with each interested Indigenous Nation and community to ensure their voice is heard by CNL directly, rather than through arms-length organizations that an Indigenous Nation or community may be a member of, notwithstanding that CNL had reasonable grounds to believe that the Indigenous organization represented all of its members for purposes of engagement on the NSDF Project. CNL has continued to adapt its approach to engagement to be responsive to the stated needs of individual Indigenous Nations, communities and organizations. This approach recognizes that each may have different preferences, perspectives, interests and concerns.

As a result of the issuance of the Procedural Direction [46], CNL, along with CNSC staff and AECL, were provided with additional time to engage with Kebaowek First Nation (KFN) and the Kitigan Zibi Anishinabeg (KZA) on the NSDF Project. With the knowledge gained about KFN and KZA's preferences prior to and during the Part 2 proceedings, CNL directed its engagement efforts to both KFN and the KZA directly as requested. While the time for engagement was initially limited, CNL believed that progress and relationship building was occurring at the pace established by KFN and the KZA, respectively. This was reported previously by CNL to the Commission in the Procedural Direction written submission [8]. While the Procedural Direction [46] did not include other Indigenous Nations, communities or organizations, CNL continued its engagement efforts with all interested Indigenous Nations, communities and organizations during this time as committed to at the Part 2 proceedings. Some of the progress with these Indigenous Nations, communities and organizations, such as the Algonquins of Pikwàkanagàn First Nation (AOPFN), was reported in their final submissions to the Commission [47]. Many interests and concerns were raised by KFN and the KZA during the time afforded by the Procedural Direction [46]. These are discussed in further detail in this submission and the Procedural Direction written submission [8].

CNL is committed to advancing reconciliation through meaningful action, establishing and maintaining relationships with Indigenous Nations, communities and organizations and meaningfully engaging with Indigenous Nations, communities and organizations, in each case on the NSDF Project today and in the longer term. CNL remains available to answer any questions that Indigenous Nations, communities and organizations may have about the NSDF and CNL's broader operations at the CRL site. CNL is committed to continuing to engage with all interested Indigenous Nations, communities and organizations, as previously stated at the Part 2 proceedings and the Procedural Direction written submission [8]. Further, CNL wishes to acknowledge AOPFN's request that CNL respond within this submission to certain items within

their final submission [47]. CNL intends to engage with AOPFN on the requested items as part of our commitment to ongoing engagement on the NSDF Project.

CNL's approach and engagement with each Indigenous Nation, community or organization and the outcome of such engagement is described in Section 2 of CNL's CMD for Licensing Decision [3], Section 6 of the final NSDF EIS [14], the Indigenous Engagement Report [6], and the Procedural Direction written submission [8].

#### **4.2 Establishment of Agreements with Indigenous Nations, Communities and Organizations**

Throughout the period of engagement on the NSDF Project, as well as the time afforded by the Procedural Direction [46], CNL has been able to execute agreements with various Indigenous Nations, communities and organizations. These include memorandums of understanding, letters of intent, capacity agreements, long-term relationship agreements and consultation and engagement framework agreements, among others. These agreements provide for capacity, if capacity was required, and establish the framework from which deep and meaningful engagement and collaboration with the applicable Indigenous Nation, community or organization may occur with respect to the NSDF Project as well as other CNL activities. These agreements are described in Section 2 of CNL's CMD for Licensing Decision [3], Section 6 of the final NSDF EIS [14], the Indigenous Engagement Report [6] and the Procedural Direction written submission [8]. In addition, Indigenous Nations, communities and organizations have reported to the CNSC developments after the publication dates of the aforementioned documents in their final submissions.

#### **4.3 Duty to Consult and Accommodate**

As discussed above, the Commission is responsible for assessing whether the Crown's duty to consult, and where appropriate, accommodate, has been satisfied.

Certain Indigenous Nations and communities expressed their opinions that the Crown's duty to consult and accommodate had not been met, and therefore the Commission should decline CNL's application until adequate consultation and accommodation regarding the NSDF occurs. Other Indigenous Nations, communities and organizations expressed that there was either a low probability of causing impacts to the environment and to Indigenous rights and interests, or that any potential impacts could be mitigated or otherwise accommodated, and were supportive of the NSDF as a result. Further, certain Indigenous Nations and communities have also raised whether the NSDF complies with the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).

