



UNPROTECTED/NON PROTÉGÉ

ORIGINAL/ORIGINAL

CMD: 22-H7

Date signed/Signé le : 24 JANUARY 2022

A Licence Amendment

Une modification de permis

Required Approvals for

Des approbations requises pour

Construction of the Near Surface
Disposal Facility (NSDF) at the Chalk
River Laboratories (CRL) site

La construction de l'installation de gestion
des déchets près de la surface au site des
Laboratoires de Chalk River (LCR)

**Canadian Nuclear
Laboratories
Chalk River Laboratories**

**Laboratoires Nucléaires
Canadiens
Laboratoires de Chalk
River**

Commission Public Hearing

Audience publique de la Commission

Commission Public Hearing – Part 1

Audience publique de la Commission –
Partie 1

Scheduled for:

Prévue le :

February 22, 2022

22 février 2022

Submitted by:

Soumise par :

CNSC Staff

Le personnel de la CCSN

Summary

This CMD presents information about the following matters of regulatory interest with respect to the proposed Near Surface Disposal Facility (NSDF) project:

- CNSC staff's review, assessment and recommendations regarding the request by Canadian Nuclear Laboratories (CNL) to amend the Nuclear Research and Test Establishment Operating Licence (NRTEOL-01.00/2028 for Chalk River Laboratories (CRL) to add the construction of the NSDF to the licensing basis

CNSC staff recommend the Commission take the following actions:

- determine the NSDF project is not likely to cause significant adverse environmental effects referred to in subsections 5(1) and 5(2) of the *Canadian Environmental Assessment Act, 2012*, conclude, pursuant to paragraphs 24(4)(a) and (b) of the *Nuclear Safety and Control Act* in that CNL:
 - a) Is qualified to carry on the activities authorized by the licence
 - b) Will make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed

Résumé

Ce CMD présente de l'information sur un ensemble de questions d'ordre réglementaire concernant le projet de l'installation de gestion des déchets de près de la surface (IGDPS):

- L'examen, l'évaluation et les recommandations du personnel de la CCSN à l'égard de la demande des Laboratoires Nucléaires Canadiens de modifier le permis d'exploitation d'un établissement de recherche et d'essais nucléaires (NRTEOL-01.00/2028) afin d'ajouter la construction de l'installation de gestion des déchets de l'IGDPS au fondement d'autorisation.

Le personnel de la CCSN recommande à la Commission de considérer et prendre les mesures suivantes :

- déterminer que le projet d'IGDPS n'est pas susceptible d'entraîner des effets environnementaux négatifs importants visés aux paragraphes 5(1) et 5(2) de la *Loi canadienne sur l'évaluation environnementale, 2012*, conclure, conformément aux alinéas 24(4)(a) et (b) de la *Loi sur la sûreté et la réglementation nucléaires* que les LNC :
 - a) Est qualifié pour exercer les activités autorisées par le permis
 - b) Prendra des dispositions adéquates pour la protection de l'environnement, la santé et la sécurité des personnes et le maintien de la sécurité nationale et les mesures nécessaires pour mettre en œuvre les obligations internationales auxquelles le Canada a souscrit
- approuver l'application des LNC pour la construction de l'IGDPS au site des Laboratoires de Chalk River et

- approve CNL's application to construct the NSDF at the Chalk River Laboratories site and amend the CRL operating licence
- determine that the CNSC, as an agent of the Crown, has upheld the honour of the Crown and has fulfilled its common law obligations to consult and where appropriate accommodate Indigenous peoples, pursuant to section 35 of the *Constitution Act, 1982*
- authorize CNSC staff as set out in section 6.6 of this CMD

modifier le permis d'exploitation des LCR

- déterminer que la CCSN, en tant que mandataire de la Couronne, a respecté l'honneur de la Couronne et a rempli ses obligations de common law de consulter et, le cas échéant, d'accommoder les peuples autochtones, conformément à l'article 35 de la *Loi constitutionnelle de 1982*
- autorise le personnel de la CCSN comme indiqué à la section 6.6 du présent CMD

Les pièces suivantes sont jointes :

The following items are attached:

- the proposed licence, NRTEOL-01.00/2028, revision 3
- the proposed licence conditions handbook, NRTEOL-LCH-01.00 2028, Revision 3
- the current licence, NRTEOL-01.00/2028
- the environmental assessment (EA) report

- le permis proposé, NRTEOL-01.00/2028, révision 3
- le manuel des conditions de permis proposé, NRTEOL-LCH-01.00 2028, révision 3
- Le permis actuel, NRTEOL-01.00/2028
- Le rapport d'évaluation environnementale

Signed/signé le

24 January 2022/24 janvier 2022



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PLAIN LANGUAGE SUMMARY

Background

Canadian Nuclear Laboratories (CNL) submitted a licence application to construct a near surface disposal facility (NSDF) at the Chalk River Laboratories (CRL) site in Deep River, Ontario. The CRL site is adjacent to the Ottawa River within the traditional unceded territory of the Algonquin Anishinabeg peoples, as well as the traditional and/or treaty territories of the Williams Treaty First Nations, and the Métis Nation of Ontario. The purpose of the proposed Near Surface Disposal Facility (NSDF) is to dispose of solid low-level radioactive wastes.

Regulatory requirements

CNL submitted the project description for the proposed NSDF to the Canadian Nuclear Safety Commission (CNSC) in 2016 and submitted the initial licensing application in 2017 [1]. In March 2021, CNL submitted an updated licence application that included updated NSDF technical documentation [2]. The proposed NSDF is considered a Class IB nuclear facility under paragraph 19(a) of the *General Nuclear Safety and Control Regulations* and therefore requires the Commission's approval before construction may proceed. The NSDF project is subject to a licensing regulatory review under the *Nuclear Safety and Control Act* (NSCA) and to an environmental assessment (EA) under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012).

Both the EA and licensing decisions trigger the Crown's duty to consult, and where appropriate, to accommodate Indigenous peoples whose potential or established Indigenous and/or treaty rights, under section 35 of the *Constitution Act, 1982*, have the potential to be impacted by the proposed NSDF project.

Therefore, the Commission has three (3) decisions to make with respect to the proposed NSDF project: an EA decision under CEAA 2012, a licensing decision under the NSCA, and a decision on whether the honour of the Crown has been met in fulfilling the CNSC's duty to consult.

The decisions will be made after a public hearing is held. If the Commission decides to approve the construction of the NSDF, the current operating licence for the CRL site will be amended.

Indigenous Consultation and Engagement

As an agent of the Government of Canada, the CNSC recognizes and understands the importance of building relationships with Indigenous peoples in Canada. The CNSC's goal is to build partnerships and trust with Indigenous Nations and communities through collaborative ongoing engagement activities related to CNSC-regulated facilities and activities of interest within their traditional and/or treaty territories.

CNSC staff conducted extensive consultation activities with the identified Indigenous Nations and communities to ensure their full participation in the regulatory review process, and to ensure their concerns were heard and addressed by CNL, Atomic Energy of Canada Limited (AECL) and the CNSC in a meaningful way. CNSC staff consider that the consultation and engagement process for the NSDF Project was meaningful, reasonable, responsive, and followed best practices.

Based on the analysis of environmental effects of the NSDF project, CNSC staff are satisfied that the potential impacts of the project on Indigenous and/or treaty rights have been adequately identified and appropriately mitigated.

CNSC Staff conclusions

For a project of this nature, even though the licence application is for the very first stage (the construction of the NSDF), CNL was required to submit information for all phases of the project, that is, the construction, commissioning, operational, closure and post-closure phases. CNSC staff have performed rigorous technical assessments of the NSDF proposal including CNL's environmental impact statement (EIS), safety case and extensive supporting documentation. CNSC staff conclude that the proposed NSDF project is not likely to cause significant adverse environmental effects. This conclusion takes into account the implementation of all identified mitigation measures and follow-up program measures. The proposed NSDF is suitable for permanently containing and isolating the waste during the time the waste's radiological hazards remain. If the Commission grants approval for construction, then CNSC's regulatory oversight will continue throughout the different stages of the facility through compliance activities, reviews and monitoring. Validation of these assessments and predictions will be a part of ongoing licensing and compliance activities throughout the lifecycle of the project, including the post-closure phase.

CNSC staff's review has determined that CNL has made adequate provision for the protection of the environment and the health and safety of persons. CNSC staff are satisfied that the information presented addresses the regulatory requirements set out under the NSCA and its regulations. This conclusion takes into account the implementation of all identified licensing regulatory actions.

CNSC Staff Recommendations

Based on CNSC staff's assessment, CNSC staff recommend that the Commission determine that the NSDF Project is not likely to cause significant adverse environmental effects, taking into account the implementation of all identified mitigation measures and follow-up program measures. Further, CNSC staff recommend that the Commission approve CNL's application to construct the NSDF and amend the CRL operating licence by including 2 new facility-specific licence conditions.

CNSC staff also recommend that the Commission determine the duty to consult under section 35 of the *Constitution Act, 1982* has been appropriately and adequately discharged. This recommendation is based on the information available to date and notwithstanding the opportunities for Indigenous Nations and communities to express their views to the Commission during the public hearing.

PART ONE

This Commission Member Document (CMD) is presented in two parts.

Part One includes:

1. An overview of the matter being presented;
2. Overall conclusions and overall recommendations;
3. Discussions pertaining to the evaluations of site suitability, design adequacy and construction activities
4. General discussion pertaining to the safety and control areas (SCAs) that are relevant to this submission;
5. Discussion about other matters of regulatory interest; and
6. Addenda material that complements items 1 through 4.

Part Two provides all available information pertaining directly to the current and proposed amendment to the CRL Operating Licence and associated LCH. The EA report and information on the duty to consult can be found respectively in appendix F and section 5.2 of this CMD.

1. OVERVIEW

1.1 Background

The Chalk River Laboratories (CRL) site is located in the Town of Deep River, County of Renfrew, province of Ontario on the southern shore of the Ottawa River, approximately 180 kilometers northwest of Ottawa within the traditional unceded territory of the Algonquin Anishinabeg peoples, as well as the traditional and/or treaty territories of the Williams Treaty First Nations, and the Métis Nation of Ontario. The CRL site represents the largest single complex within Canada's science and technology infrastructure, with a total area of approximately 3870 hectares (38,700,000 m²) and a built-up area of approximately 50 hectares (500,000 m²).

Figure 1- CRL Site (Source: CNL)



The licensed CRL site is operated by Canadian Nuclear Laboratories (CNL) under the current Nuclear Research and Test Establishment Operating Licence NRTEOL-01.00/2028 [3] and its associated Licence Conditions Handbook (LCH) [4]. The Commission renewed the CRL Operating Licence following a public hearing in January 2018 for a 10-year period. The licence is valid from April 01, 2018 to March 31, 2028. The CRL Operating Licence authorizes CNL to operate the CRL site to:

- Prepare a site for, construct, operate, modify, decommission or abandon a nuclear facility
- Possess, transfer, use or abandon a nuclear substance, prescribed equipment or prescribed information; to produce, refine, convert, process, package, manage, store or dispose of a nuclear substance
- Produce or service prescribed equipment

CNL submitted a licence application to construct a Near Surface Disposal Facility (NSDF) at the CRL site, for the permanent disposal of solid low-level radioactive waste. Further project details are provided in section 1.1.2 of this CMD.

The construction of the proposed NSDF is a change which is outside the current licensing basis because it is considered a new Class IB Nuclear Facility, as per paragraph 19(a) of the *General Nuclear Safety and Control Regulations*, that is not currently authorized in the CRL Operating Licence and requires the Commission's approval to proceed. In addition, CNSC staff determined that:

- the proposed NSDF is a new disposal facility for low-level radioactive waste
- the proposed NSDF hazards may be different in nature than the current operational licensed nuclear facilities at the CRL site

Further details on the CRL licensing basis can be found in section 1.2.3 of this CMD.

1.1.1 CNL Application

In October 2015, CNL notified Canadian Nuclear Safety Commission (CNSC) staff of its intention to proceed with a request to construct a radioactive waste disposal facility to support the planned decommissioning of many CRL facilities and buildings as part of the revitalization of the CRL site [5].

In April 2016, CNL submitted the initial regulatory application [6] to initiate the environmental assessment (EA) process for the NSDF Project at the CRL site. CNL's submission included the initial project description (revised in September 2016) to support the requirements of the (CEAA 2012), a regulatory compliance document (which provided a mapping of CNL's application to the applicable CNSC regulatory requirements), and a proposed project schedule.

Since May 2016, the proposed NSDF Project has been subject to an EA under the CEAA 2012. The NSDF Project is considered a "Designated Project" in accordance with paragraph 37(b) of the *Regulations Designating Project Activities*. Under section 15 of CEAA 2012, the CNSC is the sole Responsible Authority for the NSDF Project.

On March 31, 2017, CNL submitted a licence application for the construction of the NSDF. Upon receipt of CNL's licence application, CNSC staff initiated a licensing regulatory review of the proposed NSDF under the NSCA.

Further to CNSC staff's request, CNL submitted an updated application in March 2021 that provided revised and updated project technical documents.

1.1.2 Project Overview

The proposed NSDF Project is a facility designed for the safe and permanent disposal, with no intention of retrieval, of low-level radioactive waste. The majority of waste proposed for disposal in the NSDF is either currently in safe storage at the CRL site or would be generated from future operational, decommissioning and environmental remediation activities mainly at the CRL site.

The total area of the NSDF site is approximately 37 hectares (370,000 m²) and the center of the site is approximately 1.1 km from the Ottawa River shoreline.

The proposed NSDF includes an Engineered Containment Mound (ECM), which is a system designed to contain and isolate up to 1,000,000 cubic metres (m³) of low-level radioactive waste in ten waste disposal cells. It also includes a wastewater treatment plant (WWTP) and storage tanks to store and treat leachate (water from the ECM), contact water (water that has come in contact with the waste), and operational wastewater generated from support facilities such as the vehicle decontamination facility. The facility also includes other support facilities and site infrastructure.

The construction of the NSDF and placement of waste within the ECM would be completed in a phased approach, in two phases. Phase 1 is planned to be completed in three years should the Commission approve CNL's application to construct the NSDF. Phase 1 will include the construction of the first 6 cells of the ECM along with the WWTP, vehicle decontamination, support buildings, and site infrastructure. Phase 1 with a total waste capacity of 525,000 m³, would accommodate wastes currently in storage and wastes to be generated over the next 20 to 25 years, enabling decommissioning and environmental remediation activities at CRL and other CNL sites, as well as a small percentage from Canadian hospitals and universities. Phase 2, with a total waste capacity of 475,000 m³, would expand the ECM to 1 million m³ with the construction of the remaining 4 cells, to accommodate wastes expected to be generated following Phase 1 from future activities at the CRL site and from other CNL-managed facilities, as well as a small percentage from Canadian hospitals and universities. The facility is expected to be operational for approximately 50-years and the ECM has a design life of 550-years.

Table 1 below provides a list of the key project activities that would occur during each phase of the NSDF Project.

Table 1: NSDF Project activities and duration by phase

PROJECT PHASE (PLANNED DURATION)	PROJECT ACTIVITIES
Construction (3 years)	<ul style="list-style-type: none"> ▪ Clearing and grubbing of vegetation on site and excavating, removing, and stockpiling of topsoil and overburden ▪ Establishing exclusion and buffer zones around wetlands and other sensitive areas where activities are not permitted to occur ▪ Blasting and excavating for the ECM ▪ Removal and/or stockpiling of waste rock ▪ Excavating drainage ditches and surface water management ponds ▪ Grading the NSDF Project site, including access roads, stockpiles areas, and other building locations ▪ ECM liner system construction, including construction of the outer boundary berm ▪ Developing surface water management infrastructure ▪ Managing surface water and wastes during construction ▪ Developing on-site road and access ▪ Constructing the WWTP, support facilities, and site infrastructure
Operations (50 years)	<ul style="list-style-type: none"> ▪ Phased development of disposal cells ▪ Verification and acceptance of wastes to ensure they meet standards required to be placed within the ECM ▪ Progressive closure of disposal cells and installation of temporary and final cover systems ▪ Operation of the WWTP and discharge of treated effluent ▪ Surface water management and erosion control ▪ Domestic waste management ▪ Petroleum storage and hazardous materials handling ▪ Maintenance of infrastructure, facilities, and site services
Closure (30 years)	<ul style="list-style-type: none"> ▪ Installation of the final cover of the ECM ▪ Decommissioning of infrastructure and support facilities ▪ Remediation and grading of the NSDF Project site ▪ Continued operation of the WWTP and discharge of treated effluent ▪ Ongoing performance monitoring and inspection activities
Post-Closure (IC of 300 years and post IC)	<ul style="list-style-type: none"> ▪ Ongoing long-term monitoring to verify facility performance during institutional control period ▪ Surveillance and inspection activities to verify integrity of the facility

Phase 1 Construction

Phase 1 construction activities will start with tree and vegetation removal at the NSDF site, excavation of the overburden native soils, and replacement of those soils in the southwestern region of the ECM footprint with coarse granular fill material.

Slope depressurization accompanied by rock blasting (depth ranges from 1 to 8 m) will be needed to drain groundwater within the rock mass and lower groundwater elevations beneath the ECM footprint. Prior to rock blasting, horizontal drains will be drilled in the rock mass to lower the water table. Blasting will also be used to construct the surface water management ponds and the trenches that will house and distribute the site utilities.

After the blasted rock is removed from the rock floor, a sacrificial liner will be placed to seal the area and prevent groundwater from recharging. Prior to construction of the compacted clay liner, three clay liner trial pads, 15 m x 25 m, will be constructed off-site for field and laboratory testing. The test results will be used to specify the compaction water content and dry density criteria for the construction of the compacted clay liner, with the objective of achieving the hydraulic conductivity to meet NSDF design specifications.

Phase 1 construction activities also include delivery, storage, stockpiling, and handling of construction materials, as well as the construction of the ECM with six disposal cells, the perimeter berm and the base liner system, the WWTP, the support facilities and site infrastructure.

Following completion of Phase 1 construction activities, frost protection and a sacrificial liner will be installed at the Phase 1 and Phase 2 interface.

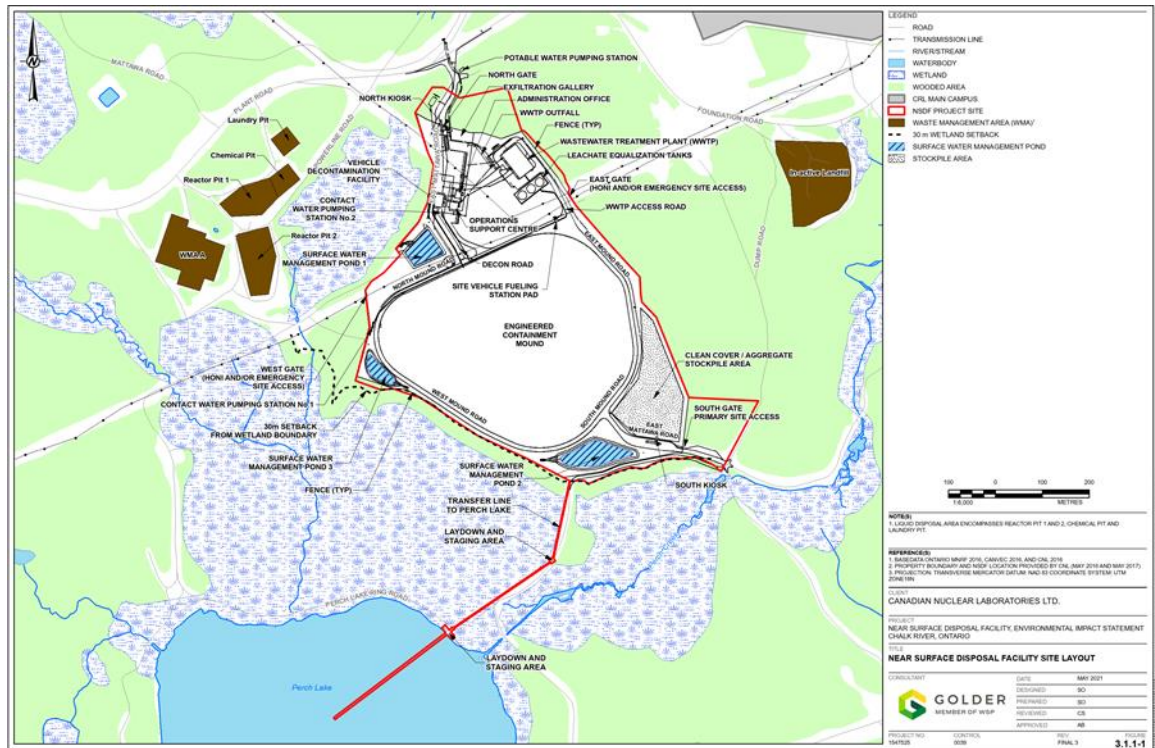
Phase 2 Construction

Phase 2 construction activities of the four remaining cells to accommodate the 475,000 m³ volume of waste are similar to Phase 1. Phase 2 is planned to begin 25 years after the launch of operations and waste emplacement activities. Part of the preparatory activities for Phase 2 construction will involve removal of the frost protection fill and sacrificial liner that was installed at the interface between Phase 1 and Phase 2.

The final cover system construction will occur in phases during the operational period. Cells will be closed in sequence (1 to 6 for Phase 1 and 7 to 10 for Phase 2) as they reach their waste capacity. As each cell is closed, placement of the select waste layer, which is a layer of homogenous soil and soil-like waste free of stones, silts and clays, or clean fill will occur. This will be followed by the placement of the first layer of the final cover. The area will then be covered with a sacrificial geomembrane liner which will be removed when the remainder of the final cover system is ready to be constructed.

Figure 2 depicts the overall location and layout of the main NSDF project components, which are described in the following sections.