As described in Section 2 of CNL's CMD for Licensing Decision [3], Section 6 of the final NSDF EIS [14], the Indigenous Engagement Report [6], the Procedural Direction written submission [8] and this submission, CNL submits that meaningful engagement and consultation has occurred in respect of the NSDF Project, and where appropriate mitigations, commitments and other accommodation measures have been provided to address the interests and concerns raised by Indigenous Nations, communities and organizations regarding potential impacts to Aboriginal

and treaty rights or interests. Therefore, CNL believes that the duty to consult, and where appropriate, accommodate, has been fulfilled in respect of the decisions to be made by the Commission in regards to CNL's license application for the NSDF.

Canada adopted *The United Nations Declaration on the Rights of Indigenous Peoples Act*, S.C. 2021, c. 14 (UNDRIP Act) [54], which provides a process for incorporating UNDRIP into Canadian law, after the inception of the NSDF Project and CNL's commencement of engagement with Indigenous Nations, communities and organizations regarding the NSDF Project. It is unclear how UNDRIP, and specifically the notion of free, prior and informed consent contained therein will be reflected in federal laws and applied in respect of Crown decisions regarding constitutionally protected Aboriginal and treaty rights and interests, as the UNDRIP Act contemplates the development of a process to align federal laws with the principles expressed therein that is currently underway. Through CNL's engagement with the public and Indigenous Nations, communities and organizations, CNL has sought to seek the support of all interested parties for the NSDF Project, whether that support is expressed as consent in terms of free, prior and informed consent or otherwise. Where there have been or are differences of opinion or concerns that need to be addressed, CNL has offered and will continue to offer to explore mitigation measures and formulate commitments with Indigenous Nations, communities and organizations with the intention of trying to remove or lessen the concern, as has been described in CNL's previous submission, including, without limitation, Section 6 of the final NSDF EIS [14] and the Indigenous Engagement Report [6]. As CNL's work is closely connected to the Government of Canada, CNL is committed to advancing Canada's policy and objectives in respect of Indigenous peoples, including the approach to be developed with respect to free, prior and informed consent and UNDRIP generally.

As set forth in the Procedural Direction written submission [8], CNL undertook extensive engagement activities with KFN and the KZA upon the issuance by the Commission of the Procedural Direction [46], as well as other interested Indigenous Nations, communities and organizations. CNL's engagement efforts during the period of time afforded by the Procedural Direction [46] were challenged at times due to the fact that they were occurring at a pace and schedule set by the Procedural Direction [46]. In CNL's view, these challenges include a lack of an appreciation or understanding for the rules, requirements and regulatory landscape that CNL operates within and an expectation that engagement activities must occur solely in the means and methods as proposed by an Indigenous Nation or community. CNL took all of the opportunities available to offer alternatives and to explain the rules, requirements and regulatory landscape applicable to CNL's sites and operations. In CNL's view, some parties did not reasonably engage with CNL's extensive efforts to advance these opportunities. In CNL's view, these actions were inconsistent with what the Commission heard at the Part 2 proceedings and the Commission's rationale for issuing the Procedural Direction [46]. This view is further compounded by the KZA and KFN joint final submission [47], which is inconsistent with the earlier submissions of KFN and the KZA in some cases. CNL acknowledges that each interested Indigenous Nation, community or organization is entitled to draw their own conclusion as to the NSDF Project, however, CNL's robust and good faith engagement efforts were intended to collaboratively inform KFN and the KZA about the NSDF Project in order to

seek their support for the NSDF Project, whether or not such support includes their free, prior and informed consent under UNDRIP or otherwise, and to help satisfy the Crown's duty to consult, and where appropriate, accommodate.

With respect to the question of the application and compliance with UNDRIP, this was raised by many Indigenous and non-Indigenous intervenors at and as part of the Part 2 proceedings and in their final submissions, where applicable. CNL's prior submissions to the Commission document these concerns in more specific detail. As was heard by the Commission at the Part 2 proceedings, at that time, CNL and AOPFN's relationship was still in development, trust was still being built. AOPFN respectfully expressed their positions and views to the Commission, and discussed same with CNL after the Part 2 proceedings. The meaningful engagement efforts of AOPFN, CNL and AECL have since resulted in AOPFN providing their free, prior and informed consent to the NSDF Project, subject to the commitments made and measures undertaken by CNL and AECL being fully and properly implemented (see AOPFN's final written submission [47]).

CNL submits to the Commission that based on the record of engagement, it is reasonable for the Commission to conclude that the Crown's duty to consult, and where appropriate, accommodate, has been fulfilled. CNL further submits that UNDRIP, as of the date of this submission, is not strictly applicable to the NSDF Project. However, CNL has sought to seek the support of all interested Indigenous Nations, communities and organizations for the NSDF Project, whether that support is expressed as consent in terms of free, prior and informed consent or otherwise.

#### **4.4 Key Interests and Concerns**

Throughout CNL's engagement with the public and Indigenous Nations, communities and organizations many interests and concerns have been raised regarding the NSDF Project. Many of these interests and concerns are discussed throughout this submission, as well as in the CMD for Licensing Decision [3], Section 6 of the final NSDF EIS [14], the Indigenous Engagement Report [6], and the Procedural Direction written submission [8]. This section of the submission discusses key interests and concerns raised that are specific to Indigenous Nations, communities and organizations.

CNL recognizes that the waters, including the Kichi-Sibi (Ottawa River), are of significant importance to Indigenous peoples, including the Indigenous Nations, communities and organizations that have participated in engagement and the associated hearing process regarding the NSDF. Many expressed that women are waterkeepers and have a special relationship and connection with the Kichi-Sibi (Ottawa River) and surrounding watersheds. Notwithstanding that KFN and the KZA shared additional information about their specific concerns and views during the time afforded by the Procedural Direction [46], any project specific impacts on asserted Aboriginal or treaty rights and interests have been previously assessed and/or mitigated as described in the final NSDF EIS [14], and the conclusions therein remain valid and unchanged. CNSC staff have also concluded that there are no residual impacts expected on Aboriginal rights due to the NSDF Project [49][50]. Further discussion as to how

the NSDF is protective of the Kichi-Sibi (Ottawa River) and other watersheds is also provided within this submission (Section 2.4.1).

CNL has heard that the protection of species at risk is also of significant importance to Indigenous Nations, communities and organizations. Many expressed a special relationship and connection to various species that may be present in and around the broader CRL site, not just the NSDF Project site. Much of the engagement activities conducted in collaboration with KFN validated the knowledge and understanding that CNL has about the NSDF site and the broader CRL site. The additional field work has enabled CNL to further refine environmental management strategies. Notwithstanding that KFN and the KZA shared additional information about their specific concerns and views during the time afforded by the Procedural Direction [46] with respect to species at risk, any project-specific impacts on the environment and species at risk have been previously assessed and/or mitigated as described in the final NSDF EIS [14], and the conclusions therein remain valid and unchanged. CNSC staff have also concluded that there are no residual impacts expected due to the NSDF Project [49][50]. Further discussion as to the protection of species at risk is also provided within this submission (Section 2.4.2).

During the Part 2 proceedings and the time afforded by the Procedural Direction [46], CNL developed a deeper understanding of the concerns of each Indigenous Nation, community and organization, and recognizes that, while western science-based regulations and conclusions are satisfied, there are areas which can be enhanced through the meaningful consideration of Indigenous Knowledge Systems, values and perspectives (see CNL's Procedural Direction written submission [8]). This includes seeking the perspective, feedback and input on the mitigation plans and strategies from Indigenous Nations, communities or organizations on key interests such as the protection of the Kichi-Sibi (Ottawa River) and species at risk, among others. CNL is committed to ensuring that this additional knowledge, data and values inform the NSDF Project as it continues. CNL also heard from Indigenous Nations, communities and organizations that western science and technology may not speak to Indigenous perspectives or worldviews and dialogue is critical for CNL to learn and, where possible, incorporate such teachings and views into its projects and operations in the future. The final NSDF EIS [14] meets western regulatory requirements, and while some Indigenous Knowledge Systems, values and perspectives informed the final NSDF EIS [14], not all were known to CNL prior to the publication of the document in light of the indirect engagement with certain Indigenous Nations and communities through Indigenous organizations that was shared at the Part 2 proceedings. CNL remains committed to enhancing the NSDF Project with Indigenous Knowledge Systems, values and perspectives that are shared.

Many Indigenous Nations, communities and organizations raised interests and concerns with respect to the broader CRL site, and the lack of consultation and engagement with Indigenous Nations, communities and organizations when the CRL site was first established. CNL has been clear that this concern is not specific to the NSDF Project. The CRL site was established by the Government of Canada more than 75 years ago, well before today's constitutional requirements of consultation and engagement with Indigenous peoples existed. Canadian law is clear that the current governmental decision or action is not the forum in which to resolve

historical grievances, these must be addressed separately. Therefore, although the issues raised by Indigenous Nations, communities and organizations may require reconciliation with respect to historical actions taken by the Federal government, CNL submits that this licensing decision process is not the appropriate forum to do so.