Figure 2 – Proposed NSDF Main Project Components and Location at the CRL site (Source: CNL)



Engineered Containment Mound (ECM)

The ECM is a double-lined facility that provides containment and isolation of the emplaced solid low-level radioactive waste. The ECM includes a multilayer base liner and cover system designed to maintain structural integrity and containment of wastes over its 550-year design life. The ten disposal cells are designed for a maximum height of 18 m, including approximately 15 m of waste, fill material, and final cover. The lowest elevation of the ECM (base liner system) is approximately 163 m above sea level and the highest elevation of the final cover system is approximately 202 m above sea level. Figure 3 shows the ECM base liner and cover system, which are also briefly described in the table below (Table 2).

Figure 3 – NSDF ECM – Base Liner and Final Cover Systems (not to scale)
Source: Adapted from CNL figures



Table 2: ECM - Main Elements Description

ECM Element	Description
Base Liner System	The base liner system provides containment, containment and retardation of the waste and leachate generated during and following operation of the ECM, and to reduce the potential impact to groundwater from a release of the ECM leachate. The base liner system is comprised of a primary liner and secondary liner, to provide redundancy in the event of primary liner failure.
Leachate Collection System (LCS) and Leak Detection System (LDS)	The LCS drains any potential leachate that may collect on the primary liner and pumps it to a leachate extraction box, to the equalization tanks and then to the WWTP for treatment. The LDS allows monitoring of any leakage flow through the primary liner and provides secondary containment for leachate that may be released through the primary liner upon any potential failure of the primary liner.
Leachate Transfer System	The leachate transfer system pumps the leachate and condensate from the LCS and LDS sumps to a leachate extraction box. Then, it is conveyed, together with contact water pumped from each disposal cell, to a sediment box and to the Pump (Lift) Station. The pumps transfer the wastewater to the equalization tanks, then for treatment in the WWTP.
Contact Water Collection and Transfer System	The water that came into contact with waste is collected in temporary contact water ponds on the floor area of the active and adjacent cell, pumped to contact water to leachate extraction boxes, then to the three equalization tanks for treatment at the WWTP.
Non-Contact Water Collection and Transfer System	Non-contact water or storm water that has not come into contact with the emplaced waste (active and capped cells) or collected from inactive cells is conveyed by pumps or by gravity to surface water management ponds located outside of the ECM perimeter berm through perimeter drainage channels and ditches.
Perimeter Berm	The perimeter berm maintains the structural integrity of the ECM waste containment during the ECM operations and throughout the post-closure design period. The perimeter berm provides containment and isolation for

	the ECM waste and leachate and mitigates run-on of water to the ECM from adjacent areas.
Final Cover	<p>The multi-component soil/geosynthetic final cover system provides containment and isolation of the waste disposed off in the ECM and minimizes infiltration and percolation of water into wastes following placement of the final cover system throughout the post-closure design period (500 years after closure). The final cover system as shown in Figure 3, has a combined minimum thickness of 2.05 m and is composed of the following from top to bottom, the</p> <ul style="list-style-type: none"> ▪ vegetative cover ▪ topsoil, 150 mm thick ▪ sandy loam, 600 mm to 1200 mm thickness ▪ granular ‘A’ filter layer, 200 mm thick ▪ intrusion barrier rock fill, 500 mm thick ▪ medium-to-coarse sand, 300 mm thick ▪ textured (both sides) 80 mil High Density Poly-Ethylene (HDPE) liner ▪ geosynthetic clay liner ▪ temporary sacrificial liner – to manage non-contact water during operations but removed prior to placement of the subsequent final cover layers. ▪ first layer of final cover- sand layer - 300 mm thick
Landfill Gas Venting System	The design of the ECM provides for a passive gas collection and venting system; which collects, controls and safely dissipate gases that may be generated within the ECM following placement of the final cover system.

Wastewater Treatment Plant (WWTP)

The WWTP treats leachate, contact water, and contaminated process water arising from NSDF operations before its discharge into the environment. The WWTP is designed for a 50-year operational life. The main systems of the WWTP are the influent flow equalization, chemical precipitation and filtration, polishing treatment system, residuals management, chemical storage and metering, process control systems and final effluent storage and discharge

Support Facilities

The support facilities provide required services for the ECM and WWTP operations and include, the vehicle decontamination facility, operations support centre, administration office, north and south entrance kiosks, weigh scales, site vehicle refueling station.

Site Infrastructure

The site infrastructure services systems include the potable water pump station, firewater pump station, perimeter fence, roads, surface water management ponds, power distribution building, aggregate stockpile/laydown area, and sanitary sewage disposal system.

1.2 Highlights

The Commission has three separate decisions to render with respect to the proposed NSDF Project:

1. an EA decision under CEAA 2012,
2. a licensing decision under the NSCA, and
3. a decision on whether the Honour of the Crown has been met in fulfilling CNSC's duty to consult obligations.

In accordance with CEAA 2012, the CNSC must ensure an EA is complete before a licensing decision under the NSCA is considered. To inform the Commission's EA decision, CNSC staff's Environmental Assessment Report (EA report) is attached as an addendum to this CMD.

Should the Commission's licensing decision approve construction of the NSDF, CNL's licence application and associated technical documents will become part of the CRL licensing basis. Staff's assessment of the NSDF licence application is provided in this CMD.

Both the EA and licensing decisions trigger the Crown's duty to consult and, where appropriate, accommodate Indigenous peoples whose potential or established Indigenous and/or treaty rights, pursuant to section 35 of the *Constitution Act 1982*, may be potentially impacted by the proposed NSDF Project. Information to support the Commission's decision on whether the Honour of the Crown has been met can be found section 5.2 of this CMD and section 9 of the EA report.

1.2.1 CNSC Staff Assessment of CNL's Application

The following provides highlights on the scope, methodology and approach applied in CNSC staff's assessment of CNL's application.

CNSC staff's technical regulatory review process is a robust, iterative, and thorough process. CNSC staff assessed CNL's submissions of technical documents and safety assessments against the regulatory requirements of the NSCA and its associated regulations as well as CNSC regulatory and guidance documents, CSA standards and International Atomic Energy Agency (IAEA) requirements and guidance. Further details can be found in section 2.4 of this CMD.

The NSDF must be designed, sited, constructed, commissioned, operated, and closed in a manner that is protective of both people and the environment now and during the period of time the emplaced wastes' hazards remain. As NSDF is a proposed Class IB disposal facility, the first of a kind in Canada, CNSC staff developed a detailed facility technical assessment reference matrix (TARM) [7] which included the relevant national and international codes and standards applicable to near surface disposal facilities. The NSDF TARM identified the key requirements and criteria to be used by CNSC staff when assessing the facility technical documents and proposed safety and control measures.

As mentioned above, CNSC staff carried out their assessment of the NSDF technical documents in an iterative manner. CNSC staff communicated questions and comments from their technical assessments to CNL. Focused technical theme meetings attended by technical experts from CNSC and CNL were held to provide clarification and explain CNSC staff expectations to resolve outstanding issues. Correspondence between CNSC and CNL continued for each comment and question raised during the review of CNL's submissions until CNSC staff were satisfied that all regulatory requirements were met. CNSC staff maintained an NSDF NSCA tracking document [8] for the technical documents that were assessed and accepted by CNSC staff.

Although the scope of the activities in CNL's application is limited to construction, international guidance and practices recommend that operational and post-closure safety assessments are sufficiently detailed and reviewed by the regulator to provide for the basis to proceed with construction. Given this, as part of this licensing review phase, CNL was required to provide information on the disposal system and facility design, the supporting safety assessments demonstrating the capability of the proposed design to meet the requirements associated with the safe pre-operational (construction, commissioning), operational and post-operational stages of the facility lifecycle. Therefore, to inform the basis to proceed with construction, CNSC staff reviewed these assessments against the respective regulatory requirements and international and industry best practices. CNSC staff's reviews of these assessments informed their recommendations to the Commission for decision, including conditions of authorization, to proceed with the construction of the proposed NSDF Project.

If approval is granted by the Commission, the NSDF technical documents will be considered as the licensing basis for the facility. Some of these documents will need to be updated or revised at different stages of the development of the facility (pre-operational, operational, and post operational periods). CNSC's regulatory oversight will continue throughout these different stages through compliance activities, reviews and monitoring. Validation of the safety assessments, predictions and any change will be a part of ongoing licensing and compliance activities throughout the lifecycle of the project. CNSC staff will report to the Commission any deviation from the licensing basis.

1.2.2 Other Regulatory Approvals

In order to proceed with the construction activities of the NSDF, should the Commission grant its approval, CNL may be required to obtain other regulatory approvals from other federal agencies. CNL is the sole entity responsible for meeting all CNSC regulatory requirements and is accountable and responsible to ensure the health, safety and security of persons and the environment are protected. As such, in addition to any regulatory approvals that CNL is required to obtain, CNL is also responsible to ensure that any contractor or third party engaged on the project also has obtained all requisite approvals.

Federal permits, licences and authorizations that may be required for the NSDF Project include the following:

- Environment and Climate Change Canada:
 - a permit from Environment and Climate Change Canada will be required under section 73 of the *Species at Risk Act*
 - a petroleum storage tank permit(s) may be required, depending on the size of fuel tanks installed on the site (under the *Canadian Environment Protection Act 1999*)
- Fisheries and Oceans Canada:
 - a project review may be required for the discharge of treated effluent to Perch Lake under section 35 the *Fisheries Act*
- Natural Resources Canada:
 - a licence under section 7 of the *Explosives Act*, may be required if explosives are to be stored at the CRL site

It is to be noted that all federal permits, licences and authorizations that may be required for the project to proceed would only be issued by the responsible federal authority following the Commission's decisions, and therefore the issuance of any of these permits are not germane to the Commission's decisions.

Given the NSDF Project is located on federal lands and is regulated by the CNSC, it is not anticipated that any provincial permits, licences or other authorizations will be required. Notwithstanding this, it is CNL's responsibility to identify and comply with all applicable regulatory requirements.

1.2.3 Amendment of the CRL Operating Licence and LCH

The CRL Operating Licence NRTEOL-01.00/2028 Part IV, authorizes CNL to operate the CRL site located in the Town of Deep River, County of Renfrew, Province of Ontario, as further detailed in paragraph (a) to “*prepare a site for, construct, operate, modify, decommission or abandon a nuclear facility*”.

In addition, Licence Condition G.1 states that:

“The Licensee shall conduct the activities described in Part IV of this licence in accordance with the licensing basis, defined as:

- (i) the regulatory requirements set out in the applicable laws and regulations;*
- (ii) the conditions and safety and control measures described in the facility’s or activity’s licence and the documents directly referenced in that licence; and*
- (iii) the safety and control measures described in the licence application and the documents needed to support that licence application;*

unless otherwise approved in writing by the Canadian Nuclear Safety Commission (hereinafter “the Commission”).

Additionally, Licence Condition 3.1: Operating Program, states under the Construction and Operation of New Nuclear Facilities that “*The licensee may construct or install facilities, buildings, structures, components or equipment only if that construction or installation is compliant with the licensing basis.*”

The proposed NSDF Project is outside of the CRL licensing basis because it is considered a new Class IB Nuclear Facility, as per paragraph 19(a) of the *General Nuclear Safety and Control Regulations*, that is not currently authorized in the CRL Operating Licence. Therefore, an approval by the Commission is required.

If the Commission approves the construction of the NSDF, CNSC staff will revise and update the CRL LCH to include the NSDF in the licensing basis. The associated changes are reflected in the proposed CRL Operating Licence and the proposed CRL LCH included in Part 2 of this CMD.

The proposed changes will be facility-specific new conditions for the implementation of licensing regulatory actions and EA regulatory commitments, respectively Licence Conditions G.7 and G.8 of the proposed licence and its associated LCH under Section G (General):

Licence Condition G.7: The licensee shall implement the licensing regulatory actions prescribed by the Commission. Review and closure of the licensing actions is administered by the Commission or a person authorized by the Commission.

Licence Condition G.8: The licensee shall implement the Environmental Assessment (EA) regulatory commitments prescribed by the Commission. Review and closure of the EA regulatory commitments is administered by the Commission or a person authorized by the Commission.

As indicated in the proposed LCH, CNL will be required to update and report on the progress of the implementation of licensing regulatory actions and EA regulatory commitments to CNSC staff on an annual basis or as required by the Commission. These will be tracked and monitored by CNSC staff using the Regulatory Information Bank database.

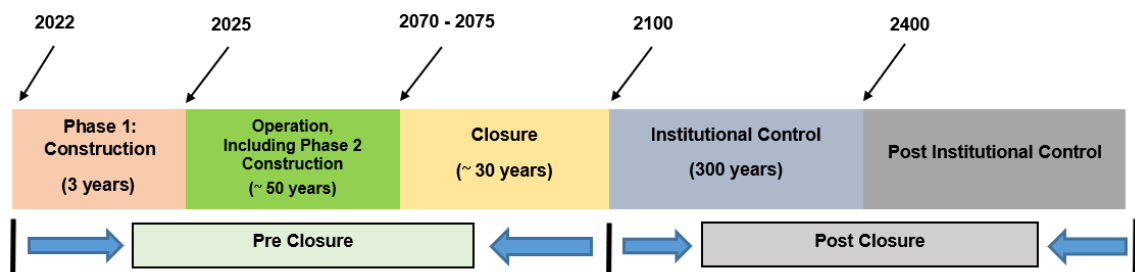
If an approval is issued to construct the NSDF, CNSC staff will verify compliance through oversight activities such as inspections, document reviews, and event reviews. In addition, CNSC staff will report to the Commission on the CNSC's oversight and compliance performance of CNL in public meetings through the Regulatory Oversight Report for CNL sites. CNSC staff will also update the Commission on changes to the LCH, as well as any facility-specific changes and licensee program documentation updates, through the Regulatory Oversight Report for CNL sites.

1.2.4 Next Licensing Phases

Should the Commission approve the construction of the NSDF, CNL will proceed with the planning and preparation of subsequent NSDF project phases, which will also require Commission approvals. The NSDF Project lifecycle includes two distinct phases, the pre-closure phase and the post-closure phase. The pre-closure phase encompasses a construction period of approximately 3 years, a 50-year operation period followed by a 30-year closure period.

CNL defined two discrete periods for the post-closure phase. The Institutional Control (IC) Period of 300 years and Post-Institutional Control Period starting at year 2400. The IC period activities include surveillance, inspection and maintenance of the ECM, groundwater monitoring and environmental monitoring. The Post-Institutional Control Period will occur after the IC period and continues indefinitely, subject to either federal or provincial regulatory control. The activities carried out during this period will depend on the facility's residual radioactivity and monitoring results. Figure 4 depicts the proposed NSDF lifecycle.

Figure 4 – NSDF Lifecycle (CNSC)



If the Commission approves the construction of the NSDF, based on the current licensing process and regulatory requirements, CNL will be required to seek subsequent approvals from the Commission for approval at the following stages:

- **Operation:** once the facility is constructed and commissioned (Phase 1 construction is planned for 3 years approximately), CNL will apply for Commission approval to proceed with operation of the NSDF. Operation includes reception, handling, storage in the temporary receiving and storage area, and emplacement in the ECM. Waste will be emplaced in the ECM cells in a sequential manner. As each waste cell reaches its design fill grade, the first layer of the final cover will be installed, along with a temporary liner that will be removed when the remainder of the final cover system is ready to be constructed. The final cover will be installed over the closed cells of the ECM and will be maintained for the balance of the operation phase. Phase 2 construction will also begin approximately 25 years into the operation period.
- **Decommissioning:** following a period of approximately 50 years of operation (2025 to 2075), CNL will seek Commission approval to proceed with decommissioning of the redundant site infrastructure and supporting facilities. CNL will be required to submit a detailed decommissioning plan to support this approval request.

During the decommissioning phase, CNL will be required to carry out final surveys of residual radioactive and hazardous materials to demonstrate that the NSDF meets the criteria and requirements established in the detailed decommissioning plan and in compliance with the applicable regulatory requirements in effect at that time.

- **Closure:** following the decommissioning activities, in approximately year 2100, CNL will seek Commission approval for the closure of the NSDF ECM. CNL will be required to submit a closure safety case to support this approval request. Closure of the NSDF will allow for the start of the Institutional Control period. CNL will have institutional controls in place to limit land usage during the planned three hundred years (2100-2400).

Figure 5 – NSDF General Aerial View – ECM capped (Source: CNL) -
Rerendering of the ECM during closure phase, during the first 5 to 10 years following the ECM cover installation while the WWTP is still in use to process and treat any leachate recovered. CNL will decommission the WWTP at a time when it is no longer needed (no leachate is recovered) or other means will be used to treat the leachate.



- **Post-Institutional Control:** At a given time in the future and/or after year 2400, and taking into consideration the regulatory requirements in effect at that time, CNL will seek Commission approval for the removal of the NSDF from CNSC regulatory control. Atomic Energy of Canada Limited (AECL), as the enduring federal entity and owner of the assets and liabilities of CNL managed sites, is responsible for controlling and restricting the land use of the NSDF footprint for as long as necessary.

1.3 Overall Conclusions

An EA under CEAA 2012 was conducted for the proposed NSDF Project. Based on the regulatory review and technical assessments of CNL's EIS and supporting documentation, CNSC staff determined that the proposed NSDF Project is not likely to cause significant adverse environmental effects, taking into account the implementation of all identified EA regulatory commitments (for further details, please refer to section 1.2.3 and part two of this CMD).

Based on the licensing regulatory review and technical assessments, CNSC staff have determined that the proposed NSDF project is protective of people and the environment, taking into account the implementation of all identified EA regulatory commitments and licensing regulatory actions (for further details, please refer to section 1.2.3 and part two of this CMD). CNSC staff conclude that CNL's licence application to construct the NSDF at the CRL site complies with all applicable regulatory requirements.

With respect to the CNSC's duty to consult obligations, CNSC staff conducted extensive consultation activities with identified Indigenous Nations and communities to ensure their full participation in the regulatory review process, and to ensure their concerns were heard and addressed by CNL, AECL and the CNSC in a meaningful way. CNSC staff consider that the consultation and engagement process for the NSDF Project was meaningful, reasonable, responsive, and followed best practices. Taking into consideration the location of the NSDF site and CNL's identified mitigation measures and follow-up program measures, CNSC staff conclude that there will be no new impacts on any potential or established Indigenous and/or treaty rights as a result of the NSDF Project. Further details can be found in section 5.2 of this CMD and section 9.2.1 of the EA report.

1.4 Overall Recommendations

With respect to the Commission's licensing decision, the regulatory basis and technical basis for CNSC staff's recommendations are provided in Addendum B, "*Basis for the Recommendation(s)*" of this CMD.

CNSC staff recommend the Commission:

1. Determine that the NSDF Project is not likely to cause significant adverse environmental effects referred to in section 5 of CEAA 2012.
2. Conclude, pursuant to paragraphs 24(4)(a) and (b) of the NSCA in that CNL:
 - a) Is qualified to carry on the activities authorized by the licence
 - b) Will make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed
3. Approve CNL's application to proceed with the construction of the NSDF at the CRL site, including the conditions with which CNL must comply as articulated in the proposed licence and proposed LCH (part two of the CMD).
4. Based on the information available to date and notwithstanding the opportunities for Indigenous Nations and communities to express their views to the Commission during the public hearing process, determine that the CNSC, as an agent of the Crown, has upheld the Honour of the Crown and has fulfilled its common law obligations to consult, and where appropriate accommodate, Indigenous peoples, pursuant to section 35 of the *Constitution Act*, 1982.
5. Approve authority to staff as set out in section 6.6 of this CMD.
6. Reflect in their decisions on this matter, the following commitments that CNSC staff have made in an ongoing effort to enhance transparency and to foster confidence and trust in the regulator:
 - 6.1 engaging with members of the public, Indigenous Nations and communities, and local authorities and seeking feedback early on future

Independent Environmental Monitoring Program (IEMP) sampling campaigns related to the NSDF and/or CRL site.

- 6.2 long-term relationships with each of the identified Indigenous Nations and communities and to involving them in the ongoing monitoring and oversight of the implementation of mitigation measures and follow-up program measures, should the NSDF Project proceed.
- 6.3 conducting engagement activities with Indigenous Nations and communities at a frequency mutually agreed upon with each of the Indigenous Nations and communities.
- 6.4 conducting regular outreach activities related to the NSDF Project and/or the CRL site with local communities.

CNSC staff will systematically track the implementation of these commitments and will report publicly on any updates and the progress made towards achieving these objectives.

2. MATTERS FOR CONSIDERATION

2.1 Environmental Review

CNSC staff conducted an EA of the proposed NSDF Project in accordance with CEAA 2012, as this was the federal EA legislation at the time the application was received. The NSDF Project is subject to CEAA 2012 as it qualifies as a Designated Project as per section 37(b) of the *Regulations Designating Physical Activities*.

The Impact Assessment Act (IAA, 2019) came into force on August 28, 2019, repealing CEAA 2012. The IAA contains transitional provisions for EAs of designated projects commenced under CEAA 2012 for which the CNSC is the Responsible Authority. As per the transition provision described in subsection 182 of the IAA:

“Any environmental assessment of a designated project by the Canadian Nuclear Safety Commission or the National Energy Board commenced under the 2012 Act, in respect of which a decision statement has not been issued under section 54 of the 2012 Act before the day on which this Act comes into force, is continued under the 2012 Act as if that Act had not been repealed.”

Thus, the EA process for the proposed NSDF Project continued under CEAA 2012. The CNSC must ensure an EA is complete in accordance with CEAA 2012 before a licensing decision under the NSCA is rendered.

The appended EA report (Appendix F of this CMD) summarizes the assessment conducted by CNSC staff, including information and analysis on potential environmental effects of the NSDF Project. CNSC staff assessed the potential effects that the NSDF Project is likely to have on the environment, based on information provided by CNL in their EIS and supporting documentation and expert advice provided by the federal provincial review team (FPRT). The EA report was informed by comments from Indigenous Nations and communities and the public received throughout the assessment process. Indigenous Nations and communities also collaborated with CNSC staff in the development of sections of the EA report.