During the Part 2 proceedings, as well as in KFN and the KZA's submissions in response to the Procedural Direction [46] and their joint final submission [48], it became apparent to CNL that there is a concern of radiological risk regarding the CRL site that is held by Indigenous Nations, communities and organizations. CNL heard concerns of fear and avoidance regarding the CRL site generally from Indigenous Nations, communities and organizations. While efforts are made to provide opportunities for familiarization and awareness, western science-based information and other information to Indigenous Nations, communities and organizations, as well as the public at large regarding CNL and its operations and projects, such as the NSDF, CNL acknowledges that it will take time to inform and raise awareness about radiological risk. CNL notes that this concern is not specific to the NSDF Project but is broader to the CRL site and potentially the nuclear industry. CNL is committed to continue work with Indigenous Nations, communities and organizations on how to communicate about the perceived radiological risk associated with CNL and its sites and projects with their members going forward and to provide information sessions for the community, if desired.

During the time afforded by the Procedural Direction [46] and prior to the finalization of this submission, new interests and concerns have been raised by Indigenous Nations and communities; however, some of these interests and concerns are, in CNL's view, related to the broader CRL site and surrounding area and are not specific interests and concerns related to the NSDF Project (e.g., historical siting of CRL). Therefore, while CNL acknowledges that meaningful engagement will require further discussion to address and understand these broader interests and concerns related to the CRL site, they are not relevant to the request for an amendment to the CRL license to permit the construction of the NSDF which is currently before the Commission.

#### **4.5 CNL's Concluding Remarks**

CNSC staff are responsible for performing, and have conducted, rights impact assessments as part of the review and assessment of the NSDF Project, which have been submitted to the Commission previously as part of the record of this matter. As a result, CNSC staff have concluded that following extensive engagement and consultation with Indigenous Nations and communities, the NSDF Project is unlikely to result in any new impacts on Aboriginal and/or treaty rights when taking into consideration the extensive mitigation measures, commitments and accommodation measures proposed by CNL, AECL and CNSC staff as stated in the EA report (see Section 3.4 of CNSC staff's final written submission [52]). Therefore, CNSC staff have concluded 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 (see Section

3.4 of CNSC staff's final written submission [52]). CNL fully supports the position expressed by CNSC staff in their final written submission to the Commission.

The NSDF Project will be located entirely within the CRL site where, aside from the operations and activities undertaken by CNL, other land uses are prohibited due to restricted public access. Based on CNL's findings, the NSDF Project is not predicted to have significant terrestrial or aquatic effects beyond the CRL site. CNL recognizes that additional data and input from Indigenous Nations, communities and organizations may augment these findings and lead to a need to work collaboratively to address any identified impacts throughout the lifecycle of the NSDF Project. The time provided by the Procedural Direction [46] has offered the opportunity for more meaningful and collaborative engagement with all interested Indigenous Nations, communities and organizations. The information collected has supplemented the baseline studies and assessments previously undertaken by CNL; however, in CNL's view, none of the additional information collected has changed CNL's conclusions as stated in the final NSDF EIS [14], and therefore, they remain valid and unchanged. It is therefore CNL's further position that the NSDF Project does not create any appreciable impacts on Aboriginal or treaty rights and interests.

CNL acknowledges that it is on a reconciliation journey. CNL is committed to building positive long-term relationships with Indigenous Nations, communities and organizations who have Aboriginal or treaty rights or interests on the lands where the NSDF Project is being proposed or who are interested in the NSDF Project. CNL remains committed to advancing the environmental protection and remediation of the CRL site and believes that the NSDF is a responsible, science-based solution which can be informed by Indigenous Knowledge Systems and values. CNL is committed to engaging and collaboratively developing solutions with Indigenous Nations, communities and organizations throughout the NSDF lifecycle in a meaningful way.

## 5. Requested Licence Amendment

CNL's application for an amendment [1] to the existing CRL site Nuclear Research and Test Establishment Operating Licence [2] is triggered by the consideration of a new Class 1B nuclear facility, the NSDF. CNL's application includes a clause-by-clause concordance of the NSDF Project to the relevant excerpts from the NSCA [10], applicable regulations, and REGDOCs. This includes the requirement in section 24(4)(b) of the NSCA that the NSDF as proposed will make adequate provision for the protection of the environment and the health and safety of persons. CNL understands that if the Commission authorizes the construction of the NSDF, CNSC staff have recommended the inclusion of two new conditions in the CRL site operating license as well as amendments to the associated Licence Condition Handbook [45]. These include:

- Annual update and report on the NSDF Licensing Regulatory Actions (Licence Condition G.7)
- Annual update and report on the progress of the implementation of the EA regulatory commitments (Licence Condition G.8)

CNL will comply with these changes should they be adopted by the Commission. CNL also acknowledges that the licence application and supporting documents become part of the licensing basis which establishes the acceptable performance for the facility. If this application is successful, at a future date, CNL intends to proceed with an application for a licence to operate the NSDF.

Some intervenors asserted that under the Government Owned and Contractor Operated model there would be a lack of long-term accountability for the NSDF, and that the operating model drove the selection of the cheapest and fastest approach. Concerns were also raised with respect to the absence of new regulatory documents or revised CSA standards related to waste management and decommissioning on the current CRL operating licence.

CNL is the licensee responsible for the existing CRL site Nuclear Research and Test Establishment Operating Licence [2] that has proposed to carry out the designated project. As such, CNL is the proponent for the development and operation of the NSDF Project and associated infrastructure. CNL is the licensee responsible to manage and operate the AECL sites and facilities. Additionally, the CNSC provides independent oversight of licenced activities as the federal nuclear regulator.

The existing CRL site Nuclear Research and Test Establishment Operating Licence [2] requires that CNL maintain a management system and programs in the 14 safety and control areas. As outlined in the CMD for Licensing Decision [3], CNL has a Management System comprised of an integrated set of documented policies, expectations, standards, procedures, and responsibilities through which CNL is governed and managed. Each safety and control area has a set of licensing basis publications which incorporates the relevant REGDOC and/or CSA standards. As new REGDOCs or standards are issued, these are added to an updated Licence Condition Handbook [45] and CNL is required to comply with these new requirements. This provides assurance that CNL is staying up to date with current regulatory requirements and

integrating them into CNL's day-to-day activities. CNSC has recently issued new regulatory documents pertaining to waste management and decommissioning (i.e., REGDOC-2.11 series). In preparation of this application and the NSDF long term safety case [35], CNL has already incorporated the requirements related to the management and disposal of radioactive waste. Furthermore, NSDF represents the application of best available technology to meet these modern requirements and standards with respect to the management of radioactive waste. This includes ensuring that radioactive waste is contained and isolated from the environment for sufficiently long time periods until it does not represent a hazard to the public or the environment.

Intervenors raised concerns that they believed there were no independent, international reviews. Along with the CNSC staff reviews, several third-party reviews were performed at various stages in the NSDF lifecycle to reduce uncertainties and increase confidence in the safety assessments performed in support of the NSDF. Third-party reviewers were identified based on experience with low level waste facilities around the world. The findings and recommendations of the third-party reviewers were considered during the iterative development of the design and safety assessments for the NSDF. Section 6.8 of the NSDF Safety Case [35] which is available to the public in both official languages, lists all the third-party reviewers, and describes how those reviews impacted the project. In addition to the third-party reviews, the design and safety assessment teams also represent knowledge and experience from the international nuclear community. Examples include the designers and long-term safety assessment modellers.

## **5.1 CNL's Concluding Remarks**

The NSDF will be a new Class IB nuclear facility on the existing CRL site licence for the disposal of current and future solid low level waste at the CRL site. CNL's robust Management System, which is aligned to the required safety and control areas outlined in the CRL site operating licence and Licence Condition Handbook [45], govern all of CNL's licensed activities. CNL's management system is well positioned to safely and securely deliver construction, as well as all future phases, of the NSDF Project. CNL's experience in managing radioactive waste and in-depth knowledge gained on implementing long-term solutions demonstrates that CNL can safely construct, operate and eventually close the NSDF.

## 6. Overall Conclusions

If approved, the NSDF will allow CNL to safely and permanently dispose of legacy and future low level waste, thereby improving protections to human health and the environment. The significance of the likely environmental effects of the NSDF Project has been assessed in the final NSDF EIS [14], as required by CEAA 2012. With the identified mitigations, the NSDF Project will not result in significant adverse environmental effects.