Based on the regulatory review and technical assessments to support the EA, CNSC staff determined that the proposed NSDF Project is not likely to cause significant adverse environmental effects, taking into account the implementation of all identified mitigation measures and follow-up program measures. For further details, please refer to the appended EA report.

Information on CNSC staff's assessment of CNL's environmental monitoring and protection programs for the NSDF Project can be found in the environmental protection SCA in section 4.9 of this CMD.

2.2 Relevant Safety and Control Areas (SCAs)

The functional areas of any licensed facility or activity consist of a standard set of safety and control areas (SCAs). Each SCA is comprised of "specific areas" of regulatory interest; however, the specific areas associated with each SCA vary between facility types. See Addendum C, "Safety and Control Area Framework" of this CMD, for further information about SCAs and how they apply to the construction of the proposed NSDF.

The assigned ranking for the proposed NSDF represents CNSC staff's assessment of the overall risk associated with each SCA based on review of the project's technical documentation with a focus on the scope of the application for the construction of the NSDF. It is recognized that the proposed facility is at a site which is governed by an existing operating licence, worker safety during site preparation and construction activities is conventional in nature, and nuclear material is absent from the proposed licensing phase.

In the following table (Table 3):

1. The risk ranking column indicates the overall level of risk associated with each SCA at the NSDF (refer to Addendum A, "Risk Ranking").
2. The relevance of each SCA to this CMD is indicated.
3. The rating level for each relevant SCA indicates the overall compliance with regulatory requirements for implementation. The rating levels are not relevant to this CMD since the proposed NSDF is a new project.

Table 3: Safety and Control Area (SCA) Risk Ranking Relevant to the Scope of the Application

FUNCTIONAL AREA	SAFETY AND CONTROL AREA	RELEVANT TO THIS CMD?	RISK RANKING	RATING LEVEL
Management	Management System	Yes	M	-
	Human Performance Management	Yes	M	-
	Operating Performance	Yes	L	-
Facility and Equipment	Safety Analysis	Yes	M	-
	Physical Design	Yes	M	-
	Fitness for Service	Yes	L	-
Core Control Processes	Radiation Protection	Yes	L	-
	Conventional Health and Safety	Yes	M	-
	Environmental Protection	Yes	M	-
	Emergency Management and Fire Protection	Yes	M	-
	Waste Management	Yes	L	-
	Security	Yes	L	-
	Safeguards and Non-Proliferation	Yes*	L	-
	Packaging and Transport	No	-	-

M: Medium L: Low

* While nuclear material is absent from the construction phase, the IAEA may perform Complementary Access activities at its discretion.

The following table (Table 4) identifies other matters that are relevant to this CMD.

Table 4: Other Matters or Regulatory Interest Relevant to this CMD

OTHER MATTERS OF REGULATORY INTEREST	
Area	Relevant to this CMD?
Public Engagement	Yes
Cost Recovery	Yes
Financial Guarantees	Yes
Improvement Plans and Significant Future Activities	Yes
Nuclear Liability Insurance	Yes
Delegation of Authority	Yes

The relevant “other matters” of regulatory interest are discussed in section 6 of this CMD.

2.3 Regulatory and Technical Basis

The regulatory and technical bases for the matters discussed in this CMD are provided in Addendum B to this document. For the proposed NSDF, the key requirements come directly from the [Class I Nuclear Facilities Regulations](#) and the [General Nuclear Safety and Control Regulations](#) (GNSCR) as well as other applicable requirements from the NSCA. CNSC staff used the applicable regulatory requirements for the licensing assessment review. At the time of CNL’s application, the Waste Regulatory Policy P-290 *Managing Radioactive Waste* [9], the CNSC Guidance Document G-320, *Assessing the Long-term Safety of Radioactive Waste Management* [10], were in use and have since been superseded by REGDOC-2.11.1, *Waste Management, Volume III: Assessing the Long-Term Safety of Radioactive Waste Management* [11].

CNL’s licence application submission [2] provides a mapping of the sections of the NSCA and its regulations to the applicable sections of the licence application. CNSC staff reviewed the mapping table and conclude that CNL has adequately provided and referenced the information associated with the application requirements from the NSCA and its regulations.

CNSC staff considered all applicable IAEA safety standards and guidance documents in the review of CNL’s application, including:

1. IAEA SSR-5, Disposal of Radioactive Waste [12],
2. IAEA SSG-23, The Safety Case and Safety Assessment of Disposal of Radioactive Waste [13],
3. IAEA SSG-29, Near Surface Disposal Facilities for Radioactive Waste [14], and,
4. IAEA SSG-31, Monitoring and Surveillance of Radioactive Waste Disposal Facilities [15].

As part of the information submitted in support of the licence application, CNL was requested to provide the NSDF Design Requirements, which has been reviewed and scrutinized by CNSC staff. The NSDF Design Requirements document [16] identifies all the facility applicable codes and standards' requirements.

The regulatory basis for the matters that are relevant to this CMD are provided in Addendum C. The technical basis for the matters that are relevant to this CMD include standards and codes as well as the regulatory documents as listed in Addendum C.

3. NSDF PROJECT EVALUATION

CNSC staff's assessment of CNL's licence application and supporting documents specific to the construction activities of the proposed NSDF is outlined in section 4 of this CMD, for all applicable SCAs. The purpose of this section is to provide an overview of the various reviews performed by CNSC staff of CNL's licence application and supporting documentation with respect to the entire lifecycle of the NSDF Project, including the long-term safety, and summarize CNSC staff's technical assessments.

As has been mentioned earlier, although the scope of the activities in CNL's application is limited to construction, international guidance and practices recommend that operational and post-closure safety assessments are sufficiently detailed and reviewed by the regulator to provide for the basis to proceed with construction. Given this, as part of this licensing phase, CNL was required to provide information on the disposal system and facility design, the supporting safety assessments demonstrating the capability of the proposed design to meet the requirements associated with the safe pre-operational (construction, commissioning), operational and post-operational stages of the facility lifecycle. Therefore, to inform the basis to proceed with construction, CNSC staff assessed, during this licensing phase, the adequacy of the design, construction, commissioning, operation, decommissioning, closure and post-closure performance of the facility against the respective regulatory requirements and international standards and guidance as well as industry best practices. CNSC staff's licensing review and technical assessment conclusions and recommendations are made based on scientific and technical evidence and arguments that the proposed facility is safe, people and the environment are protected during the entire lifecycle of the facility.

Details on CNSC staff's reviews and assessments on site selection and design considerations, carried out to meet EA regulatory requirements, can be found in section 4.2, Alternative means to carry out the project of the appended EA report.

3.1 Site Selection Evaluation

This section covers CNSC staff's assessment with respect to CNL's selection and evaluation of the proposed site and location of the NSDF. CNSC staff assessed CNL's NSDF Site Selection Report [17], the EIS [18], Geotechnical Report [19] and information summarized in the NSDF safety case document [20].

The results of CNL's site selection process identified that a location at the CRL site was preferred to any off-site location, or other CNL site. CNL considered the CRL site the best option due to the close proximity of most of the waste (legacy, operational and decommissioning and environmental remediation) that is currently in storage and/or will be generated on-site and the cost associated with transporting waste from the CRL site to an off-site location.

CNL's site selection process established mandatory criteria to be satisfied by the candidate locations and exclusion criteria to remove locations constrained by project requirements. CNL applied the following mandatory criteria: a minimum area of 30 hectares, a minimum side width of 200 m, and access to infrastructure and support services (e.g., sanitary and process requirements, electric power and gas, etc.). Exclusion criteria were then applied to eliminate locations where development is not permitted or poses a risk for the intended project. Risks to the intended project included considerations such as impact on the Ottawa River floodplain, areas of steep slope, distance from Plant Road, geotechnical characteristics, species at risk, proximity to wetlands, cultural heritage, proximity to CRL property boundary, existing or previously sited facilities.

CNL identified the East Mattawa Road (EMR) site which is the proposed site, and an alternate site on CRL property as candidates for the NSDF based on the application of the mandatory and exclusion criteria. The alternate site is relatively remote from service access points compared to the EMR site.

Further technical assessments and site characteristics information (e.g., locations and accessibility, topography, subsurface features, biodiversity and archeological and cultural significance) were evaluated using comparison criteria distributed in five categories: cost, health and safety, environment, site functionality and constructability. Each category was assigned a score based on its importance and relevance to the siting of the NSDF such that the combined scores of the five categories added up to 100%. The application of the rated criteria produced a higher score for the EMR site than for the alternate site in each of the five criteria categories and as a total. A sensitivity analysis was also performed to test the validity of the results, by applying five different weighting combinations to the ranking of each category. All weighting combinations resulted in a higher rating for the EMR site than for the alternate site, which, determined for CNL that the EMR site was preferred to the alternate site.

CNL solicited public, stakeholders and Indigenous Nations and communities' views on the NSDF site selection process. Open houses, meetings, letters and a variety of other channels were used to initiate dialogue and promote discussion of the siting options and identify considerations important to the decision. The major concern expressed was the proximity of the proposed NSDF Project to the Ottawa River and how the Ottawa River, surface water, groundwater, people and environment would be protected.

CNSC staff assessed the site selection and site evaluation of the proposed site and location of the NSDF against applicable standards, specifically Appendix I of the IAEA SSG-29 [14]. Through the licensing review process, CNL adequately addressed all of CNSC staff's review comments and concerns and revised/updated the documents as necessary. CNSC staff are satisfied that the NSDF site selection process used structured criteria and methodology and is in alignment with the applicable standards.

3.2 Design Options Evaluation

This section of the CMD covers CNSC staff's assessment of CNL's evaluation of NSDF design options, which included the review of CNL's NSDF design description [21], the facility design requirements [16], and the waste water treatment plant process design report [22] along with other associated technical documents.

CNL evaluated three design concepts of near surface disposal facilities to dispose of low-level radioactive waste, namely above ground concrete vaults, shallow caverns and an engineered containment mound. CNL assessed the three conceptual alternatives based on technical and economic feasibility.

The shallow caverns concept was eliminated from further consideration due to the CRL site characteristics (high water table which increases the likelihood and risk of flooding) and due to the large volume of waste inventory (1 million m³) which would require the design of multiple caverns.

The above ground concrete vault and the ECM options are both comparable and technically feasible. These two options were evaluated and compared based on technical and economic feasibility, environmental effects and societal considerations. CNL assessed that both alternatives can be constructed on the CRL site to meet the purpose of the NSDF Project, can accommodate the waste inventory and are technically feasible with proper engineering.

The results of CNL's evaluation identified the ECM design as the most favourable facility alternative for the NSDF design. There are several similar facilities for both designs internationally, while the ECM approach is largely used in the US, the above ground concrete vaults are more utilized in Europe and other countries.

CNSC staff assessed CNL's evaluation of NSDF design options against international and industry best practices and benchmarking of similar facilities internationally. Through the licensing review process, CNL adequately addressed all of CNSC staff's review comments and concerns and revised/updated the documents as necessary. Based on the review of CNL's analysis, CNSC staff are satisfied that the design evaluation process used structured criteria and methodology and was in alignment with international and industry standards.

CNL estimated the facility lifecycle costs associated with the concrete vaults to be approximately 4.5 times the cost of the ECM alternative, however this criterion is not factored into CNSC staff's review. Irrespective of the proposed design concept being above ground concrete vaults or ECM, CNSC staff's thorough regulatory review and technical assessments focused on the safety of the proposal during all phases of the facility lifecycle (from the design to the post-closure). The facility will be required to meet and comply with the relevant regulatory requirements, be protective of the health and safety of the public and the environment, and aligns with international guidance and industry best practices.

With respect to the specific facility design, CNSC staff are satisfied that the NSDF design adequately meets the applicable regulatory requirements (regulatory documents, CSA standards and IAEA requirements and guidance as specified under the safety analysis, physical design and waste management SCAs in addendum C.2 of this CMD), and is in line with international guidance and industry best practices for the disposal of solid low-level radioactive waste. Further details on CNSC staff's assessment on the various aspects of the facility design can be found in sections 4.4 (Safety Analysis), 4.5 (Physical Design) and 4.6 (Fitness for Service) of this CMD.

3.3 Construction

CNSC staff's assessment of CNL's licence application and supporting documents, specific to the construction activities of the proposed NSDF is outlined in section 4 of this CMD, for all applicable SCAs.

3.4 Operation and Closure

3.4.1 Operation

The operation of the NSDF would be subject to a separate Commission approval. These activities would be governed by the CRL Operating Licence, the associated LCH licensing basis, the facility authorization (FA) (which sets the key requirements, conditions and limits for the safe operation of a given CRL facility), the CNL management system and quality program and the conduct of operation program. As has been mentioned earlier, international guidance and practices recommend that operational and post-closure safety assessments are sufficiently detailed and reviewed by the regulator to provide for the basis to proceed with construction.

Based on CNSC staff's assessment of CNL's licence application and supporting documents, such as the NSDF design description, the proposed FA, the operation and maintenance plan, the safety analysis report (SAR), the waste emplacement and compaction plan, and As Low as Reasonably Achievable (ALARA) assessment plan, CNSC staff have determined that CNL has in place the appropriate programs to meet the regulatory requirements to operate the NSDF. CNSC staff are satisfied that CNL would prepare specific operating procedures, as part of the conduct of operation activities, and submit them for CNSC staff review and acceptance during the next licensing phase of the facility and prior to operation.

In addition, CNSC staff would monitor CNL's performance during the operation period through routine compliance oversight activities, including inspections and reviews of documentation, and event reporting. Further details on CNSC staff's assessment, specific to the operation activities of the NSDF, can be found in sections 4.3 (Operating Performance), 4.4 (Safety Analysis), 4.7 (Radiation Protection), and 6.4.2 (Activities to be Completed – Operation Phase) of this CMD. Should the construction of NSDF be approved by the Commission, this information will be revisited by CNSC staff and presented to the Commission in more detail at the appropriate licensing stage.

3.4.2 Closure

Subject to a separate Commission approval to proceed with the closure of the NSDF, these activities would be governed by the CRL Operating Licence, the associated LCH licensing basis, the FA, and the CNL management system and quality program.

Based on CNSC staff's assessment of CNL's licence application and supporting documents, and to meet passive control requirements of the IAEA SSR-5 [12] and SSG-29 [14], CNSC staff directed CNL to install at least 4 permanent and durable markers on the final cover or at a specific/appropriate location of the ECM cover. The markers are to identify the facility name, closure date, acreage, waste capacity and other essential information about the disposal site. The planning and details of the facility closure plan [23] may evolve during the lifecycle of the facility as CNSC guidance becomes available. CNL and CNSC staff will revisit this matter to align with the most up-to-date information on international research with respect to archives and markers/monuments to provide passive warnings to future generations. This will also include records and information management and retaining copies at different locations such as an international data bank on disposal facilities or an equivalent system. Should the construction of the NSDF be approved by the Commission, this information will be revisited by CNSC staff and presented to the Commission in more detail at the appropriate licensing stage.

3.5 Post-Closure (Long Term Safety) Safety Assessment

3.5.1 Discussion

This section of the CMD covers CNSC staff's assessment of CNL's licence application and supporting documentation with respect to the Post-Closure Safety Assessment (PCSA) or long-term safety of the facility. A particular focus on the PCSA is provided in the CMD given this assessment is the main and predominant aspect of the overall safety case (further details on staff's assessment of the overall safety case are provided in section 3.6 of the CMD) as it demonstrates the safety of the facility in the long-term.

The role of the PCSA is to provide an evidence based, systematic analysis of the impact of the disposal facility on people and the environment during the post-closure period and for the entire period that isolation and containment is required. The PCSA analyzes the expected evolution of the disposal system, which includes the waste, engineered and natural barriers, as well as the impact of disruptive events on the ability of the disposal system to isolate and contain the waste. The PCSA results are compared to regulatory acceptance criteria. The PCSA forms a crucial part of the NSDF safety case and as a result is subject to detailed scrutiny by CNSC staff.

3.5.2 CNSC Staff Assessment

The NSDF PCSA was assessed against the following requirements and guidance in both Canadian and international regulatory documents and standards:

- REGDOC-2.11 - Framework for Radioactive Waste Management and Decommissioning in Canada, 2018
- REGDOC-2.11.1, Waste Management, Volume III: Assessing the Long Term Safety of Radioactive Waste Management, May 2018
- CSA N292.0-19, General principles for the management of radioactive waste and irradiated fuel
- CSA N292.3, Management of low- and intermediate-level radioactive waste, 2014
- CSA N292.6-2018, Long-term management of radioactive waste and irradiated fuel
- IAEA SSR-5, Disposal of Radioactive Waste, 2011
- IAEA SSG-23, The Safety Case and Safety Assessment of Disposal of Radioactive Waste, 2012
- IAEA SSG-29, Near Surface Disposal Facilities for Radioactive Waste, 2014

CNSC staff assessed the information provided by CNL through the following mechanisms using Canadian and international requirements, guidance and best practices:

- Verifying in the submission:

- the adequacy of the conceptual (theoretical) model underlying calculations
- the assumptions adopted and simplifications made to make calculations traceable are appropriate and not inconsistent or mutually exclusive
- the systematic assessment of features, events and processes (FEPs) that may affect the long-term performance and safety of the facility
- the appropriateness and source of input data used
- the validity of data collection or generation techniques
- the mathematics of the calculations performed
- the uncertainty in the calculated results
- the interpretation of the results and that the assumptions and simplifications used in the PCSA are taken into account in the calculation of the results and in the uncertainty in the results
- Critically comparing the submission information with relevant standards and criteria
- Performing independent calculations to confirm the safety arguments presented in the submission

Key Review Themes

Several key themes emerged during CNSC staff's review that required CNL to revise the PCSA and/or provide additional supporting evidence. CNSC staff identified these themes through review of the regulatory criteria and the importance of these topics on the assessment results. The following section provides examples of the comments submitted by CNSC staff and the actions taken by CNL to address these comments and modify their submission.

Inventory and Waste Acceptance Criteria (WAC) derivation

The radionuclide inventory CNL proposed to emplace in the NSDF was the subject of numerous comments by CNSC staff. CNL had initially proposed including intermediate level radioactive waste in the NSDF. However, CNSC staff determined that the safety margin in the early drafts of the PCSA were insufficient and inclusion of intermediate level waste in the NSDF waste inventory did not align with the IAEA safety requirements and guidance [12] for near surface disposal facilities. CNL subsequently removed intermediate level waste from the NSDF waste inventory in response to CNSC staff concerns as well as concerns raised by the public and Indigenous Nations and communities.

CNL developed the WAC for the NSDF using the PCSA that considered the existing waste inventory at CRL site and the waste forecast for the site. The results were then used in the PCSA model of the NSDF disposal system to determine the potential dose to people and the environment during the post-closure period. The PCSA results were used to adjust the NSDF waste inventory and develop the WAC. The WAC provides a key set of limits and controls on the waste that will be accepted for disposal in the NSDF. Using the PCSA results ensures that the final inventory at closure will result in the predicted doses during the post-closure period meeting the WAC.

CNSC staff verified that this approach aligns with Canadian and international guidance and best practice on the development of WAC for waste disposal facilities by verifying:

- The waste data used in model inputs
- That the waste types identified for disposal in the NSDF met the definition of low-level radioactive waste in CSA N292.0-19, and the IAEA GSG-1, Classification of Radioactive Waste, 2009
- That the activity limits and concentrations stated in the WAC were derived from the CSA N292.0:19, the IAEA GSG-1 and the PCSA results and met the PCSA acceptance criteria

Seismic Impacts on the NSDF

The impact of seismicity on the NSDF has been questioned by both the public and CNSC staff due to the location of the facility in the West-Quebec Seismic Zone. CNSC staff requested that CNL provide further information on the geology of the NSDF site both locally and regionally to provide more robust support to the assumptions used in the PCSA. CNL conducted a detailed review of available geoscience literature including information on seismicity and neotectonics that is now included in the PCSA and supporting documents. CNSC staff's review concluded that the seismic impacts on the NSDF have been comprehensively assessed, the NSDF and specifically the ECM perimeter berm can resist a severe seismic event (an earthquake with a 50 000 year return period).

Site Description and Engineered Barriers

CNSC staff provided a number of comments to CNL on the engineered barriers proposed to isolate and contain the waste in the NSDF. Specifically, CNSC staff questioned CNL on the expected design life of the engineered barriers in the cover and liner as well as the potential impact of ionizing radiation on the design life. In response, CNL pointed out that the barrier system is composed of both natural and engineered barriers and provided additional evidence to support both its design life and the impact of ionizing radiation on barrier performance.

CNSC staff also questioned the assumed degradation rates for the cover system used in the PCSA model. Specifically, CNSC staff requested that CNL provide additional evidence to support the assertion that the barriers degrade beginning at 100 years post-closure. In response, CNL provided additional information to support the degradation rates selected.

Human Intrusion

CNSC staff submitted several comments to CNL regarding the human intrusion scenarios in the PCSA. CNSC staff requested that CNL include mass excavation and archaeological dig human intrusion scenarios. In response, CNL revised their human intrusion scenarios to include: borehole drilling, a site resident house with a basement as well as human intrusion “what if” scenarios such as mass excavation and a well in the NSDF contaminant plume. Additional scoping studies were performed to evaluate the impact of a highway construction and archaeological dig.

NSDF Assessment Timeframe

CNSC staff submitted comments to CNL regarding the post-closure assessment timeframe selected for the NSDF. Initially, CNL proposed a 100,000 years assessment timeframe for NSDF. CNSC staff questioned the justification of this timeframe, particularly given the large uncertainties associated with near surface disposal of radioactive waste for 100,000 years. CNL subsequently removed the intermediate level waste component from the waste inventory. This significantly reduced the amount of time the NSDF would be required to provide isolation and containment. As a result, CNL reduced the post-closure assessment timeframe to 10,000 years. The 10,000 years assessment timeframe comprises the maximum dose predicted time and is in alignment with regulatory requirements.

CNL has defined an assessment timeframe that considers the following:

- Hazardous lifetime of the contaminants associated with the waste
- Design life of engineered barriers
- Duration of both active and passive institutional controls
- Time to the peak of the impact

Taking the above points into consideration, CNL selected an assessment timeframe of 10,000 years. CNSC staff assessed each of the above points against REGDOC 2.11.1 Vol. III and their scientific basis, such as the evidence supporting the design life of the barriers. CNSC staff find that CNL’s selection of the assessment timeframe is adequately supported and aligns with international guidance [13].

Acceptance Criteria and End Points

In order to demonstrate confidence in post-closure safety, acceptance criteria are established from current regulatory limits, standards, objectives, and appropriate benchmarks. The results of the PCSA are termed safety assessment end points, and are compared to their applicable acceptance criteria to assess the potential long-term impact to people and the environment.

CNSC staff agree with the end points and acceptance criteria CNL has selected and find that they are consistent with Canadian and international requirements and best practices. As a result, CNSC staff conclude that the use of these acceptance criteria and end points coupled with existing conservatism in the model and complimentary indicators of safety, will ensure both people and the environment are protected during the post-closure period for the NSDF.

Input Data, Conceptual and Numerical Models

PCSA involves the quantification of the impact of the proposed facility on human health and the environment. This quantification is performed with the use of mathematical models that are implemented in computer codes.

CNSC staff have reviewed CNL's models and the input data to the models, by verifying that:

- The input data are consistent with the site, waste and engineered barriers characteristics and their evolution. Whenever variability and uncertainty exist, CNSC staff verify that the input data are conservative
- The computer codes where the models are implemented are verified, well-used and recognized, and were developed using acceptable software Quality Assurance (QA) procedures
- The models are calibrated with existing conditions
- Independent calculations performed using different codes and approaches, to verify several key conclusions from the PCSA, for example dose rate to the critical receptor in the normal evolution scenario, and seismic stability of the ECM's perimeter berm

CNSC staff conclude from this assessment that there is reasonable confidence that the models and input data used by CNL provide conservative estimates of the post-closure impact of the NSDF on human health and the environment.

Management of Uncertainty

PCSA inherently involves uncertainties given the long timeframe being modelled. The uncertainties are managed in NSDF PCSA in the following way:

- The assessment of a range of scenarios, models and data with a variety of calculation cases
- The adoption of conservative data, models and scenarios
- Calculations performed in the PCSA were conducted using deterministic and multivariate approaches to show that the radiation dose or risk from possible migration of radionuclide from the NSDF will remain below the acceptance criteria for the facility timeframe

CNSC staff accepts CNL's assessment of uncertainties and approaches used to manage them. Confidence in safety has been established through use of a systematic, transparent and auditable process for developing and analyzing models, comparison with regulatory safety criteria and constraints, and the inclusion of a range of performance measures and calculations.

PCSA Scenarios

The safety of a disposal facility must be demonstrated during the entire lifecycle of the facility, including the post-closure period which is covered in the PCSA. The PCSA scenarios describe alternative and possible evolutions of the disposal systems and its surroundings.

The normal evolution scenario (NES) is a reference description of the expected evolution of the disposal system, which is based on reasonable extrapolation of current site features and receptor lifestyles. In addition, the PCSA include the assessment of a range of disruptive events to evaluate the NSDF's performance under a different set of challenging conditions but less realistic.

The subsections below describe CNSC staff's review of the NSDF PCSA scenarios.

Normal Evolution Scenario (NES)

The NES is the base-case of the PCSA. It represents the anticipated evolution of the site over the assessment timeframe and is used to calculate the radiological results to be compared to the dose constraint criterion of 0.3 mSv/a (dose constraint set in the CRL operating licence). The NES is based on reasonable extrapolation of current site features and uses conservative assumptions. This includes the anticipated degradation of the engineered barriers (e.g., corrosion of waste containers in the ECM and degradation of the ECM cover and base liners), the restoration of the ECM following gradual degradation of the cover, and the associated transport of radiological and non-radiological contaminants from the ECM through the geosphere and into biosphere.

The NES for the NSDF was conducted over the 10,000-year assessment timeframe. It assumes a 300-year IC period, and that the gradual degradation of ECM cover begins at the end of the IC period (i.e., 300 years). The NES also considers external events that are expected to occur during the assessment timeframe. These include a 1 in 10,000-year design basis earthquake, and a 3.9°C increase in temperature over the assessment timeframe, resulting in a 3% per-degree increase in precipitation to account for the effects of climate change.

The modeling assumes that as the ECM cover begins to degrade and water begins to infiltrate the ECM, contaminants in the waste will begin to transport through the ECM and into geosphere and biosphere. Once the contaminants reach the biosphere, the NES models the exposure pathways to defined receptors.

As per the requirements of REGDOC-2.11.1 Volume III, CNSC staff verified that the NES:

- Is based on reasonable (but conservative) extrapolation of present day site features and receptor lifestyles
- Includes the expected evolution of the site and degradation of the waste disposal system
- Includes relevant disruptive events of an appropriate magnitude for the assessment timeframe
- Incorporates and models the failure modes of the barriers due to both degradation and disruptive events
- The predicted results meet acceptance criteria

As a result of this assessment, CNSC staff conclude that the NES provides a reasonable basis for the expected performance of the NSDF during the post-closure period and demonstrates that people and the environment will be protected.

Sensitivity Analysis Scenarios

Sensitivity analysis scenarios are used to assess uncertainties in model assumptions and data used to represent the system described by the NES. They do so by examining the effect that a change in a key model parameter will have on the assessment results in comparison to those of the NES. The results of these scenarios are compared to both the acceptance criteria and the results of the normal evolution scenario to identify the impact of the changed parameter on the results.

Sensitivity analysis builds confidence in the assessment model results and the results of the NES by showing the impact of a particular change. CNSC staff verified that the values changed in these sensitivity cases were appropriate and that the conceptual models proposed were reasonable.

CNSC staff assessed the changes made for each sensitivity analysis scenario (such as an increase in the waste inventory by a factor of 10, shorter period of IC of 100 years, reducing sorption factors which is synonymous to an increase in contaminant releases, rapid transit time to Perch Creek of 5 years instead of 7, faster degradation of cover and liner system, climate change, degradation of the berm, etc.) and ensured that the results provided insight into how the model results changed to the changed parameter and its relative importance in the NES results. CNSC staff also ensured that the changes made demonstrated the conservativeness in the model inputs.

CNSC staff conclude that the results of the sensitivity analysis scenarios build confidence in the conclusions of the NES that the NSDF will protect people and the environment during the post-closure period.

Disruptive Events and Human Intrusion Scenarios

Disruptive event scenarios, which include inadvertent human intrusion, investigate the occurrence of events that lead to loss of containment and isolation through penetration or destruction of the facility barriers. For example, events such as earthquakes, fires or floods that cause loss of containment are analyzed. The results are compared to the acceptance criteria and normal evolution scenario. CNSC staff verified that the events selected, their impact on the barrier system, and the time at which the penetration of the barriers occurred met the regulatory requirements and expectations for disruptive event scenarios found in REGDOC-2.11.1, Vol III.

Defence-in-Depth Scenarios

Defence in depth scenarios are used to illustrate the role of specific barriers in the disposal system during the post-closure period to show the disposal system meets the regulatory requirement for defence in depth. The results of these scenarios provide confidence in the robustness of the disposal system and its ability isolate and contain waste in the event one of the components of the multiple barrier system fails. These scenarios show that the safety of disposal system is not reliant on a single barrier to meet the acceptance criteria and ensure long term safety. The results of the scenarios are compared to both the acceptance criteria and the results of the NES. In assessing these cases, CNSC staff verified the relative role of each barrier in ensuring long term safety as well as the input data used and the conceptual model for each scenario.

“What If” Scenarios

“What if” scenarios are used to quantify the dose impact on receptors using an extreme set of assumptions or to depict the impact of events that are extremely low probability but may be of public or regulatory interest. The results of “what if” scenarios are informative as they provide bounding assessments, which show the limitations of the NSDF barrier system’s performance during the post-closure period. “What if” scenarios are also useful to bound uncertainties in the normal evolution and disruptive event scenarios as they present the consequences of worst-case failures of the disposal system. For the NSDF, CNL assessed three “what if” scenarios. Two of these are variants of the human intrusion scenario (i.e., mass excavation and farming and shallow well) and the third is a permanent bathtub (a flooding scenario in which it is assumed that the final cover fails while the base liner remains intact and flooding of the ECM occurs resulting in pooling in the ECM and spilling over the sides). In all cases the peak annual dose from the “what if” scenarios is greater than the NES. This result is expected given the extreme assumptions being modelled.

Using Canadian and international guidance regarding “what if” scenarios, CNSC staff assessed the input data and assumptions as well as the results of the scenarios. The use of “what if” scenarios enables CNSC to apply the precautionary principle in the evaluation of the PCSA as these scenarios purposefully address the worst-case failures for the facility.

Assessment Conservatism

Examples of conservative assumptions used in the PCSA are:

1. While radionuclides will decay over time, the radioactivity of the emplaced waste is assumed to be the same at the closure of the ECM as it was at the time of emplacement in the ECM.
2. The design life of the ECM including the low-permeability barriers in both the cover and base liner systems is assumed at 550 years while testing and research has shown that their service life could be up to 2000 years.
3. In the series of land-slides scenario (series of landslides occurring over a long period of time starting at year 650 (maximum water level in the ECM) and ending at year 5000 (wastes unsaturated) after closure, assuming the berm is not present and failure of the liner, which results in material being transported downslope and waste being exposed) it is not expected that a farmer will be living on top of the ECM; yet it is assumed that the critical receptor most affected by the facility is a farmer family who lives 100% of their time on the NSDF site, with a house and garden located on top of the ECM, and raises cattle that grazes in Perch Lake Swamp, an area immediately downstream of the ECM and most potentially impacted by the contaminant plume.
4. In addition to NES, disruptive and human intrusion scenarios were considered, with some of them assuming total loss of containment after the end of the IC period. These extreme scenarios resulted in doses to the critical group that still meet dose criteria, as shown in table 5 below.
5. Non-radiological contaminants of interest released from the ECM include copper, lead and uranium. Peak environmental concentrations of lead in groundwater, and uranium in groundwater and swamp soils, were observed to slightly exceed their acceptance criteria for a number of scenarios in the PCSA. CNL applied federal (Canadian Council of Ministers of the Environment (CCME) and provincial (Ministry of Environment, Conservation and Parks, MECP), formerly Ontario Ministry of Environment and Climate Change) environmental quality standards and guidelines as the acceptance criteria for groundwater and soil. The most conservative guideline concentrations for groundwater, soil and sediment are provided primarily from Ministry of Environment, MOE (2011), and the most conservative guideline concentrations values between MOE (1994) and CCME (2018) are used for surface water. Whereas for a number of elements of potential interest, no criteria were provided in the above mentioned standards and guideline, therefore, surface water criteria from available literature were used such as Sneller et al. (2000), Suter and Tsao (1996), Oregon Department of Environmental Quality, ODEQ (2001) and Canadian Center for Occupational Health and Safety (CCOHS) (2009). Due to the high level of conservatism applied in the models, and that exceedances are only marginally above background and below CCME EQGs, these levels are not likely to pose any impacts to human health or the environment.

Table 5: Calculated Doses during Post-Closure (NES and Disruptive Events)

SCENARIO DESCRIPTION	DOSE CRITERIA	HIGHEST CALCULATED DOSE TO RECEPTOR	% OF CRITERIA
Post-closure: Normal Evolution Scenario – dose to critical receptor	0.3 mSv/y	0.015 mSv	5%
Post-closure: Disruptive Events – dose to critical receptor	1 mSv/y	0.14 mSv	14%

3.5.3 Conclusion

Based on CNSC staff's assessment of CNL's licence application and supporting documentation with respect to the PCSA, CNSC staff conclude CNL's NSDF PCSA [24] aligns with Canadian and international regulatory requirements and guidance. The PCSA, through the use of mathematical modelling, analyzed the impact of a variety of scenarios, the normal evolution, disruptive events, human intrusion, and other worst case "what if" scenarios, and evaluated radiological doses and risks to be compared with relevant criteria and standards during an assessment timeframe of 10,000 years. CNSC staff assessed both the methodology and the results of the PCSA against Canadian and international requirements and guidance and have found that the predictions for long term impacts from the NSDF will comply with regulatory acceptance criteria. As a result, CNSC staff conclude that people and the environment will be protected.

Should the Commission approve the construction of the NSDF, CNSC staff will monitor that NSDF-specific activities meet the design and safety assessment requirements through the conduct of regular compliance verification activities.

3.6 Safety Case

3.6.1 Discussion

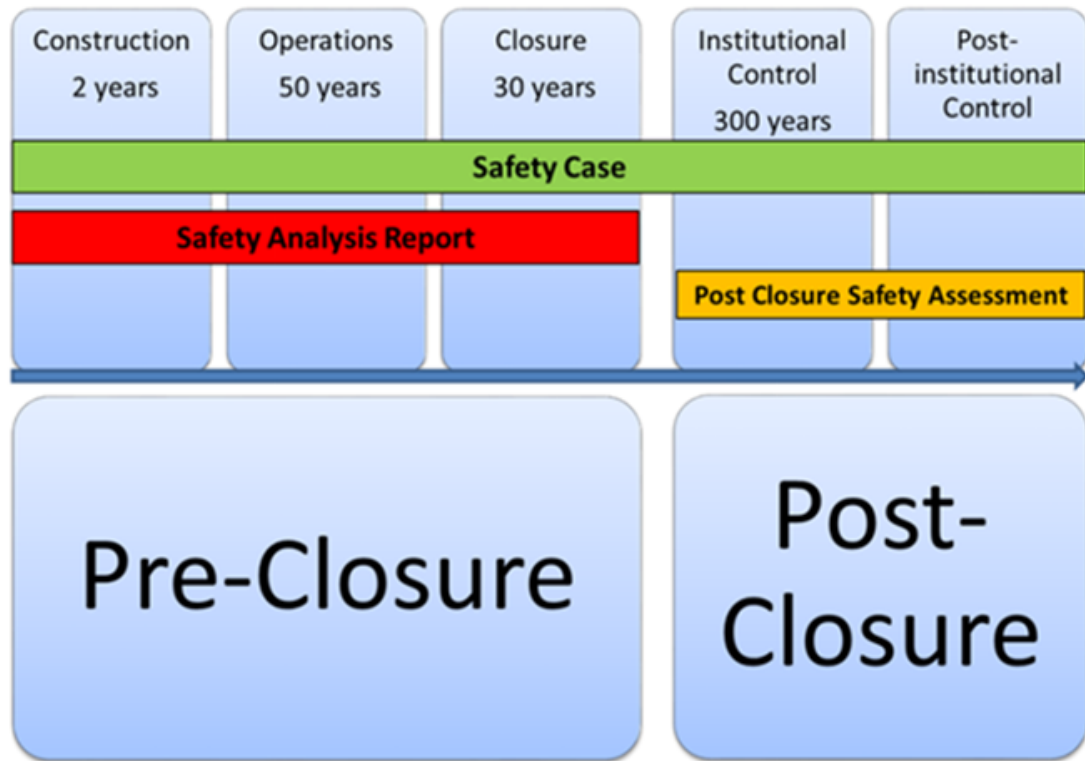
A safety case provides multiple arguments and evidence to demonstrate that people and the environment will be protected from the hazards posed by the waste during both the pre-closure and post-closure periods. The NSDF Safety Case is a key set of documents in support of CNL's application for a licence to construct the proposed NSDF and for other future licensing stages.

This section provides an overarching summary of CNSC staff's review of the arguments and evidence that the proposed disposal facility is safe during all phases of the project.

The general structure of the NSDF Safety Case and the periods it covers are illustrated in Figure 6. The NSDF Safety Case report [20] summarizes and integrates the results from the SAR [25] for pre-closure safety, and the PCSA report [24] for post-closure safety. Further details on CNSC staff's assessment with respect to the SAR for pre-closure safety is detailed in the safety analysis SCA (section 4.4 of this CMD) and the PCSA is discussed in the previous section of this CMD (section 3.5).

Several supporting documents related to the long-term performance of the engineered barriers and the geosphere are also of key importance, as they provide arguments and justifications used in both the pre-closure and post-closure safety assessments. These safety assessments were performed with mathematical and computer models which are internationally verified and validated and have been used for other disposal facilities. There is a high degree of conservatism adopted in these assessments to provide bounding estimates of the impact of the proposed NSDF on the health of people and workers and the environment.

Figure 6. General structure of the safety case and the time periods it covers - duration of each period is approximate (Source: CNL)



3.6.2 CNSC Staff Assessment

The NSDF Safety Case was assessed against the requirements and guidance in both CNSC regulatory documents and international standards:

- REGDOC-2.11.1, Waste Management, Volume III: *Assessing the Long Term Safety of Radioactive Waste Management*, May 2018
- IAEA SSR-5, *Disposal of Radioactive Waste*, 2011
- IAEA SSG-23, *The Safety Case and Safety Assessment of Disposal of Radioactive Waste*, 2012
- IAEA SSG-29, *Near Surface Disposal Facilities for Radioactive Waste*, 2014

The main arguments provided in CNL's safety case and CNSC staff's assessment of those arguments are summarized below.

CNSC staff assessment methodology

CNSC staff used the following processes and mechanisms to evaluate the information provided in CNL's safety case:

- Verifying that the engineering design of the facility follows international best practice, uses proven technology and is compatible with the site characteristics
- Comparing the submission information with relevant standards and criteria
- Performing independent calculations to validate the safety arguments presented (for example with respect to the overall PCSA of the NSDF, CNSC conducted independent calculations for the transport of contaminants from the ECM, and the seismic stability of the ECM)
- Undertaking alternate interpretations of the data and information in the submission to identify those topics and issues that are the most critical to the conclusions of the submission
- Verifying that there is a management system put in place to ensure that the NSDF would be constructed, operated, and closed out as designed and planned

Review of the safety arguments

CNL's main safety arguments put forth in the safety case can be classified in three main classes:

1. Those related to the waste inventory and waste characteristics.
2. Those related to the engineered barriers and the site characteristics.
3. Those related to the pre-closure and post-closure safety assessments.

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

CNSC staff's review concludes that the safety arguments meet the relevant regulatory requirements and align with international guidance for a near surface disposal facility as recommended by the IAEA.

Review of the waste characteristics

Only low-level radioactive waste, defined at the lower bound of the IAEA (IAEA GSG-1, Classification of Radioactive Waste, 2009) and CSA N292.0 classifications, would be emplaced in the ECM. Due to radioactive decay, the total radioactivity in the waste will decrease to approximately three times the background level of Chalk River soil at 300 years after closure, the reference timeframe for IC. The radiotoxicity at that time will be approximately two orders of magnitude lower than the average radiotoxicity of natural surficial uranium ore bodies found in the Pembroke-Renfrew region, as documented by the Ontario Geological Survey [26].

The substantial decline in the hazards of the waste is further demonstrated by the results of the safety assessment for two human intrusion scenarios. In a first scenario, the entirety of the NSDF and the barriers are excavated, mixed and redeposited at 300 years post-closure. The receptor then lives and has a garden directly on top of the waste and raise cattle that graze on contaminated lands. In the second scenario, the site resident receptor obtains their water from a shallow well drilled into the contaminant plume downslope of the NSDF. Both human intrusion scenarios results in peak dose that remains below the acceptance criterion of 1 mSv/yr.

CNSC staff concludes that due to the nature and characteristics of the waste to be disposed in the ECM, near surface disposal is a suitable design, in alignment with IAEA standards and guidance.

Review of the engineered barriers

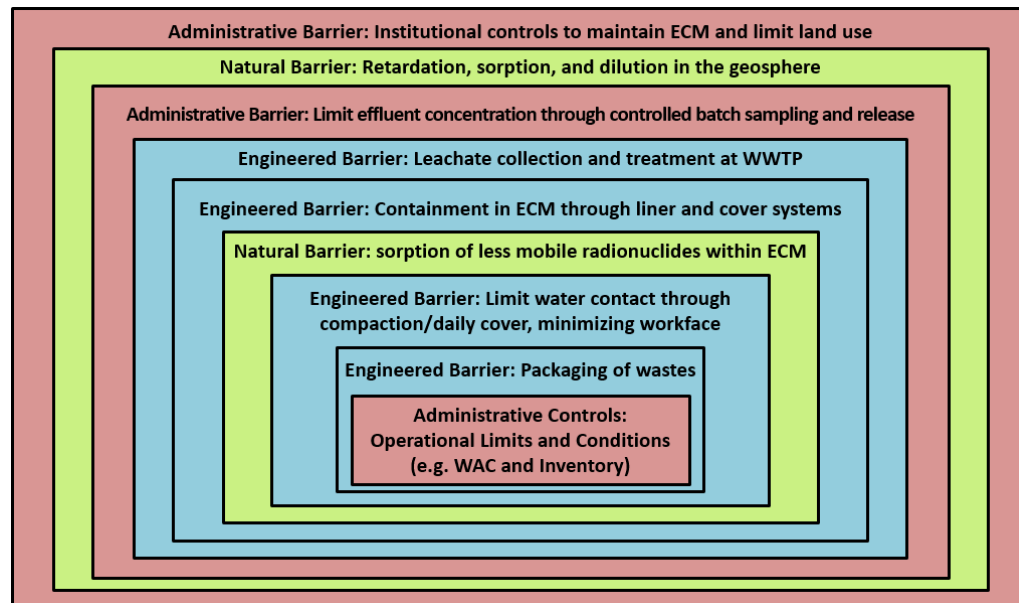
The waste would be emplaced in an ECM. CNL has provided evidence that the design of the ECM and its location has been optimized in order to suit the site characteristics:

- The ECM would be located on a bedrock ridge, sloping away from the Ottawa River located approximately 1.1 km to the northeast. During the pre-closure period, all contaminated water would be captured and treated before release to Perch Lake and Perch creek (Figure 2). In the post-closure period, water infiltration into the ECM and release of contaminated water to the environment would be controlled by a multi-barrier system, whose main components are the cover, the base liner and the perimeter berm that together encapsulate the waste for containment, isolation and control of contaminated water release. Contaminated water released from the ECM would be at a low rate, would migrate in a Southeast direction away from the Ottawa River toward Perch Lake Swamp, before reaching Perch Creek. Contaminants would be further attenuated by sorption and dispersion along this flow path before reaching Perch Creek, where they would be further attenuated and dispersed by surface water in the creek before reaching the Ottawa River approximately 1.7 km to the northeast. The understanding of the site characteristics has been confirmed with a multi-phase geoscientific site investigation program combined with groundwater modelling.