CNL has demonstrated that:

- CNL is qualified to implement the NSDF Project to meet all the required standards of the license's safety and control areas;
- The NSDF Project is the appropriate solution for the permanent disposal of low level waste at the CRL site;
- The engineering features of the NSDF represent an increase in safeguards to protect the Ottawa River and the environment; and
- The preferred location of the NSDF within the licensed CRL site boundary enables CNL to manage and control all aspects of the NSDF Project for the protection of its workers, contractors, Indigenous peoples, members of the public, and the environment.

The NSDF Project is the right solution for the forecasted low level waste inventory and will advance the clean-up mission for the CRL site, which is the right thing to do - the NSDF Project has no significant adverse environmental effects, with identified mitigations, and reduces the current environmental risk at the CRL site. Should CNL's application to amend the CRL site licence to construct the NSDF be approved, CNL is the licensee to be held accountable to meet applicable regulatory requirements and remains committed to:

- Applying modern standards and technologies to reduce risks of radioactive waste;
- Continuing to engage with Indigenous Nations, communities and organizations and the public, and addressing concerns as they arise;
- Ensuring the protection of human health and the environment – which includes the Ottawa River - during all phases of the project; and
- Completing periodic reviews and updates of the NSDF safety case through all licensing stages.

CNL has engaged extensively with the public on the NSDF since 2016. CNL has incorporated public concerns raised throughout the EA process. CNL operates an ongoing Public Information Program [31] to inform groups about activities at CNL-managed sites and the potential effects of these activities on the public, Indigenous peoples, and the environment. The Public Information Program [31] forms the basis of communication efforts with the public and Indigenous Nations, communities and organizations and helps to direct the establishment of long-term, mutually beneficial working relationships with communities in proximity to CNL sites.

Engagement with Indigenous Nations, communities and organizations has resulted in valuable feedback about the NSDF Project, which helps CNL understand areas of concern and improve the NSDF Project design and environmental assessment. CNL has proactively addressed key issues raised by interested Indigenous Nations, communities and organizations using open and transparent communication to share information regarding traditional land use, biodiversity, and archaeology. CNL submits that meaningful engagement has occurred with Indigenous Nations, communities and organizations to support the satisfaction of the duty to consult and where appropriate, accommodate, and therefore the Commission may issue the requested license amendment.

The NSDF Project is unlikely to result in any appreciable impacts on any Aboriginal or treaty rights or interests when taking into consideration the extensive mitigation measures, commitments and other accommodation measures proposed. CNL submits that meaningful engagement has occurred with Indigenous Nations, communities and organizations to support the satisfaction of the Crown's duty to consult and where appropriate, accommodate, and therefore the Commission may issue the requested license amendment.

CNL firmly believes the NSDF Project will significantly improve current conditions at the CRL site, through safe low level waste disposal and enhanced environmental protection and stewardship. CNL respectfully requests that the CNSC approve the NSDF Project to realize these real environmental benefits.

## 7. References

- [1] Letter from P. Boyle (CNL) to M. Leblanc (CNSC), "[Updated Application for Licence Amendment to add the Near Surface Disposal Facility to the Chalk River Laboratories Licensing Basis](#)", 232-CNNO-21-0004-L, 2021 March 26.
- [2] Canadian Nuclear Safety Commission, *Nuclear Research and Test Establishment Operating Licence, Chalk River Laboratories*, NRTEOL-01.00/2028, Expiry Date: 2028 March 31.
- [3] Canadian Nuclear Laboratories, [Commission Member Document for Licensing Decision. Chalk River Laboratories Site Licence Amendment to Authorize the Construction of the Near Surface Disposal Facility](#), 232-508760-REPT-002, Revision 0, 2022 January 24.
- [4] Canadian Nuclear Laboratories, [Presentation from the Canadian Nuclear Laboratories In the Matter of the Application to amend its Chalk River Laboratories site licence to authorize the construction of a near surface disposal facility](#), 2022 February 22.
- [5] Canadian Nuclear Laboratories, [Commission Member Document for Licensing Decision – Supplemental Submission, CMD.22-H7.1B, Public Engagement Report](#), 232-508760-REPT-003, 2022 April.
- [6] Commission Member Document for Licensing Decision – [Canadian Nuclear Laboratories Supplemental Submission, Chalk River Laboratories Site Licence Amendment to Authorize the Construction of the Near Surface Disposal Facility, CMD.22-H7.1C, Indigenous Engagement Report](#), 232-513130-REPT-001, Revision 0, 2022 January 17.
- [7] Canadian Nuclear Laboratories, [Presentation from the Canadian Nuclear Laboratories In the Matter of the Application to amend its Chalk River Laboratories site licence to authorize the construction of a near surface disposal facility](#), 2022 April 24.
- [8] Canadian Nuclear Laboratories, [Written Submission – Near Surface Disposal Facility Procedural Direction](#), 232-508760-REPT-004. 2023 May 01.
- [9] *Canadian Environmental Assessment Act, 2012*.
- [10] *Nuclear Safety and Control Act, S.C. 1997, c.9*.
- [11] Canadian Nuclear Safety Commission, *Environmental Protection – Environmental Principles, Assessments and Protection Measures, REGDOC-2.9.1 Version 1.1*, 2017 April.
- [12] Generic Guidelines for the *Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012*, 2016 May.
- [13] *Addressing "Purpose of" and "Alternative Means" under the Canadian Environmental Assessment Act, 2012*. 2015 March.
- [14] [Near Surface Disposal Facility Environmental Impact Statement](#), 232-509220-REPT-004, Revision 3, 2021 May.
- [15] Natural Resources Canada, *Canada's Policy for Radioactive Waste Management and Decommissioning*, 2023.