- The site is located far above the maximum calculated Ottawa River flood levels for the area. Specifically, the lower point of the ECM is at 163 metres above sea level (mASL), while the maximum flood level due to upstream dam breaks is calculated to be about 122 mASL.
- The base liner would be located above the water table, however it would be founded near or on bedrock. Existing sand that is prone to liquefaction from seismic events would be removed from the perimeter berm footprint. These design choices provide additional structural resistance of the ECM to strong seismic events.
- The main components of the ECM that provide containment and isolation of the waste are the cover system, the base liner system and the perimeter berms:
 - The cover system is composed of multiple layers in order to reduce water infiltration to the emplaced waste. The main barrier that controls infiltration is an 80 mil (2 mm) HDPE geomembrane underlain by a geosynthetic clay liner. A 0.5 m intrusion rockfill layer and a 0.3 m sand cushion overlay the geomembrane / geosynthetic clay liner barrier for intrusion protection against plant roots and burrowing animals.
 - The base liner has a primary seepage barrier, composed of a geomembrane and geosynthetic clay liner, and a secondary seepage barrier composed of a geomembrane, geosynthetic clay liner and compacted clay liner. A LCS overlays the primary liner, and a LDS is provided between the primary and secondary seepage barriers. Any contaminated water that leaks to the LDS and LCS would be routed to the WWTP for treatment before release to the environment during the operation and closure phase of the NSDF, and after closure until it is no further needed. In the post-closure period following the end of active IC, release of contaminants from the ECM would be controlled by passive means provided by the multi-barrier components of the ECM and through dispersion and retardation in the subsurface environment.
 - The perimeter berm provides physical containment of the waste and hydraulic containment of the waste pore water. The infiltration barrier of the cover system, and the primary and secondary seepage barriers of the base liner system are extended onto the crest and upstream face of the berm. The perimeter berm would be constructed with free-draining erosion resistant fill material. Both upstream and downstream slopes are designed at 3H:1V in order to enhance berm stability during pre-closure and post-closure periods.

CNSC staff reviewed the conceptual design of the ECM and concluded that the design follows Canadian and international best practice, is commensurate with the hazards associated with the waste and is compatible with the external environmental conditions. The design and operational limits and control adopted by CNL provides defence-in-depth through multiple barriers and multiple safety functions and through administrative controls such as waste acceptance criteria, waste emplacement methods, Construction Quality Assurance (CQA), effluent release control, and a period of active and passive IC after closure. This defence-in-depth provides multiple layers of protection as illustrated in Figure 7.

Figure 7. Defence-in-depth through passive natural and engineered barriers and operational and administrative control (Source: CNL)



The service life of the low permeability components of the ECM, the HDPE geomembrane, could attain 2000 years, as shown by accelerated ageing tests and research by Canadian experts in the field [27]. CNSC staff have reviewed the experts' reports on the longevity of those components and conclude that sufficient evidence has been provided to support the design life of 550 years of the HDPE geomembrane. The longevity of these barriers and the treatment of any leaks during the operational and active institutional control phases ensure nearly full containment of the waste and wastewater for the 550 years design life of the ECM. At that time, radioactivity of the waste would reduce to less than three times the background level of Chalk River soils, and its radiotoxicity would reduce to more than two orders of magnitude compared to the radiotoxicity of natural ore bodies in the Pembroke-Renfrew region.

The ECM is designed to withstand a 1:10,000-year seismic event, without loss of containment or deterioration of its safety functions. CNL has provided stability and seismic analyses using multiple modelling approaches to support the claim on robustness of the ECM. CNL was required to assess the impact of a more severe earthquake with a return period of 50 000 years ($2 \times 10^{-5}/y$), as a variant of the NES, on the ECM and particularly a likely partial failure of the perimeter berm, even if less probable. CNSC staff's review determined that the modelling and the assumptions are adequate and that the consequences of a partial or full perimeter berm failure are bounded by the series of landslides scenario. The calculated total risk of the series of landslides scenario is two orders of magnitude lower than the risk threshold of 10^{-5} per year recommended by the IAEA, SSR-5 [12].

In addition, the cover and liner were also shown to resist erosional forces from surface water flow resulting from a Probable Maximum Precipitation (PMP). CNSC staff have reviewed these analyses and have performed independent analyses and conclude that the ECM barrier system is robust.

The IAEA SSG-23 [13] suggest the use of multiples lines of reasoning to enhance confidence in the safety case through the use of natural analogues. To complement the argument on the proposed design and robustness of the ECM, CNL provided examples of man-made mounds that were constructed hundreds to thousands of years ago. The most relevant example comes from the Monks Mound, in Illinois, USA ([Monks Mound - Wikipedia](#)). The Monks Mound was constructed around 900-955 Common Era (CE). It has comparable dimensions to the proposed ECM; it is taller (30 m versus 18 m) but has a smaller area (6.9 hectares versus 16 hectares. Seismic hazard at the Monks Mount (e.g., peak ground acceleration for a 1:2450 event 0.265 vs 0.25) and annual precipitation (980 vs 852mm) are also comparable to the proposed NSDF site. These historical mounds were constructed without advanced engineering and the level of CQA expected for the ECM. Their longevity for more than a thousand years, under comparable external natural disturbances, provides additional confidence in the credibility of the design life of the ECM.

Confidence and uncertainties in the safety case

The design life of the ECM of 550 years ensures containment and isolation of the waste. In 100 years and 300 years (end of IC period) after closure, respectively 99.984 % and 99.991 % of the total activity emplaced in the ECM will have decayed (i.e., 0.009 % remains). Therefore, there is high confidence in the NSDF natural and engineered barriers (base liner system, the berm and the cover system) to achieve their safety functions, i.e., containment, isolation and retardation. The arguments presented by CNL in the safety case and supporting PCSA, which assessed quantitatively and qualitatively a number of scenarios, such as the NES (more realistic) and related sensitivity analysis cases, disruptive events (human intrusion), dose optimization, defence-in-depth and what-if scenarios, provide evidence and confidence in the safety case and the safety of the NSDF in the long-term. In accordance with CNSC, Canadian and international guidance, CNL identified remaining uncertainties and proposed a way forward to reduce or address them, which will be described in the following section:

1. The presence of deep geological features under the ECM's footprint could influence the present and future hydrogeological regime and affect the ECM's long-term performance. CNL has assessed the influence/potential impacts of these features by additional modelling and has found that they do not influence the post-closure performance of the facility. However, in order to further reduce this uncertainty, CNL committed to perform a geological verification during construction to verify the existence or absence of these features. Further details can be found in section 6.4.1.1.
2. Uncertainty in the waste inventory and near-field sorption coefficients directly influences the calculated dose rate and environmental impact results. The PCSA uses conservative estimates in several variant scenarios to bound this uncertainty with assessment results that meet all acceptance criteria for dose. However, CNL committed to perform further studies to reduce this uncertainty.
3. The gas vents on the ECM would be sealed (backfilled with gravel) at the end of IC. However, if the seals were imperfect, there might be a continuous exchange of air with the waste leading to relatively oxidizing conditions. CNL will perform further studies to assess the impact of oxidized conditions in the waste.
4. Biochemical conditions are a source of uncertainty in the current environment and PCSA modeling and this uncertainty will be assessed in the future using monitoring results.
5. Exact knowledge of the composition of each waste layer in the ECM could result in more refined PCSA models.
6. The PCSA references the latest acceptable CSA and ICRP dose coefficients until new ones are accepted by the CSA and ICRP. The next iteration of the PCSA will be updated with new dose coefficients, when applicable.
7. Further to CNSC staff's request, CNL are developing a research and development plan to study the performance of the NSDF engineered barrier system, taking into consideration the full lifecycle and information and data that CNL will need at the time of closure. Further details can be found in section 6.4.1.2 of this CMD.
8. Further to CNSC staff's request, CNL developed a monitoring and surveillance plan for the NSDF. The program objective is to provide assurance that the NSDF is performing at the required level of safety during the pre-operational, operational, closure, institutional control and post closure phases and the NSDF meets the specified performance and safety requirements. The plan is based on and aligns with the IAEA SSG-31 "*Monitoring and Surveillance of Radioactive Waste Disposal Facilities*". Further details can be found in section 6.4.1.3 of this CMD.

CNSC staff determined that the remaining uncertainties have been adequately identified and the methods proposed by CNL to further reduce those uncertainties are acceptable.

The NSDF safety analysis, the safety assessments, the PCSA and the safety case will be periodically updated/revised at different phases of the facility lifecycle (every 5 years or at CNSC staff request) to verify and confirm that the disposal system performs as intended and as designed, the assumptions used in the modelling are realistic and consistent, dose to the public is below the dose acceptance criterion and people and the environment are protected. The review/update of these documents will be based on and in consideration of the following:

- Any facility configuration/modifications
- Monitoring and surveillance results
- Performance of the disposal system
- Results from research
- The actual radiological waste inventory
- Degradation rate of the engineered barriers
- Operating experience and lessons learned from international similar near surface disposal facilities
- Changes to regulatory documents and international guidance (particularly the IAEA)

As mentioned earlier, the results of the reviews and updates to documents are subject to CNSC staff review and acceptance and would inform staff's recommendations to the Commission on the next licensing phase of the NSDF, should the construction licence be granted.

3.6.3 Conclusion

Based on CNSC staff's assessment of the NSDF Safety Case provided by CNL in support of the licence application, CNSC staff conclude that CNL has presented sufficient evidence to demonstrate the safety of the proposed NSDF Project during construction, operation, closure and post closure and the protection of people and the environment, including the Ottawa River. The evidence and arguments integrated in the safety case are comprehensive, transparent and traceable. The safety case conforms to the structure recommended by the CNSC and by international guidance. The safety case and other major technical documents (EIS and PCSA) have also been peer reviewed by international third-party experts [28] further to CNSC staff's request. CNL has addressed comments submitted by the international third-party experts and has a corrective action plan in place to implement the experts' outstanding recommendations and suggestions. Taking all of this into consideration, CNSC staff conclude that the NSDF Safety Case meets the applicable regulatory requirements and is in line with international and industry best practices for the proposed disposal of solid low-level radioactive waste.

Uncertainties were adequately handled by CNL using conservatism in the design and assessment. Furthermore, CNSC staff determined that the remaining uncertainties have been adequately identified and the methods proposed by CNL to further reduce those uncertainties, through monitoring, verification and research, are acceptable.

Should the Commission approve the construction of the NSDF, CNSC staff will monitor that NSDF-specific activities meet the applicable requirements through the conduct of regular compliance verification activities. The results of the reviews and updates to documents are subject to CNSC staff review and acceptance and would inform staff's recommendations to the Commission on the subsequent licensing phases of the NSDF, should the construction licence be granted.

4. GENERAL ASSESSMENT OF SCAs

The specific areas that comprise the SCAs for this facility or activity type are identified in section D.2 (appendix D) of this CMD. CNSC staff provide continuous regulatory oversight of the CRL site, assessing CNL's performance in all SCAs by verifying compliance of CNL programs, processes, documents, procedures and activities through desktop reviews and compliance verification inspections.

The following table (Table 6) presents a summary of CNSC staff's assessment of CNL's performance ratings for the CRL site over the current licensing period. Appendix B defines the "rating Levels".

Table 6: CRL Site Performance Rating (2018 to 2020)

SAFETY AND CONTROL AREAS	2018	2019	2020
Management system	SA	SA	SA
Human performance management	SA	SA	SA
Operating performance	SA	SA	SA
Safety analysis	SA	SA	SA
Physical design	SA	SA	SA
Fitness for service	SA	SA	SA
Radiation protection	SA	SA	SA
Conventional health and safety	SA	SA	SA
Environmental protection	SA	SA	SA
Emergency management and fire protection	SA	SA	SA
Waste management	SA	SA	SA
Security	SA	SA	SA
Safeguards and non-proliferation	SA	SA	SA
Packaging and transport	SA	SA	SA

SA = satisfactory

The following subsections of the CMD present CNSC staff's general assessment of relevant SCAs in relation to the proposed construction of the NSDF. The specific areas that comprise the SCAs for this facility or activity type are identified in Addendum D, section D.2.

CNSC staff provided information on future commitments and assessment of information related to future stages of the NSDF in some SCAs, where appropriate. Should the NSDF be approved by the Commission, this information will be revisited by CNSC staff and presented to the Commission in more detail at the appropriate licensing stage.

4.1 Management System

The management system SCA covers the framework that establishes the processes and programs required to ensure an organization achieves its safety objectives, continuously monitors its performance against these objectives, and fosters a healthy safety culture.

4.1.1 Discussion

In order to meet regulatory requirements in this area, CNL must implement and maintain a management system in accordance with the national standard applicable to management system, CSA N286-12, *Management System Requirements for Nuclear Facilities* [29]. The management system brings together, in a planned and integrated manner, the processes necessary to satisfy the requirements that must be met to safely carry out a licensed activity.

In conformity with these requirements, CNL has implemented and continues to maintain a mature corporate-wide management system program in accordance with CSA N286-12, and which continues to improve and meet regulatory requirements.

Based on CNSC staff's assessment of CNL's licence application and supporting documents for the construction of the NSDF, focused highlights are provided for the following specific areas:

- Management system
- Management of contractors

4.1.2 CNSC Staff Assessment

Management System

As part of ongoing regulatory oversight at the CRL site, CNSC staff evaluate CNL's management system by reviewing and assessing CNL documents, verifying records, and conducting inspections.

Since 2016, CNL has been developing and transitioning to a new and integrated, corporate-wide management system structure. This new structure includes the use of corporate level documents which are applicable to multiple CNL sites, including the CRL site. The major update since 2017 is CNL's adoption of the CSA N286-12 standard requirements. CNL also incorporated changes such as reorganizing the company document structure and format, and changes in responsibilities.

The Management System Manual is CNL's higher tier document that explains the integrated corporate-wide management system and sets out the framework of policies and procedures through which CNL is governed and managed, from the setting of direction through to day-to-day operations. The framework applies to research & development, design engineering, procurement, manufacturing, qualification testing, construction, commissioning, operations, decommissioning, demolition, waste management, inspection, maintenance and plant life management, and project management for nuclear and non-nuclear facilities and installations.

The management system applies to all work performed by CNL employees, contractors and sub-contractors across all CNL sites and business lines, which would include the proposed NSDF, if approved. Given this, CNSC inspections performed at any CNL site are an assessment of the same management system, and corrections made to address non-compliances apply CNL wide. Since 2017, CNSC staff have inspected CNL's change management, document and records management, corrective action process, and the changes made by CNL as a result of a 2019 safety culture self-assessment. CNSC staff also conducted inspections on CNL's contractor management (please refer to subsection below for further details). For all inspections, CNSC staff have determined that all of the findings have been closed or CNL has an appropriate corrective action plan that has been put in place.

Based on past performance, CNSC inspections and assessment of CNL's licence application for the NSDF, CNSC staff have determined that CNL continues to implement and maintain a management system in compliance with regulatory requirements. Should the Commission approve construction of the NSDF, the facility would also be subject to CNL's corporate management system program.

CNSC staff are satisfied that CNL's current management system program elements are acceptable for the proposed construction activities at the NSDF.

Management of Contractors

In staff's review of the licence application, CNSC staff placed emphasis on this specific area due to the ongoing use of contractors at other CNL sites and the proposed use of contractors for the NSDF Project. CNL's corporate-wide management system program provides the framework for external contractors performing site preparation, construction and installation activities. Construction work carried out at CNL sites, including the CRL site, is governed and controlled by various procedures that provide the basis and guidelines to ensure that construction activities comply with CSA N286-12.

Since 2017, CNSC staff conducted focused inspections in this area, specifically on qualification of contractors (how CNL assesses a contractor's acceptability before awarding a contract), and contractor management (CNL's surveillance and oversight of contractors and contracted work underway). CNSC staff are satisfied that CNL took appropriate corrective actions in response to inspection findings.

Specific to the NSDF, CNSC staff inspected CNL's oversight of the NSDF design phase [30], including the processes followed by CNL to qualify the engineering service provider for the NSDF Project. CNSC inspectors found that CNL's engineering documentation needed improvements to better reflect effective management of external agencies. CNL took corrective actions to address the inspection findings, including updating the implementing procedure for managing engineering services to clarify CNL's oversight requirements for external contractors and engineering agencies. CNSC staff are satisfied with CNL's corrective actions in response to the inspection [31].

Construction quality assurance and quality control play a significant role in ensuring that NSDF performance will meet the long-term safety criteria and objectives, by verifying that construction activities are carried out in conformance with design requirements and specifications. In 2017, CNL submitted the NSDF construction quality assurance plan, which addresses responsibilities of workers, documentation guidelines, work practices, work procedures and monitoring requirements for the construction of the NSDF. CNSC staff reviewed this plan and requested CNL to provide further details on the procurement of subcontracting services, oversight roles and responsibilities, and construction quality assurance sampling frequencies. CNL provided sufficient information to address CNSC staff's comments and in 2019 submitted an update to the construction quality assurance plan [32]. CNSC staff reviewed this update and have no additional comments.

Commissioning is focused on verifying and documenting that a facility fulfills the functional and performance requirements of the design. In 2017, CNL submitted the NSDF commissioning plan. This plan outlines the process and methodology to conduct NSDF commissioning activities, as well as roles and responsibilities for performing those activities. CNSC staff reviewed this plan and requested CNL to clarify the responsibilities for procuring a contractor to lead the commissioning activities. CNSC staff also requested clarification on CNL's role in oversight of the construction quality assurance activities. CNL provided sufficient information and addressed CNSC staff's comments and updated the NSDF commissioning plan accordingly [33].

CNSC staff have determined that continued implementation of CNL's existing program and adherence to accepted NSDF-specific procedures is adequate for managing external contractors with respect to NSDF construction activities.

4.1.3 Regulatory Focus

CNSC staff will continue to monitor CNL's performance in the management system SCA through regulatory oversight activities including inspections and desktop reviews of relevant program documentation.

CNSC staff have determined that CNL's NSDF-specific documents, including the detailed commissioning plan and related procedures, the construction sequence plan, construction schedule, and contractor health and safety plan, are adequate to properly carry out the proposed NSDF construction activities in accordance with management system requirements.

Should the Commission approve the NSDF construction, CNSC staff will prepare an inspection plan for the construction/commissioning phase. CNSC staff will observe, assess, and inspect targeted activities and milestones to verify that these activities are carried out in compliance with the accepted and validated construction and commissioning processes, plans, procedures, and quality assurance and quality control measures. CNSC staff will also verify the implementation of the construction quality assurance plan, the commissioning plan and associated processes.

4.1.4 Conclusion

Based on NSDF-specific and overall CNL management system inspections and document reviews, CNSC staff conclude that CNL continues to implement and maintain an effective management system program in accordance with regulatory requirements. CNSC staff have determined that this existing program is adequate to support the proposed construction of the NSDF.

Should the Commission approve the construction of the NSDF, the facility would be subject to CNL's corporate management system program. In addition, CNSC staff will monitor NSDF-specific activities through the conduct of regular compliance verification activities to ensure that CNL continues to meet requirements of the management system SCA.

4.2 Human Performance Management

The human performance management SCA covers activities that enable effective human performance through the development and implementation of processes that ensure that licensees have sufficient staff in all relevant job areas with the necessary knowledge, skills, procedures and tools in place to safely carry out their duties

4.2.1 Discussion

In order to meet regulatory requirements in this area, CNL must implement and maintain a human performance program in accordance with the GNSCR, *Class I Nuclear Facilities Regulation*, CSA standard N286-12, and REGDOC-2.2.2, *Personnel Training*.

CNL has implemented and maintains human performance and training programs at the CRL site in order to ensure a sufficient number of qualified workers are available in all relevant job areas, and they have the necessary knowledge, skills, procedures and tools in place to safely carry out their duties.

Based on CNSC staff's assessment of CNL's licence application and supporting documents for the construction of the NSDF, focused highlights are provided for the following specific areas:

- Human performance program
- Work organization and job design
- Fitness for duty
- Personnel training

4.2.2 CNSC Staff Assessment

Human Performance Program

CNL's Human Performance Program is part of CNL's Performance Assurance Program which uses information from within CNL and from the nuclear industry to improve the safety of operation, improve operational performance and reduce the significance and occurrence of unplanned events at CNL sites in Canada. CNL uses the Performance Assurance Program to continuously monitor human performance so that the likelihood of an event occurring as a result of human involvement can be reduced. The requirements on human performance are listed in the Performance Assurance Program. Based on past performance, CNSC staff are satisfied that CNL continues to implement and maintain a human performance program in compliance with regulatory requirements and have assessed that this existing program is adequate to support the proposed construction of the NSDF. CNSC staff will monitor NSDF's progress in this area through the conduct of regular compliance verification activities.

Work Organization & Job Design

Although minimum staff complement is not applicable to the construction of the NSDF, for readiness to move to operation phase, CNL included a section in the NSDF SAR on minimum staffing requirements for the operation of a nuclear facility. CNSC staff reviewed and deemed this information acceptable in meeting regulatory requirements (REGDOC-2.2.5, *Minimum Staff Complement*). With a view to readiness for the operation phase, CNL has indicated that the minimum number of qualified workers for the safe operation of the NSDF, as well as information on shift schedule, will be provided to CNSC once the NSDF operation procedures have been prepared. CNL has committed that these operation procedures will be developed to meet the relevant regulatory requirements, such as REGDOC-2.2.5, *Minimum Staff Complement*. CNSC staff will assess staffing levels including minimum staff complement once these documents are submitted.