- [16] *Impact Assessment Act*, S.C. 2019, c. 28, s. 1.
- [17] Letter from C. Cianci (CNSC) to M. Vickerd (CNL), “*Changes to Federal Legislation and Implications for Near Surface Disposal Facility Project*”, e-Doc 5979654. 2019 August 29.
- [18] IAEA, *Near Surface Disposal Facilities for Radioactive Waste*, SSG-29, 2014.
- [19] Canadian Nuclear Laboratories, [Near Surface Disposal Facility Environmental Impact Statement](#), 232-509220-REPT-004, Revision 0, 2017 March.
- [20] Canadian Nuclear Safety Commission, *Waste Management, Volume III: Safety Case for the Disposal of Radioactive Waste*, REGDOC-2.11.1, 2021 January.
- [21] International Atomic Energy Agency, *Disposal of Radioactive Waste*, SSR-5, 2011
- [22] Canadian Nuclear Safety Commission, *Environmental Protection – Environmental Principles, Assessments and Protection Measures*, REGDOC-2.9.1 Version 1.1, 2017 April.
- [23] Canadian Standards Association, N288.4-2019, *Environmental Monitoring Programs At Nuclear Facilities and Uranium Mines and Mills*, 2019.
- [24] Canadian Standards Association, N288.5-11 *Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills*. 2011
- [25] Canadian Standards Association N288.6-12 (R2017), *Environmental Risk Assessments at Class I Nuclear Facilities and Uranium Mines and Mills*, 2017.
- [26] Canadian Standards Association N288.1:14 (R2019), *Guidelines for Calculating Derived Release Limits for Radioactive Material in Airborne and Liquid Effluents for Normal Operation of Nuclear Facilities*, 2019.
- [27] Canadian Standards Association, N288.7-15 *Groundwater Protection Programs at Class I Nuclear Facilities and Uranium Mines and Mills*, 2015.
- [28] Canadian Standards Association N288.8-17, *Establishing and Implementing Action Levels to Control Releases to the Environment from Nuclear Facilities*, 2017.
- [29] *Species at Risk Act*, S.C. 2002, c. 29.
- [30] Golder Associates (Golder), [Draft Environmental Assessment Follow-Up Monitoring Program for the Near Surface Disposal Facility](#), 232-509220-PLA-001, Revision 0. 2021 February 25.
- [31] Canadian Nuclear Laboratories, [Public Information Program for CNL](#). CW-513430-REPT-001, Revision 8. 2021 January 13.
- [32] *Class I Nuclear Facilities Regulations*, SOR/2000-204.
- [33] *General Nuclear Safety and Control Regulations*, SOR/2000-202.
- [34] Canadian Nuclear Safety Commission, *Waste Management, Volume I: Management of Radioactive Waste*, REGDOC-2.11.1, 2021 January.
- [35] Canadian Nuclear Laboratories, [Near Surface Disposal Facility Safety Case](#), 232-03610-SAR-001, Revision 2, 2021 January.