Fitness for Duty

The CRL site is a high-security site. The regulatory requirements of REGDOC-2.2.4, *Fitness for Duty for Managing Worker Fatigue* and REGDOC-2.2.4, *Fitness for Duty, Volume II: Managing Alcohol and Drug Use* apply. CNL has indicated that the company-wide procedure, Hours of Work, applies to all employees. In addition, CNL's corporate document Fitness for Duty applies to CNL employees, contractors (including subcontractors, regardless of level), and visitors at work sites controlled by CNL. Based on past performance at the CRL site, CNSC staff are satisfied that CNL continues to meet fitness for duty requirements and have determined that CNL's existing corporate documents are adequate to support the proposed construction of the NSDF. CNL employees and contractors carrying out NSDF construction activities will be required to meet these same fitness for duty requirements and CNSC staff will monitor NSDF's progress in this area through the conduct of regular compliance verification activities. For readiness to move to operation phase, CNL included a section in the NSDF SAR on fitness for duty requirements with respect to operation of a nuclear facility. CNSC staff reviewed and deemed this information acceptable in meeting regulatory requirements (REGDOC-2.2.4).

Personnel Training

CNL's Training and Development Program description document is the CRL site wide governance document. The training system elements address regulatory training and qualification requirements, including processes for implementing the various phases of a systematic approach to training in accordance with the requirements of REGDOC-2.2.2, *Personnel Training*. Based on past performance, CNSC staff are satisfied that CNL continues to implement and maintain a personnel training program in compliance with regulatory requirements and have assessed that this existing program is adequate to properly carry out the proposed NSDF construction activities in accordance with training requirements. CNSC staff will monitor NSDF's progress in this area through the conduct of regular compliance verification activities.

4.2.3 Regulatory Focus

CNSC staff will continue to monitor CNL's performance in the human performance SCA through regulatory oversight activities, including inspections, desktop reviews of compliance reports and relevant program documentation.

4.2.4 Conclusion

Based on CNSC staff's assessment of CNL's licence application and supporting documents and past performance at the CRL site, CNSC staff conclude that CNL continues to maintain appropriate measures and programs to meet regulatory requirements associated with human performance management and training. CNSC staff determined that the existing programs are adequate to support the proposed construction of the NSDF.

Should the Commission approve the construction of the NSDF, CNSC staff will monitor that NSDF-specific activities meet human performance management requirements through the conduct of regular compliance verification activities to ensure that CNL continues to meet requirements of the human performance management SCA. In addition, further review will be undertaken by staff during the construction phase to verify CNL's readiness to move to the operation phase, such as operation procedures with respect to staffing levels including minimum staff complement.

4.3 Operating Performance

The operating performance SCA includes an overall review of the conduct of the proposed licensed activities and the activities that enable effective performance.

4.3.1 Discussion

In order to meet regulatory requirements in this area, CNL must implement and maintain operational programs at the CRL site in accordance with the *Class I Nuclear Facilities Regulations*, the CRL Operating Licence and REGDOC-3.1.2, *Reporting Requirements, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills*.

In conformity with these requirements, CNL has implemented and maintains effective operational programs in order to ensure licensed activities at the CRL site are performed safely and in compliance with regulatory requirements.

Given the proposed NSDF project is a new facility, there is no NSDF-specific operating performance information available to review. CNSC staff focused on CNL's overall performance at the CRL site in order to assess CNL's ability to adequately carry out operating performance elements with respect to the proposed NSDF construction and commissioning activities.

Based on CNSC staff's assessment of CNL's licence application and supporting documents for the construction of the NSDF, focused highlights are provided for the following specific areas:

- Facility Design
- Procedures
- Reporting and Trending

4.3.2 CNSC Staff Assessment

Facility Design

The NSDF is designed in accordance with the most recent versions of the National Building Code of Canada (NBCC 2015), National Fire Code of Canada (NFCC 2015), and applicable National Fire Protection Associations (NFPA) standards. The NSDF design is supported by a safety analysis and safety assessments which examine potential hazards and accidents scenarios. Hazards resulting from normal operations, as well as the consequences from accidents and abnormal events, are primarily radiological in nature. The facility design applies the defence-in-depth principle and provides multiple barriers to any potential uncontrolled release of radioactive materials. CNSC staff assessed the design of the NSDF to be acceptable. CNSC staff's assessment of the facility design can be found in sections 4.4 (Safety Analysis), 4.5 (Physical Design) and 4.6 (Fitness for Service) of this CMD.

Procedures

CNL's Management System consists of high-level documentation that is supported by lower level procedures. CNL maintains a comprehensive set of procedures across all CRL programs. CNSC staff have reviewed CNL's processes and procedures and conclude that they meet regulatory requirements.

CNL's procedures are governed by management system principles and changes made to procedures are carried out in accordance with CNL's change control process. As part of CNSC's ongoing compliance verification activities, the review of procedure level documents demonstrated that CNL continually updates facility-specific procedures as needed and to support ongoing process improvements at the CRL site. In addition, CNSC staff determined that changes made to CNL procedures were carried out in accordance with CNL's change control process and there were no significant changes to operating documentation that could have affected the safe operation of the facilities at the CRL site. CNSC staff are satisfied that continued implementation of CNL's existing processes is adequate for meeting procedure requirements with respect to NSDF construction activities. Further details on CNSC staff's assessment of CNL's management system can be found in section 4.1 (Management System) above.

Reporting and Trending

CNL is required to report information to the CNSC through compliance monitoring and operational performance reports, event reporting, and various types of notifications. CNSC staff conducted desktop reviews as part of its ongoing compliance verification activities and determined that the reporting and submission requirements meet the regulatory requirements as outlined in the CRL LCH and REGDOC-3.1.2.

Should the Commission grant approval to construct the NSDF, the NSDF will be added to the CRL licensing basis. In accordance with the CRL LCH and REGDOC-3.1.2, CNL will be required to report unplanned situations or events that may occur during the construction of the NSDF to the CNSC. NSDF will be included in their annual report submissions as part of compliance monitoring and operating performance of the CRL site.

4.3.3 Regulatory Focus

CNSC staff will continue to monitor CNL's performance through regulatory oversight activities, including inspections and desktop reviews of relevant program documentation.

Should the Commission approve construction of the NSDF, CNSC staff will focus compliance verification activities on the safe conduct of construction and commissioning activities.

4.3.4 Conclusion

Based on CNSC staff's assessment of CNL's licence application and supporting documents for the construction of the NSDF and past performance at the CRL site, CNSC staff conclude that CNL continues to maintain and implement effective operational programs that ensure that licensed activities will be performed safely and in compliance with regulatory requirements.

CNSC staff are satisfied that continued implementation of CNL's existing programs and adherence to accepted NSDF-specific procedures are adequate to support the proposed construction of the NSDF. Should the Commission approve the construction of the NSDF, the facility will be subject to these operating performance program elements. In addition, CNSC staff will monitor NSDF-specific activities through the conduct of regular compliance verification activities to verify that CNL continues to meet operating performance requirements.

4.4 Safety Analysis

The safety analysis SCA covers the maintenance of the safety analysis that supports the overall safety case for the facility. Safety analysis is a systematic evaluation of the potential hazards associated with the conduct of a proposed activity or facility and considers the effectiveness of preventative measures and strategies in reducing the effects of such hazards.

4.4.1 Discussion

CNL is required by the *Class I Nuclear Facilities Regulations* to prepare formal SARs for Class I nuclear facilities. The safety analysis must include analyses of the postulated sequences and consequences of conditions that could arise from initiating events and associated hazards.

In accordance with these requirements, CNL has implemented a safety analysis program at the CRL site that ensures systematic evaluation of the potential hazards associated with the conduct of a proposed activity or facility and to consider the effectiveness of preventative measures and strategies in reducing the effects of such hazards.

CNSC staff assess CNL's performance in the safety analysis SCA through desktop reviews of documents and reportable events and also through the course of inspections. These compliance activities confirm that CNL's safety analysis measures at the CRL site meet applicable regulatory requirements.

Specific to the NSDF Project, CNL submitted the NSDF SAR, the safety case document and the PCSA; which covers the pre-closure and the post-closure periods (long-term safety) of the facility. The safety case includes arguments and evidence to demonstrate the safety of the facility during its entire lifecycle. These safety analysis and safety assessments document the safety aspects and assessments of facility effects and impacts on workers, people and the environment for normal operations and accident conditions during the construction, operation and closure phases.

CNSC staff's evaluation of CNL's PCSA and the safety case can be found in sections 3.5 and 3.6 of this CMD, respectively. CNSC staff expect that CNL will update the NSDF SAR, PCSA and the safety case documents as required by the applicable requirements, that is, at a minimum every 5 years or as new information and knowledge become available.

Based on CNSC staff's assessment of CNL's licence application, pre-closure SAR, and supporting documents for the construction of the NSDF, focused highlights are provided for the following specific areas:

- Deterministic safety analysis
- Hazard analysis
- Nuclear criticality safety

4.4.2 CNSC Staff Assessment

CNSC staff's assessment of this SCA is focused on the review of the pre-closure SAR specific to NSDF construction and operation activities, noting that the PCSA and the safety case are discussed in sections 3.5 and 3.6 of this CMD respectively.

Deterministic safety analysis

CNL performed a deterministic safety analysis (that is, an assessment of the consequences) to identify the physical processes occurring at the NSDF during an event and to assess the consequences.

CNL justified the assumptions and the actions of qualified mitigating measures, such as safety systems and operator worker actions, used in the deterministic analysis. CNL identified and classified structures, systems and components (SSCs) in terms of their importance to safety. CNL established acceptance criteria for the results of safety analysis on the radiological consequences and associated chemical consequences for workers and people from direct exposures to radiation or discharges of radionuclides to the environment. These limits were set equal to, or below:

- The provisions of the *Radiation Protection Regulations*, when applicable
- Criteria established by national or international standards as triggers for protective measures during radiological or chemical emergencies

CNSC staff confirm that the acceptance criteria established by CNL align with the regulatory dose acceptance criteria documented in the *Radiation Protection Regulations*, REGDOC-2.4.1: *Deterministic Safety Analysis*, REGDOC-2.5.2: *Design of Reactor Facilities* and RD-367: *Design of Small Reactor Facilities*. These acceptance criteria were applied to the consequences of normal operations and the possible consequences of anticipated operational occurrences (AOO) and design basis accidents (DBA) at the NSDF.

CNSC staff conclude that the NSDF deterministic safety analysis meets regulatory requirements.

Hazard analysis

Methodology

CNSC staff reviewed CNL's assessment carried out to establish the likelihood of postulated initiating events (PIEs) or event sequences that may occur at the NSDF. To achieve that, CNL utilised a systematic hazard analysis methodology that included:

1. Hazard identification.
2. Identification of major hazards and PIEs associated with the NSDF design and operations.
3. Hazard analysis of the consolidated list of major hazards and PIEs for the NSDF project elements.
4. Failure mode effects and criticality analysis.

CNSC staff reviewed CNL's assessment and concluded that the systematic hazard analysis methodology is adequate and meets regulatory requirements.

In addition, CNL addressed the concept of defence in depth in the NSDF safety analysis. In doing so, CNL defined levels of defence in depth in accordance with REGDOC 3.5.3, *Regulatory Fundamentals* and IAEA Specific Safety Requirements SSR- 4, *Safety of Nuclear Fuel Cycle Facilities*, 2017. CNSC staff's review assessment found the approach adequate and confirm that it aligns with the above stated standards' requirements and guidance.

Identification of PIEs

With respect to the identification of PIEs, CNL performed the assessment to consider normal operations, and internal and external PIEs that deviate from normal operations and belong to a category of credible abnormal events, i.e. for the events or event sequences that have a likelihood of occurrence once in a million years ($10^{-6}/y$). Examples of PIEs that CNL identified and classified as credible or not credible include: containment failure, contamination, crane failure, dropped load, explosions (deflagrations and detonations) and fires, external hazards (natural and human induced), damaged structure, equipment failure, loss of shielding, and loss of ventilation.

Within each category listed above, CNL identified a set of potential scenarios. For instance, the following scenarios were identified for the category of external natural hazards:

- Earthquake
- Extreme meteorological conditions (temperature, snow, freezing rain, wind, drought, and rain)
- Ground subsidence, soil erosion or frost heave, flooding (precipitation, dam failure, snow melt, and rise in water table)
- Wildland fire, tornados and microbursts (with or without projectiles), lightning
- Biological phenomena (e.g., algae, fauna and flora invasion and biological contamination)
- Intrusion of non-human biota (e.g. animals such as fox, bear, deer, geese, etc.)

CNSC staff's assessment concluded that the list of PIEs identified by CNL is complete and comprehensive.

With respect to the classification of the PIEs, CNL classified these events into one of the following facility states: AOO, DBA, beyond-design-basis accident (BDBA) and specific ranges within BDBA referred to as design extension conditions (DEC).

The AOOs to which the NSDF is designed include events with a likelihood of occurrence of once in a year to once in a hundred years ((less than 1 to 10^{-2} per year), and these events are listed in the examples of PIEs above.

The DBAs to which the NSDF is designed include events with a likelihood of occurrence of once in 100 years to once in 100,000 years (10^{-2} to 10^{-5} per year), and these events are:

- Design Basis Earthquake (DBE) with a return period of 10, 000 years ($10^{-4}/y$)
- Operating Basis Earthquake (OBE) with a return period of 2 500 years ($4.10^{-4}/y$).
- Design Basis Tornado (DBT), the DBT with a return period of 10,000 years for the CRL site is an upper EF2 Tornado ($10^{-5}/y$)

- Back to back 100-year 24-hour rain event ($10^{-2}/y$) and PMP

The DEC to which the NSDF is designed include selected BDBAs that, by definition, are less frequent and potentially more severe than a DBA. The frequency range for the selected BDBAs is from 10^{-5} to 10^{-6} , and the selected BDBAs assessed are:

- External events: seismic activity, flooding (catastrophic dam(s) failure upstream of the Ottawa River and precipitation events), and tornado
- Human-induced external events: aircraft crash

CNSC staff reviewed the submitted classification of PIEs into AOO, DBA and DEC and found it consistent and meeting the safety criteria, requirements and guidance of the CSA N292.0, N292.3 and IAEA SSR-4.

Nuclear criticality safety

While nuclear criticality is not applicable to NSDF construction activities given there will be no emplacement of any waste in the ECM in this phase, to adequately prepare and plan for the operation phase, CNL developed and submitted nuclear criticality safety documentation during this licensing phase. Submission of the criticality safety documentation was required prior to moving to the next phase of licensing to establish the concentration limits of the fissionable material and to ensure the NSDF will remain subcritical under normal and credible abnormal conditions. CNSC staff assessed the criticality safety documentation to ensure it meets the CNSC full-scope nuclear criticality safety program requirements and to support the safe operation of the nuclear criticality-controlled area. The criticality safety documentation applies to all activities conducted during the operation as well as the post-closure period.

CNSC staff assessed and are satisfied that CNL's documentation followed all applicable requirements for ensuring nuclear criticality safety specified in REGDOC-2.4.3, *Nuclear Criticality Safety* and CRL operating licence conditions. Should the Commission approve the construction of the NSDF, and CNL subsequently seek approval to proceed to the operation of the NSDF, further details on CNSC staff's assessment with respect to nuclear criticality safety will be provided at the next licensing stage.

4.4.3 Regulatory Focus

CNSC staff will continue to monitor CNL's performance in the safety analysis SCA through regulatory oversight activities, including inspections, desktop reviews of compliance reports and relevant program documentation.

4.4.4 Conclusion

Based on CNSC staff's assessment of CNL's licence application and supporting documents for the construction of the NSDF and past performance at the CRL site, CNSC staff conclude that CNL continues to maintain an effective and strong safety analysis program at the CRL in compliance with the regulatory requirements and the CRL operating licence conditions. CNSC staff also conclude that the NSDF SAR and supporting hazards analysis and assessments meet regulatory requirements.

Should the Commission approve the construction of the NSDF, CNSC staff will monitor that NSDF-specific activities meet design and safety assessment requirements through the conduct of regular compliance verification activities.

4.5 Physical Design

The physical design SCA relates to activities that impact the ability of structures, systems and components (SSC) to meet and maintain their design basis given new information arising over time and taking changes in the external environment into account.

4.5.1 Discussion

CNL is required to implement and maintain a design program in accordance with requirements of the CRL operating licence and the associated LCH. The program's objective is to ensure that the design of facilities is managed using a well-defined systematic approach. Implementing and maintaining a design program confirms that safety-related structures, systems and components (SSC) and any modifications to them continue to meet their design bases given new information arising over time and taking changes in the external environment into account. It also confirms that SSCs continue to be able to perform their safety functions under all facility states.

In accordance with these requirements, CNL has implemented and maintains a design program to ensure the ability of systems, components and structures to meet and maintain their design basis given new information arising over time and taking changes in the external environment into account.

CNSC staff assess and rate CNL's performance annually for the physical design SCA based on results from regulatory oversight activities, e.g., desktop reviews of documents and reportable events and through the course of inspections. These regulatory oversight activities confirm that CNL's physical design measures at the CRL site meet applicable regulatory requirements.

The regulatory requirements for the NSDF physical design include a design program and a pressure boundary program and the requirements of the CRL operating licence and LCH.

Based on CNSC staff's assessment of CNL's licence application and supporting documents for the construction of the NSDF, focused highlights are provided for the following specific areas:

- Design governance
- Site characterization
- Structure design
- System design
- Component design

4.5.2 CNSC Staff Assessment

CNL carried out the NSDF design activities based on the existing CRL site-wide programs. CNSC staff consider CRL's site-wide programs applicable to the NSDF physical design and are adequate for conducting the NSDF physical design activities by CNL.

CNL developed documentation to provide detailed design requirements and descriptions for all the NSDF design elements. CNL followed a systematic approach to the NSDF design, as summarized below:

- The design was classified as Grade 1-Nuclear
- A graded approach was followed for the design
- Operating Experience (OPEX) of similar projects/designs was reviewed
- Design requirements were developed based on regulations, codes, standards, CNL requirements
- A Design Input and Assumptions Database (DIAD) was maintained
- Processes were followed for design calculations, preparing drawings and specifications
- Progressive designs were developed at 30%, 60%, 90% and 100%
- Internal reviews were applied at each step
- The design verification process followed the Design Verification Plan
- Design changes (change control process) and request for information (RFI) were documented
- A Constructability and Sustainability Analysis was completed
- Safety Engineering led to design optimization for both rad and non-rad hazards
- The Design Basis were established
- The Design Description was completed

CNL submitted the NSDF design documents [16, 21] along with supporting design and analysis documentation. CNSC staff assessed the adequacy of the NSDF physical design against regulatory requirements, applicable codes and standards, and good industry practices. Overall, CNSC staff determined that the NSDF physical design measures meet all applicable regulatory requirements and CNSC expectations. All CNSC staff's technical comments, including requests for additional information on physical design have been closed. Further details are provided in the subsections below.

Design Governance

Civil Structure Design

The NSDF design documents presented detailed design requirements for civil structure design of all project elements, including the ECM, WWTP, support facilities, and site infrastructure. While applying the NBCC 2015 as the minimum requirements for civil structure design, CNL adopted more stringent requirements for structures and components identified as being of high importance based on safety classification or contributing to long-term safety. The following specific requirements for civil structure design are documented in the NSDF design documents:

- General structural requirements and establishment that the NBCC 2015 forms the basis of the design
- Structural design requirements for the WWTP building and support buildings
- ECM design loads and seismic criteria

The above civil structure design requirements governed the detailed NSDF Seismic and Structural Design documentation. During the regulatory review process, CNL revised NSDF design documents to clarify requirements and address CNSC staff comments from the review of the detailed Seismic and Structural Design documentation. All CNSC staff comments have been closed [34, 35]. CNSC staff conclude that the design governance for the NSDF seismic and civil structural design meets regulatory requirements and CNSC staff expectations.

Engineering Change Control (ECC) Process

CNL's corporate ECC process [36] is applicable to all CNL sites and projects, and should the Commission approve the construction of the NSDF, would apply to this facility. As outlined in the management system SCA (section 4.1 of this CMD), CNL's ECC process has been assessed through regulatory oversight activities, including CNSC inspections over the last 4 years. The findings from these inspections were resolved by CNL and closed by CNSC staff. Based on CNSC staff's compliance oversight activities, CNSC staff are satisfied that the CNL ECC process meets regulatory requirements. Specific to the NSDF, any design changes have been documented in the project-specific design documents. Should the Commission approve construction of the NSDF, CNSC staff will monitor CNL's implementation of the ECC process during NSDF construction and commissioning activities.

Human Factors in Design

CNL has conducted a set of human factors activities throughout the design phase of the NSDF to ensure that human capabilities and limitations were appropriately integrated in the design. CNSC staff have assessed CNL's submitted Human Factors Verification and Validation Report [37] and the Human Factors Engineering Summary Report [38], which summarizes the human factors activities that were completed during the design phase of the NSDF. CNSC staff consider that human factors activities in the NSDF design meet good safety management practices in the conduct of activities, training and qualification of operations staff. Should the Commission approve construction of the NSDF, CNSC staff will monitor how CNL incorporates human factor considerations into any changes or updates to the NSDF when the instruments and equipment are procured and installed, tested and put into service.

Site Characterization

CNL adopted the NBCC 2015 values for environmental parameters for the design of the ECM, WWTP, and support facilities. To characterize the seismic hazards at the CRL site in support of the NSDF seismic design and analysis, CNL conducted a site-specific probabilistic seismic hazard assessment (PSHA). This section focuses on staff's assessment of CNL's PSHA.

Seismic Hazard and Seismic Monitoring

In 2017, CNL submitted a site-specific PSHA study, which relied on a U.S. industry model of seismicity (EPRI model). CNSC staff's review determined that the PSHA calculated ground motions were significantly lower than those provided in the NBCC and other relevant references by CNL. As such, CNSC staff requested CNL provide clarification on this discrepancy, conduct a peer review of the PSHA and address CNSC staff's detailed comments and questions.