- [36] International Atomic Energy Agency, *The Safety Case and Safety Assessment for the Disposal of Radioactive Waste*, SSG-23, 2012.
- [37] Arcadis & Quintessa, [Post-Closure Safety Assessment 3rd Iterations to the NSDF Project](#), 232-509240-ASD-004, Revision 2, 2020 December.
- [38] IAEA, *Safety Assessment Methodologies for Near Surface Disposal Facilities, ISAM, Volume 1, Review and Enhancement of Safety Assessment approaches and Tools*, 2004. ISBN 92–0–104004–0
- [39] Canadian Nuclear Laboratories, [Near Surface Disposal Facility Waste Acceptance Criteria](#), 232-508600-WAC-003, Revision 4, 2020 November.
- [40] *General – Waste Management*, O. Reg. 347/90.
- [41] Project Description: *Near Surface Disposal Facility at Chalk River Laboratories*, 232-509200-ENA-001, Revision 1, 2016 September 30
- [42] Canadian Standards Association, N292.8:21, *Characterization of Radioactive Waste and Irradiated Fuel*, 2021.
- [43] IAEA, *Classification of Radioactive Waste*, GSG-1, 2009.
- [44] Canadian Nuclear Laboratories, [NSDF Reference Inventory Report](#), 232-508600-REPT-003, Revision 3, 2020 April.
- [45] Canadian Nuclear Safety Commission, *Licence Conditions Handbook for Chalk River Laboratories, NRTEOL-LCH-01.00/2028*, Revision 2, CRL-508760-HBK-002, Revision 2, 2021 February 28
- [46] Canadian Nuclear Safety Commission, *Procedural Direction in the Matter of Canadian Nuclear Laboratories. Subject: Application to amend the Nuclear Research and Test Establishment Operating Licence for the Chalk River Laboratories site to authorize the construction of a Near Surface Disposal Facility*. DIR 22-H7. July 5, 2022.
- [47] Algonquins of Pikwàkanagàn First Nation, *Final Written Submission on Canadian Nuclear Laboratories' Proposed Near Surface Disposal Facility*. CMD 22.H7.109D. 2023 June 06.
- [48] Kebaowek First Nation and Kitigan Zibi Anishinabeg First Nation, *Final Submissions of KFN and KZA Pursuant to the Revised Notice of Public Hearing and Procedural Guidance for Final Submissions (Rev. 2)*, dated May 17, 2023. CMD 22-H7.111D and CMD 22-H7.113C. 2023 June 06.
- [49] Canadian Nuclear Safety Commission, *Commission Member Document for Commission Public Hearing – Part 2*. CMD 22-H7.B. 2022 May 20.
- [50] Canadian Nuclear Safety Commission, *Required Approvals for Construction of the Near Surface Disposal Facility at the Chalk River Laboratories site*. CMD 22-H7.D. 2023 April 28.
- [51] CSA Group. 2019. CSA N292.0:19: *General Principles for the Management of Radioactive Waste and Irradiated Fuel*.

[52] Canadian Nuclear Safety Commission, *CNSC Staff Final Remarks: for Commission Decision on Application to Construct the Near Surface Disposal Facility*. CMD 22-H7.E. 2023 June 06.

[53] *Constitution Act*, 1982

[54] *United Nations Declaration on the Rights of Indigenous Peoples Act*, s.c. 2021 c.14

**Appendix A** Acronyms

There is a deliberate attempt to use as few acronyms and initialisms as possible in this document in an effort to enhance readability for all interested parties and stakeholders. The acronyms and initialisms frequently used in this document are limited to a select few commonly used terms, corporations, organizations, and Indigenous communities:

AECL	Atomic Energy of Canada Limited
AOPFN	Algonquins of Pikwàkanagàn First Nation
CEAA	Canadian Environmental Assessment Act
CMD	Commission Member Document
CNL	Canadian Nuclear Laboratories
CNSC	Canadian Nuclear Safety Commission
CRL	Chalk River Laboratories
CSA	Canadian Standards Association
EA	Environmental Assessment
EAFMP	Environmental Assessment Follow-up Monitoring Program
EIS	Environmental Impact Statement
IAA	Impact Assessment Act
IAEA	International Atomic Energy Agency
KFN	Kebaowek First Nation
KZA	Kitigan Zibi Anishinabeg
NSCA	Nuclear Safety and Control Act
NSDF	Near Surface Disposal Facility
REGDOC	Regulatory Document
SARA	Species At Risk Act