In 2018, CNL submitted a new PSHA study along with an independent third-party review report for CNSC staff review. CNSC staff found the new NSDF PSHA and the associated third-party review report acceptable and adequately addressed CNSC staff's comments and questions [39]. In the view of the third party reviewer, based on independent calculations and comparison of results, the main cause for the discrepancy was that the EPRI source model under-estimated epistemic uncertainty relative to the Geological Survey of Canada (GSC) model used in national hazard maps for the NBCC. The new PSHA adopted the fifth generation of GSC's seismic source model for the CRL site, which is based on the GSC catalogue and it considers three alternatives for the seismic sources. The new PSHA results aligns with the seismic ground motions for the 2500-year earthquake ground motion provided in the NBCC 2015.

CNSC staff note that the third-party review report included a recommendation to install broadband seismograph stations at the CRL site, which will provide more site-specific information, as it records, processes and analyses ground motions in real time during the project's different phases. CNL decided not to further pursue this recommendation noting that sufficient seismic monitoring already exists at the CRL site. This consists of a broadband seismograph monitoring station operated by Natural Resources Canada (NRCan) very close to the proposed NSDF location since 1981. During the 2019-2020 period, the instrument was upgraded to be a broadband, 3-component seismometer plus a 3-component accelerometer. Considering the above, CNSC staff accept CNL's decision not to further pursue the seismograph related recommendation [40].

Structure Design

Seismic and structural design

CNL submitted detailed NSDF seismic and structural design documentation, including the following documents:

- Seismic Analysis
- Seismic Criteria and Assessment
- Operating Instruction - Design for Earthquakes (Seismic Qualifications at CRL)
- Bearing Capacity and Settlement Analysis
- Slope Stability Analysis
- Seismic Analysis and Structural Calculations
- Base liner and final cover evaluation and optimization
- Base Liner and Leachate Compatibility Evaluation

These documents cover proposed ground improvements, seismic design criteria for the ECM and its components (base liner and final cover), building structures, and non-structural components, and supporting seismic analyses. CNSC staff reviewed these documents and raised various comments surrounding the use of NBCC 2010 code version, adequacy of the factors of safety used for the NSDF design, impact of aging of ECM cover and base liner in long-term safety (operation/post-closure). CNL provided additional information to justify the adequacy of the ECM design considering long-term safety and revised the NSDF design to the NBCC 2015 code version. CNSC staff further reviewed the revised NSDF seismic and structural design documentation and determined CNL's responses and clarifications were acceptable and adequately addressed CNSC staff's comments and questions [34, 35].

CNSC staff determined that the overall seismic and structural design criteria for the NSDF design was acceptable given that it is aligned with the NBCC 2015 criteria. While adopting the NBCC 2015 seismic and structural design criteria as a minimum for the NSDF project elements, CNL established more stringent seismic design criteria for the ECM design. The seismic design criteria adopted for the ECM design are comparable to those for the Nuclear Power Plants (NPP), which CNSC staff note is conservative for non-reactor facilities. CNL specified the following seismic performance for the ECM design:

1. The ECM must be able to withstand a design basis earthquake with a return period of 1-in-10,000 years, defined as per CSA N289.1: *General requirements for seismic design and qualification of nuclear power plants*, while maintaining containment of waste and leachate;
2. A 2,500-year earthquake must not result in damage that requires emergency response or impedes ECM operation. Integrity of ECM components, including the containment berm, the ECM mound, the liner systems and component, and containment of waste and leachate must be maintained.

Although CNL's dose limit calculations from the safety analysis support the use of NBCC 2015 as the design basis of the ECM, CNL decided to use the 10,000-year earthquake as its design basis given the length of ECM design life of 550 years.

The NBCC 2015 criteria were used for the seismic and structural design of WWTP building structures and non-structural components, including the mechanical/electrical components, processing piping and vessels, and well as instrumentation and controls. The WWTP structure is classified as 'High importance' building category and designed using the NBCC 2015 criteria to resist against collapse in strong ground shaking in a 2500-year earthquake.

Ground improvements

Ground improvements intended to mitigate against liquefaction (Soil liquefaction is a phenomenon whereby a saturated or partially saturated soil substantially loses strength and stiffness in response to an applied stress, usually earthquake shaking or other sudden change in stress condition, causing it to behave like a liquid) of the silty sand foundation soils that underlie certain areas of the ECM were incorporated into the design. CNL conducted the soil liquefaction triggering analysis to delineate the depth and horizontal extents of liquefaction that could occur at the site as a result of the DBE. Based on the results of the triggering analysis and a comparison of several liquefaction mitigation schemes, CNL selected the ‘excavate-and-replace’ mitigation method, i.e., to remove the existing soil and replace it with non-liquefiable engineered fill. Using this method, the soil liquefaction potential at the ECM foundation under the 10,000-year earthquake will be completely eliminated. During the review, CNSC staff requested CNL to provide more detailed information on how the results of the slope analysis and seismic analysis are considered for the selected method and on the extent of soil excavation and replacement using this method. CNL confirmed that the requirements and assumptions of the seismic analysis regarding the soil foundation will be satisfied. CNL provided information on liquefaction mitigation through the drawings and project specifications. The actual extent of the soil replacement will be determined prior to construction. Given all the information provided, CNSC staff’s review concluded that the liquefaction mitigation solution to excavate the liquefaction-prone soil and replace by engineered fill is acceptable [35].

Confinement design

The NSDF design incorporates multiple engineered barriers into the ECM design to provide adequate containment of waste and leachate, considering long-term safety performance and challenges caused by disruptive conditions such as a design basis earthquake defined as per CSA N289.1. The ECM has been designed to include:

- A base liner system comprised of a primary and secondary liner to provide redundancy, with a LCS layer, and a LDS layer
- A final cover system consisting of a multi-layer soil/geosynthetic engineered cover designed to limit infiltration, minimize erosion, and provide a drainage pathway off the ECM
- A perimeter berm that forms the outer boundary and sidewalls comprising the perimeter of the ECM and provides containment of the wastes placed into the ECM

The base liner system, final cover system, and perimeter berm are identified to contribute to long-term safety performance.

As part of seismic and structural design documentation, CNL submitted the following analyses to support the design of the base liner and final cover components:

- Slope Stability Analysis
- Seismic Analysis
- Base liner and final cover evaluation and optimization
- Base Liner and Leachate Compatibility Evaluation

These documents provided specific analyses to assess the ECM base liner and final cover systems performance, including stability against sliding along interfaces between side slope liner components, seismic stability, liquefaction potential, resistance of base liner system components to tensile strains and pull-out from anchor trenches on perimeter side slopes, geomembrane liner tension caused by thermal contraction, and etc.

Based on CNSC staff's review, comments were provided regarding the adequacy of various factors of safety used in the supporting analyses, such as the factors of safety against sliding in slope stability analysis and against deformation, the modelling approach of engineered cover and the base liner in the seismic analysis, verification of the assumed input properties of the liner and cover systems, and validation of the analysis of the cover and base liner systems.

CNL provided information in the form of peer-reviewed scientific literature references supporting its modelling approach as being in line with the current state of practice. CNSC staff note that the numerical modelling performed in one of these references [41] was validated by laboratory experiments, including large-scale and small-scale centrifuge testing of a prototype of geomembranes liner systems subject to seismic loading, and 1-g tests using rigid blocks on sliding on geomembranes to evaluate interface properties. Additionally, CNL conducted laboratory testing of the candidate geomembranes to confirm their index properties, and indicated that other material used in the construction of the base liner and cover systems will have their properties confirmed through the Construction Qualification Assurance Program. Regarding the 550-year design life of the ECM, CNL referred to reference [42] for discussion of the performance and service life of the base liner and final cover systems, including freeze thaw and leachate compatibility evaluations.

CNSC staff reviewed CNL's dispositions to staff's comments, including the additional information provided, and concluded that the provided responses and clarification [43] are acceptable and adequately addressed CNSC staff comments and questions associated with the confinement design. Overall, CNSC staff's review concluded that the seismic and the slope stability analysis followed acceptable methodologies and assumptions to demonstrate the stability and containment capability of the ECM.

System Design

Pressure Boundary Systems

A key element for the pressure boundary systems is code classification. CNL provided code classification and quality assurance requirements and descriptions for the NSDF and support facilities in the NSDF design documents. CNL performed pressure boundary classification for the WWTP and support facilities, systems and components that contain compressed air, radioactive materials, and other substances more hazardous than water. CNL identified system registration requirements (or exemptions) with the Technical Standards and Safety Authority (TSSA) in accordance with CSA N285.0 requirements. CNSC staff have determined that these design activities for the NSDF pressure boundary systems meet the relevant regulatory requirements.

Mechanical and Process system

CNSC staff reviewed the NSDF design description from mechanical and process design aspects and raised a number of comments, including whether the WWTP air operated valves and dampers will go to fail safe position (open or close depending on the safety function) during a loss of electric power. CNL confirmed that all air operated valves and dampers (WWTP process control) are fail-safe.

In addition, during staff's review of the NSDF safety analysis report [25], CNL confirmed that due to negligible radioactive particles/gases present in the exhaust system, continuous monitoring is not required and therefore there is no need for the WWTP active ventilation system to contain exhaust air (automatic isolation requirements) in the event of a loss of the WWTP ventilation. CNSC staff considered CNL's responses acceptable.

Process Control System

The general design philosophy for the WWTP, ECM, and contact water pump stations is such that the control system automatically controls the process to minimize the need for operator intervention and to avoid human errors that could lead to unsafe situations.

Based on the NSDF design description, a process control system is used to monitor and automatically control the WWTP processes, the ECM, and the contact water pump stations. The process control system provides the process information and alarms required to make operational decisions in a timely manner. The process control system is designed for 24/7 availability and utilizes components with a level of reliability suitable to the operating requirements.

CNSC staff reviewed the Hazard Identification and Analysis Report from an instrument and control perspective and identified a number of deficiencies, such as the lack of potential failure modes for the controller and the lack of adequate mitigation measures for certain failure modes. As a result of CNSC staff's review, CNL assessed and included the potential failure modes and malfunction of programmable logic controllers and the Supervisory Control and Data Acquisition workstations (to be fully redundant). CNSC staff found the changes incorporated in the revised Hazard Identification and Analysis report [44] acceptable.

Electrical Power Systems

CNSC staff note that while the Nuclear Reactor Universal (NRU) reactor is in a safe shutdown state, CNL maintains Class I to Class IV power systems on the CRL site. A waste disposal facility does not normally use electrical power systems like a nuclear reactor facility with Class I to Class IV power. However, the NSDF design adopted the conservative Class I to Class IV power scheme currently used for the CRL site. Based on the definition of Class I power in CSA N290-5: – *Requirements for electrical power and instrument air systems of CANDU nuclear power plants* (2016), CNL confirmed that there are no Class I loads in the NSDF. The loads normally supplied by the Class I power system, which is a direct current (DC) power supply, are systems which must be uninterrupted and cannot tolerate any power outage. CNL also confirmed that the Class II and Class III power supplies to NSDF will adhere to quality assurance requirements and applicable codes and standards.

In addition, to respond to CNSC staff's comments related to uninterrupted power source (UPS) sizing, battery sizing and testing, CNL has made the required changes in the design document, such as adding the applicable industry standards (IEEE/IEC standards) to resolve the issues [43].

In summary, CNSC staff consider that the design of the electrical power systems is acceptable because it meets appropriate codes and standards (CSA N290.5) and from a safety stand point, is conservative given a more stringent design comparable to NPP requirements, has been adopted.

Component design

Component design has been covered by previous review topics on structural design and system design.

4.5.3 Regulatory Focus

CNSC staff will continue to monitor CNL's performance in the physical design SCA through regulatory oversight activities, including inspections, desktop reviews of compliance reports and relevant program documentation.

4.5.4 Conclusion

Based on CNSC staff's assessment of CNL's licence application and supporting documents for the construction of the NSDF and past performance at the CRL site, CNSC staff conclude that the NSDF physical design meets regulatory requirements and CNSC staff expectations. CNL has demonstrated to CNSC staff's satisfaction that the NSDF physical design has adequately followed the relevant codes and standards, aligns with industry good practices, and that the performance of the NSDF design is supported by the results of various supporting analyses conducted using acceptable numerical modelling methods and assumptions, and using input materials index properties confirmed by laboratory testing. CNSC staff consider that the physical design of structures, systems, and components of the NSDF is acceptable.

Should the Commission approve the construction of the NSDF, CNSC staff will monitor to ensure NSDF-specific activities meet the applicable requirements through the conduct of regular compliance verification activities. During the construction phase, CNSC staff will also conduct further assessments based on the results of NSDF commissioning and testing. These assessments will verify that the facility performance meets the design requirements and determine if any structural and system design improvement is required.

4.6 Fitness for Service

The fitness for service SCA covers the activities that impact the physical condition of structures, systems and components to ensure that they remain effective over time. This area includes programs that ensure all equipment is available to perform its intended design function when called upon to do so.

4.6.1 Discussion

CNL is required to manage the aging of structures, systems and components at the CRL site in accordance with requirements of the current CRL operating licence, LCH, and REGDOC-2.6.3, *Aging Management*. In addition, REGDOC-2.6.2, *Maintenance Programs for Nuclear Power Plants* provides guidance to CNL in relation to the maintenance of structures, systems and components.

In accordance with these requirements and guidance, CNL has implemented and maintained a fitness for service program to cover activities that impact on the physical condition of systems, components and structures to ensure that they remain effective over time.

CNSC staff assess CNL's performance in the fitness for service SCA through desktop reviews of documents and reportable events and also through the course of inspections. These compliance activities confirm that safety systems are being properly maintained and that CNL has appropriate measures to ensure equipment fitness for service at the CRL site.

Should the construction of the NSDF be approved by the Commission, CNSC staff will carry out inspections to make sure that equipment, systems and components (temporary or permanent) will be installed as per design and specifications, commissioned as per the commissioning plans and procedures, and adequately maintained to perform their design function and remain fully functional. In addition, CNL must demonstrate that the planning for moving to the operation phase is acceptable. As such, CNSC staff's review for this licence application focused on assessing whether adequate design considerations (such as maintainability) and preparatory work for readiness to move to operation have been undertaken to establish the required specific programs under the fitness for service SCA.

Based on CNSC staff's assessment of CNL's licence application and supporting documents for the construction of the NSDF, focused highlights are provided for the following specific areas:

- Maintenance

- Chemistry control
- Aging management

4.6.2 CNSC Staff Assessment

Maintenance

As part of ongoing compliance verification activities, CNSC staff have verified that the conduct of maintenance at the CRL site meets regulatory requirements.

CNSC staff verified that the NSDF design description and design requirements documents addressed the maintainability of components and systems. CNSC staff conducted a detailed review of the NSDF Operations and Maintenance (O&M) Plan [45, 46] and assessed that CNL's existing maintenance governance at the CRL site is adequate to support NSDF maintenance activities that will be carried out during the operation phase.

Should the Commission approve the construction of the NSDF, CNL will establish NSDF-specific maintenance manuals, to ensure that the relevant structures, systems and components can meet the design requirements during the operation of the NSDF.

Chemistry control

CNL has implemented a chemistry control program which monitors and analyzes chemistry parameters to demonstrate compliance with limiting conditions for operation of applicable facilities at the CRL site (e.g., NRU reactor systems, Molybdenum-99 Production Facility). Based on the performance of the chemistry control program, CNSC staff are satisfied that CNL has the appropriate oversight in place and continues to meet regulatory requirements for this specific area.

Based on the review of CNL's submission related to the NSDF design requirements and Waste Water Treatment Plant process design report [22], CNSC staff conclude that adequate consideration has been given in the process design, material selection and chemical treatment of the leachate resulting from the operation of the ECM.

Aging management

As part of inspections and reviews conducted by CNSC staff, CNSC staff have verified that CNL's aging managing program meets the requirements of REGDOC-2.6.3, *Aging Management* and has implemented effective aging management strategies for the CRL site. CNL has identified which SSCs may be run to failure with no added risk to health and safety of workers and the public, or the environment. The remaining SSCs fall under the aging management programs and continue to be monitored by CNL for obsolescence. Additionally, CNL continues to carry out activities related to replacing and modernizing aging infrastructure. Based on the performance of CNL's aging management program, CNSC staff are satisfied that CNL has the appropriate oversight in place and appropriate oversight in place and continues to meet regulatory requirements for this specific area

As a design requirement, the NSDF is required to have a process to detect, assess, and manage deterioration of safety-classified systems occurring as a result of aging effects such as irradiation, corrosion, erosion, fatigue, and other material degradation processes. Based on the review of NSDF design documents and CNL's consideration of applicable codes and standards, CNSC staff are satisfied that aging factors have been considered in the NSDF design. Should the Commission approve the construction of the NSDF, CNL will further address these requirements in future NSDF O&M manuals and generate an NSDF-specific aging management document, based on the application of the existing aging management program.

4.6.3 Regulatory Focus

CNSC staff will continue to monitor CNL's performance in the fitness for service SCA through regulatory oversight activities, including inspections, desktop reviews of compliance reports and relevant program documentation.

4.6.4 Conclusion

Based on CNSC staff's assessment of existing CNL governance documents and NSDF-specific design documents, CNSC staff are satisfied that CNL has adequately considered design elements related to fitness for service (such as maintainability) and carried out sufficient preparatory work for the establishment of required specific programs under the fitness for service SCA during the operation phase. CNSC staff conclude that CNL has met the appropriate fitness for service requirements for this licence application.

Should the Commission approve the construction of the NSDF, CNSC staff will conduct a more detailed assessment if CNL applies for a licence to operate the NSDF, to confirm that their commitments have been fulfilled and acceptable programs have been established.

4.7 Radiation Protection

The radiation protection SCA covers the implementation of a radiation protection program in accordance with the *Radiation Protection Regulations*. The program must ensure that contamination levels and radiation doses received by individuals are monitored, controlled and maintained ALARA.

4.7.1 Discussion

The *Radiation Protection Regulations* require licensees to implement a radiation protection program to keep exposures ALARA, taking social and economic factors into account, through the implementation of:

- management control over work practices
- personnel qualification and training
- control of occupational and public exposures to radiation
- planning for unusual situations

CNL has a corporate Radiation Protection (RP) program which meets the requirements of the *Radiation Protection Regulations*. The overall objective of this program is to control radiological hazards and occupational exposures to radiation, to report doses received by workers and to maintain radiation doses ALARA, social and economic factors taken into account.

Should the construction of the NSDF be approved by the Commission, and subsequently the operation of the NSDF be approved, CNL's corporate RP program would be applicable during the operation of the NSDF. While there are no radiological activities to be performed during the construction phase of the NSDF, CNL must demonstrate that the planning for RP moving to the operation phase is acceptable.

Based on CNSC staff's assessment of CNL's licence application and supporting documents for the construction of the NSDF, focused highlights are provided for the following specific areas:

- Application of ALARA
- Worker Dose Control
- Radiation protection program performance
- Radiological hazard control

4.7.2 CNSC Staff Assessment

Application of ALARA

CNL has a documented ALARA program which identifies the strategies and processes in place to control doses and minimize exposures to workers. This program integrates ALARA into design, planning, management and control of radiological activities, and is based on current industry best practices and operating experience. CNL's application of ALARA includes management commitment and oversight, personnel qualification and training, design analyses of facilities and systems, provision for protective equipment and clothing, and requirements for the conduct of ALARA assessments and reviews of radiological work activities.

For the NSDF site, CNL performed an ALARA assessment to identify and evaluate the expected and potential radiation hazards and exposures to workers from the operational activities, and to determine the methods to keep worker exposures ALARA. The ALARA assessment includes several aspects such as an evaluation of the design of the facility, the proposed radiation work activities during operation of the NSDF, the identification and assessment of the radiological hazards for routine radiation work activities, and the completion of an ALARA design and review questionnaire. CNSC staff reviewed the ALARA assessment and confirmed that it meets regulatory requirements.

Worker dose control

CNL has developed an RP plan, in accordance with CNL's RP program requirements, specific to the radiological work activities proposed for the NSDF. CNSC staff reviewed the RP plan and confirmed that it is consistent with CNL's RP program. The RP plan would ensure that measures are in place to control doses to workers at the NSDF. It includes aspects such as training and qualification of workers, access control, and the establishment of action levels to provide early warning of potential losses of control of the RP program.

Radiation protection program performance

CNL's RP program satisfies the requirements of the *Radiation Protection Regulations* and includes performance indicators such as action levels in order to continuously monitor the performance of the program.

CNL has established action levels¹ for effective dose, equivalent dose, internal exposure and skin exposure due to a skin contamination event. CNL reviews the action levels established for each of their sites at least once every five years in order to validate their effectiveness. If any of the action levels are reached or exceeded, CNL must notify the CNSC and conduct an investigation of the circumstances so that corrective actions can be taken. In addition, CNL assigns dose control points to Nuclear Energy Workers (NEWs) to manage doses ALARA. Dose control points reflect the dose that is reasonable for a worker to receive during a year and are reviewed annually by CNL. Exceeding a dose control point triggers a management review of the worker's activities to ensure doses are justified and ALARA. For the NSDF, CNL provided conservative dose estimates for NEWs assigned to carrying out work activities at the WWTP and those carrying out work activities at the ECM. The highest dose for a worker working at the WWTP is estimated at 5.2 mSv/y and the highest dose for a worker working at the ECM is estimated at 10.4 mSv/y. These operational doses are less than the occupational radiation exposures action levels for the CRL site, i.e., 20 mSv/y. Should the Commission approve the construction of the NSDF, CNL will review and revise the dose estimates once operating procedures for the NSDF are developed. CNSC staff will assess the revised dose estimates to confirm their validity.

Radiological hazard control

CNL's RP program ensures that adequate measures are in place to monitor and control radiological hazards. This includes, but is not limited to, contamination control, radiation dose rate control and airborne monitoring and control.

¹ According to the *Radiation Protection Regulations*, action levels are a specific dose of radiation or other parameter that, if reached, may indicate a loss of control of part of a licensee's radiation protection program and triggers a requirement for specific action to be taken

In accordance with CNL's RP program, contamination control measures implemented at the NSDF would ensure that contamination is prevented from leaving radiologically controlled areas, and that the spread of contamination within these areas is minimized. This would be achieved by:

- establishing radiological zones with prescribed contamination /dose rate limits and classifying areas according to their radiation hazard potential
- restricting site access to authorized personnel
- ensuring each radiological area is posted
- performing routine monitoring of workplaces for contamination and dose rate levels
- minimizing contamination levels
- applying dose rate limits and a means of handling and transferring for bulk and packaged waste
- applying surface contamination limits on the outer surfaces of each waste package and transportation container
- monitoring personnel and material prior to leaving contaminated or potentially contaminated areas

4.7.3 Regulatory Focus

CNSC staff will continue to monitor CNL's performance in the radiation protection SCA through regulatory oversight activities, including inspections, desktop reviews of compliance reports and relevant program documentation.

4.7.4 Conclusion

Based on CNSC staff's assessment of CNL's application and supporting documents specific to the NSDF and past performance at the CRL site, CNSC staff conclude that CNL continues to implement and maintain a radiation protection program in compliance with regulatory requirements.

CNSC staff have assessed CNL's documentation related to the radiation protection SCA submitted in support of the licence application for the NSDF and have found that it meets requirements. While there are no radiological activities to be performed during the construction phase of the NSDF, CNSC staff are satisfied that CNL has and will continue to adequately plan for RP moving to the operation phase.

Should the Commission approve the construction of the NSDF, further review will be undertaken by staff during the construction phase to verify CNL's readiness to move to the operation phase, such as the review of the dose estimates.

4.8 Conventional Health and Safety

The conventional health and safety SCA covers the implementation of a program to manage workplace safety hazards and protect workers.

4.8.1 Discussion

CNL is required by the *Class I Nuclear Facilities Regulations* to ensure measures, policies and procedures for safe operation and maintenance are in place.

In addition to the NSCA and its associated regulations, CNL's activities at the CRL site must comply with the *Canada Labour Code* and *Canada Occupational Health and Safety Regulations*, and other applicable federal and provincial health and safety acts and regulations. The Ministry of Employment, Workforce Development and Labour is mandated with overseeing and enforcing compliance with the Canada Labour Code and its regulations.

CNL has implemented and maintains a conventional health and safety program at the CRL site to manage workplace safety hazards and to protect personnel and equipment and meets regulatory requirements. Should the construction of the NSDF be approved by the Commission, CNL's existing conventional health and safety program would also pertain to the NSDF.

Based on CNSC staff's assessment of CNL's licence application and supporting documents for the construction of the NSDF, focused highlights are provided for the following specific areas:

- Performance
- Practices
- Awareness

4.8.2 CNSC Staff Assessment

Performance

The key performance indicators for conventional health and safety are the number of recordable lost-time injuries (RLTI) that occur per year, and the RLTI severity and frequency. An RLTI is defined as a workplace injury that results in the worker being unable to return to work for a period of time. RLTI severity and frequency provide context to the number of RLTIs. Severity quantifies the number of lost work days experienced per 100 employees, while frequency quantifies the number of lost-time injuries relative to the number of hours worked.

CNL is required to report all hazardous occurrences to Employment and Social Development Canada (ESDC). CNSC staff receive copies of these notifications as per the requirements of CNSC REGDOC-3.1.2.

In addition, data on RLTI, and RLTI frequency and severity at the CRL site is provided in CNL's Annual Compliance Monitoring Reports and reported by CNSC staff in annual Regulatory Oversight Reports. For comparison, CNL's reported RLTI frequency is lower than lost-time injury rates for comparable industries in Ontario like construction and manufacturing, as per Ontario Workplace Safety and Insurance Board data. CNSC staff consider this to be a conservative comparison because Ontario lost-time injury data includes only injuries for which compensation claims were allowed, rather than all reportable injuries, as is included in CNL data. As part of ongoing compliance verification activities, CNSC staff have verified that CNL is meeting regulatory requirements in reporting injuries.

Practices

CNL's occupational health and safety program applies to all work performed by CNL employees, and to work performed by others on sites and workplaces controlled by CNL. CNL applies its occupational health and safety program through:

- Providing technical and regulatory site-wide support to improve and strengthen the Program processes
- Conducting workplace inspections to identify and correct unsafe working/building conditions

The occupational health and safety program covers over 40 documented processes on the various aspects of conventional health and safety. Under this program, CNL conducts approximately 200 health and safety inspections every year (with the exception of 2020 due to the COVID pandemic, during which 90 inspections were carried out). The majority of findings are minor non-compliances with codes and standards or CNL governing documents. Several CNL self-assessments are conducted annually and actions resulting from the self-assessments are managed and tracked to completion through CNL's corrective actions program.

CNL's Improvement Action system is used by CNL to record all events, including injuries, at CNL sites. CNL's Improvement Action data is available to CNSC staff. As part of ongoing compliance verification activities, CNSC staff have verified and are satisfied with CNL's safety practices at the CRL site.

Awareness

CNL actively promotes conventional health and safety through the provision of information, training, instructions, and supervision of employees and contractors. Employees and contractors are encouraged to participate, and to report concerns (e.g., unsafe conditions, non-compliances, or events) in order to identify hazards and ensure measures are put in place to prevent injury and illness. CNL employees and contractors report safety concerns to CNL through Improvement Actions process as stated above.

CNSC staff have observed that CNL has improved aspects of the conventional health and safety program based on industry best practices and the results of internal focused audits, self-assessments, effectiveness reviews and health and safety inspections. The findings from these reviews, audits, inspections and self-assessments resulted in internal actions being raised to improve site wide health and safety performance. These internal actions focused on continuing to increase awareness of occupational hazards and the potential for injury to workers, as well as on methodologies to reduce the frequency of occurrence.

CNL conducts company-wide and site-wide Safety Stand Downs dedicated to raising safety awareness, building knowledge, strengthening work practices, and taking immediate action to address emergent safety issues.

CNL conducts numerous site health and safety inspections. The majority of the findings from these inspections are minor nonconformities with codes and standards as listed in the CRL LCH or with CNL governing documents. CNL tracks these issues through the Improvement Action system to address them, and remedial or corrective actions are taken as appropriate. CNL's Improvement Action data is available to CNSC staff. As part of ongoing compliance verification activities, including monitoring of Improvement Actions and the associated corrective actions taken, CNSC staff have verified and are satisfied with CNL's promotion of health and safety awareness at the CRL site.

4.8.3 Regulatory Focus

CNSC staff will continue to monitor CNL's performance in conventional health and safety SCA through regulatory oversight activities, including inspections, desktop reviews of compliance reports and relevant program documentation.

4.8.4 Conclusion

Based on CNSC staff's assessment of CNL's licence application and supporting documents for the construction of the NSDF and past performance at the CRL site, CNSC staff conclude that CNL continues to maintain and implement an effective conventional health and safety program in compliance with regulatory requirements. CNSC staff are satisfied that continued implementation of CNL's existing program elements are adequate to support the proposed construction of the NSDF.

Should the Commission approve the construction of the NSDF, CNSC staff will monitor that NSDF-specific activities meet the conventional health and safety requirements through the conduct of regular compliance verification activities.

4.9 Environmental Protection

The environmental protection SCA covers programs that identify, control and monitor all releases of nuclear (radiological) and hazardous substances and effects on the environment resulting from the NSDF.

4.9.1 Discussion

In order to meet regulatory requirements in this area, CNL must implement and maintain an environmental protection (EP) program in accordance with CNSC REGDOC-2.9.1, *Environmental Protection: Environmental Principles, Assessments and Protection Measures*, the CRL operating licence and LCH for facilities and activities conducted at the CRL site.

In conformity with these requirements, CNL implements and maintains an EP program to identify, control and monitor releases of nuclear and hazardous substances from CRL facilities into the environment ensuring protection of people and the environment.

CNSC staff assess CNL's performance of the EP SCA through desktop reviews of documents and reportable events and through the conduct of inspections. As a result of CNSC staff's ongoing compliance verification activities, CNSC staff are satisfied that CNL continues to maintain and implement an effective EP program at the CRL site that complies with applicable regulatory requirements. Should the construction of the NSDF be approved by the Commission, CNL's existing EP program at the CRL site would also pertain to the NSDF.

Based on CNSC staff's assessment of CNL's licence application and supporting documents for the construction of the NSDF, focused highlights are provided for the following specific areas:

- Effluent and emissions control (releases)
- Assessment and monitoring
- Environmental management system
- Protection of people
- Environmental risk assessment (ERA)

4.9.2 CNSC Staff Assessment

Effluent and Emissions Control (Releases)

In compliance with CSA N288.5, *Effluent monitoring programs at Class 1 nuclear facilities and uranium mines and mills*, CNL currently has implemented an Effluent Verification Monitoring Program (EVMP) to address compliance and effective monitoring for the releases from the CRL site.

To adequately prepare and plan for the operation phase, CNL has proposed an environmental protection plan for NSDF which includes a high level effluent monitoring program and committed to develop a detailed effluent monitoring program/plan for NSDF's WWTP [18] prior to its commissioning. CNSC staff have reviewed the NSDF-specific documentation and conclude that the information provided by CNL is sufficient and acceptable to support the proposed construction of the NSDF.

Should the Commission approve the construction of the NSDF, CNL will be required, in compliance with regulatory requirements, to integrate NSDF operational activities into the current CRL EVMP.

Assessment and Monitoring

In compliance with CSA N288.4, *Environmental monitoring programs at Class 1 nuclear facilities and uranium mines and mills*, CNL currently has implemented an Environmental Monitoring Program (EMP) at the CRL site. Should the Commission approve the construction of the NSDF, CNL will be required, in compliance with regulatory requirements, to integrate NSDF operational activities into the current CRL EMP.

CNL submitted an Environmental Protection Plan [47] as the framework for its Environmental Protection Program for the NSDF as well as a Dust Management Plan [48]. These plans apply to the construction and operation phases of the NSDF. Specifically, for the construction phase:

- CNL has developed the NSDF Dust Management Plan, which includes dust control measures and monitoring in alignment with its Environmental Protection Plan. CNL will apply water spray as a general dust control measure to unpaved roads, excavation areas, and work areas as needed to control dust during construction and operation. CNL will develop specific protocols for water or chemical application for dust control during construction and operational periods
- CNL will perform EA follow-up program activities as outlined in section 11 of the EA report appended to this CMD
- CNL has developed mitigation measures to limit predicted effects to aquatic habitat, the atmospheric environment, vegetation and terrestrial habitat, land and resource use, and surface water, geological and hydrogeological environment. Further details on the mitigation measures can be found in sections 6 and 7 of the EA report appended to this CMD
- CNL will provide the construction contractor environmental protection plan once the contractor has been chosen

Based on CNSC staff's assessment of this documentation, CNSC staff conclude that these plans meet the requirements for site construction activities and the proposed mitigation measures and monitoring activities are adequate to support NSDF construction activities. CNSC staff have reviewed and conclude that continued implementation of CNL's existing EP program and NSDF-specific Environmental Protection Plan and Dust Management Plan are sufficient and acceptable to support the proposed construction of the NSDF. Should the construction of the NSDF be approved by the Commission, CNL will modify the existing EP program at the CRL site in order for it to apply to the NSDF.

Environmental Management System (EMS)

The CNSC requires that licensees develop and maintain an EMS in order to provide a documented framework for integrated activities related to environmental protection. An EMS includes activities such as establishing annual environmental objectives, goals and targets. CNL has established its corporate level EMS that is part of the overall CNL Management System, which applies to all the CNL sites operated in Canada. CNL's EMS conforms to and the CRL site is registered to International Standards Organization (ISO) 14001:2015 Standard, *Environmental Management Systems – Requirements with Guidance for Use* [49].

As part of ongoing regulatory oversight at the CRL site, CNSC staff evaluate CNL's EMS to ensure compliance with regulatory requirements. CNSC staff are satisfied that CNL's current EMS is acceptable for the proposed construction activities at the NSDF. Should the Commission approve construction of the NSDF, the facility would also be subject to CNL's EMS.

Protection of People

This specific area within the environmental protection SCA is related to ensuring that people are not exposed to "unreasonable" risk with respect to hazardous substances discharged from nuclear facilities, and that the radiation dose received by a member of the public from radionuclides does not exceed the regulatory annual public dose limit of 1 mSv/year.

Based on the information provided by CNL, CNSC staff have assessed that the NSDF construction phase is expected to result in no releases of nuclear substances and negligible releases of hazardous substances to the environment.

The proposed location of the NSDF is in an undisturbed area of the CRL site and CNL sampling of trees and surface soil has not detected nuclear substances above background levels at this location. As such, CNSC staff conclude that there is no radiological or hazardous exposure risk to people from NSDF during the construction phase.

Environmental Risk Assessment

CNSC staff have conducted a comprehensive review of the environmental risks in support of the NSDF EA and licence application. The environmental risks consider potential interactions of the proposed facility with the environment and their predicted effects during the pre-closure phases of the project, including construction. CNSC staff confirmed that the assessment of environmental risks meets the requirements of CSA Standard N288.6-12, *Environmental Risk Assessments at Class I Nuclear Facilities and Uranium Mines and Mills*. The results of CNSC staff's review demonstrated protection of the environment throughout the lifecycle of the project. Should the Commission approve the construction of the NSDF, then the facility will be incorporated into the CRL site-wide Environmental Risk Assessment that is required to be reviewed every five years, or more often if there is a change in operations or scientific knowledge, in accordance with the LCH.

4.9.3 Regulatory Focus

CNSC staff will continue to monitor CNL's performance in the EP SCA through regulatory oversight activities, including inspections, desktop reviews of compliance reports and relevant program documentation. In addition, CNSC staff will track implementation of the EA commitments as described in sections 1.2.3 and 6.6 of the CMD.

4.9.4 Conclusion

Based on CNSC staff's assessment of CNL's licence application and supporting documents for the construction of the NSDF and CRL's performance (past and present), CNSC staff conclude that CNL continues to implement and maintain an effective environmental protection program at the CRL site in compliance with regulatory requirements. CNSC staff are satisfied that continued implementation of CNL's existing program elements and NSDF-specific plans, activities and measures (e.g., Dust Management Plan) are sufficient and acceptable to support the proposed construction of the NSDF.

CNSC staff have assessed CNL's documentation related to the EP SCA submitted in support of the licence application for the NSDF and have found that it meets requirements. While the NSDF construction phase is expected to result in no releases of nuclear substances and negligible releases of hazardous substances to the environment, CNSC staff are satisfied that CNL has and will continue to adequately plan environmental protection elements moving to the operation phase.

Should the Commission approve the construction of the NSDF, CNSC staff will continue its regulatory oversight during the construction phase (with the main focus on the WWTP construction and the Dust Management Plan) to verify CNL's readiness in moving to the operation phase, and to ensure that NSDF-specific activities/operations continue to be in compliance with the regulatory requirements.

4.10 Emergency Management and Fire Protection

The emergency management and fire protection SCA covers emergency plans and emergency preparedness programs that exist for emergencies and for non-routine conditions. This area also includes any results of participation in exercises.

4.10.1 Discussion

CNL is required to implement and maintain an emergency preparedness program in accordance with the current CRL site Operating Licence, LCH, and REGDOC 2.10.1: *Nuclear Emergency Preparedness and Responses*, Version 2, 2016.

Licensees are required to have an emergency preparedness program to prepare for, respond to, and recover from the effects of accidental radiological/nuclear and/or hazardous substance release.

CNL must also implement and maintain a fire protection program that meets the requirements of CSA standard N393: *Fire protection for facilities that process, handle, or store nuclear Substances* [50] and the National Fire Code of Canada. CNL is required to have a comprehensive fire protection program to ensure that licensed activities do not result in unreasonable risk to the health and safety of persons and to the environment due to fire and to ensure that CNL is able to efficiently and effectively respond to emergency fire situations.

CNL has implemented and maintains emergency management and fire protection programs at the CRL site that meet regulatory requirements. Should the construction of the NSDF be approved by the Commission, CNL's existing emergency management and fire protection programs would also apply to the NSDF.

Based on CNSC staff's assessment of CNL's licence application and supporting documents for the construction of the NSDF, focused highlights are provided for the following specific areas:

- Conventional emergency preparedness and response
- Nuclear emergency preparedness and response
- Fire emergency preparedness and response

4.10.2 CNSC Staff Assessment

Conventional emergency preparedness and response

At the CRL site, CNL continues to maintain effective conventional emergency response programs. Emergency response personnel are available on site 24 hours a day to respond to any type of emergency. Training and equipment continue to be maintained for medical response, hazardous materials and other conventional hazards that may be present. Based on ongoing compliance verification activities, CNSC staff are satisfied that CNL's conventional emergency response programs meet regulatory requirements and is performing satisfactorily with respect to conventional emergency response.

Nuclear emergency preparedness and response

Emergency preparedness at the CRL site is governed by the CNL document CRL-508730-ERP-001, *Chalk River Laboratories Site Emergency Response Plan*. The CRL Site Emergency Response Plan deals with emergency situations involving releases of radioactive materials that endanger the safety of onsite staff, the environment and the public, and outlines the interfaces for coordinating off-site activities and cooperating with external response organizations throughout all phases of an emergency. To evaluate emergency preparedness, CNSC staff have assessed CNL's site emergency response plan as well as the results of emergency exercises. Based on ongoing compliance verification activities, CNSC staff are satisfied that CNL continues to meet regulatory requirements and is performing satisfactorily with respect to emergency response. In addition, CNSC staff confirm that the NSDF can be incorporated into the established emergency response program. CNL's emergency nuclear program was previously developed for a nuclear reactor with potential for significant off-site consequences. CNL's emergency nuclear response capability remains in service with nuclear response personnel, equipment, training and resources to respond to a site nuclear emergency. These nuclear emergency resources continue to be available to be able to respond to any potential NSDF emergencies.

Should the Commission approve construction of the NSDF, CNL will be required to develop plans and procedures specific to the NSDF, which CNSC staff will assess. This will include plans and procedures regarding:

- Spill Response
- Contingency Plan for Non-Routine Operations and Emergency Response
- Emergency Response
- Fire Response

During the construction phase of the NSDF, the construction contractor will be required to prepare and submit to CNL for acceptance, an emergency response plan that is compliant with CNL's emergency procedures.

Fire emergency preparedness and response

At the CRL site, CNL's fire emergency preparedness and response program identifies how protection from fire is achieved through planned, coordinated and controlled activities to reduce risk to the health and safety of persons and to the environment from a fire. The CNL Industrial Fire Brigade provides emergency response services to the entire CRL site for fire, hazmat and medical response. Based on ongoing compliance verification activities, CNSC staff are satisfied that CNL continues to meet regulatory requirements and is performing satisfactorily with respect to fire emergency preparedness and response.

In addition, CNSC staff confirm that the NSDF can be incorporated into the established CRL site fire program. CNL's Industrial Fire Brigade has the equipment, training and resources to incorporate emergency response to fires, spills and accidents at the NSDF. Should the Commission approve construction of the NSDF, CNL will be required to develop plans and procedures specific to the NSDF, which CNSC staff will assess.

Specific to the NSDF, CNL carried out a third-party review of the NSDF Fire Hazard Analysis and code compliance review in accordance with CSA standard N393, *Fire protection for facilities that process, handle, or store nuclear Substances* as well as key standards such as the NBCC, National Fire Code of Canada and associated National Fire Protection Associations standards. CNSC staff have assessed and determined that the NSDF fire hazard analysis complies with the programmatic and operational requirements of the applicable standards.

4.10.3 Regulatory Focus

CNSC staff will continue to monitor CNL's performance in emergency management and fire protection SCA through regulatory oversight activities, including inspections, desktop reviews of compliance reports and relevant program documentation.

4.10.4 Conclusion

Based on CNSC staff's assessment of CNL's licence application and supporting documents for the construction of the NSDF and past performance at the CRL site, CNSC staff conclude that CNL continues to maintain and implement effective emergency management and fire protection programs in compliance with regulatory requirements. CNSC staff are satisfied that potential emergencies at the NSDF facility can be successfully incorporated into CNL's existing emergency management and fire protection programs. Should the Commission approve the construction of the NSDF, CNL will be required to develop a set of NSDF specific emergency response procedures. During the construction phase, CNSC staff will evaluate the specific NSDF emergency response plans and procedures to ensure they meet regulatory requirements. CNSC staff will also verify that NSDF-specific activities meet emergency management and fire protection requirements through the conduct of regular compliance verification activities.

4.11 Waste Management

The waste management SCA covers internal waste-related programs that form part of the facility's operations up to the point where the waste is removed from the facility to a separate waste management facility. This area also covers the planning for decommissioning.

4.11.1 Discussion

In order to meet regulatory requirements in this area, CNL must implement and maintain a waste management program and a decommissioning plan in accordance with the GNSCRs, and the CRL licence and LCH for facilities and activities conducted at the CRL site, specifically, for the proposed NSDF.

CNL submitted the waste management program and the proposed plan for closure of the NSDF including the decommissioning of ancillary facilities with its application to construct the facility, as required by the *Class I Nuclear Facilities Regulations*.

Based on CNSC staff's assessment of CNL's licence application, supporting documents for the construction of the NSDF, and proposed decommissioning plan, focused highlights are provided for the following specific areas:

- Waste Minimization
- Waste Characterization
- Waste Management Practices
- Decommissioning Plans

Given the NSDF is a proposed waste disposal facility, CNSC staff's assessment in the following subsections addresses the management of wastes throughout the facility lifecycle, including wastes resulting from construction, operation and decommissioning activities. CNSC staff's assessment of the licence application for the construction of the NSDF and supporting documentation considered the operation and decommissioning phases, given that Class I facilities must plan for decommissioning throughout the lifecycle of the facility, including at the construction phase.

4.11.2 CNSC Staff Assessment

Waste Management

CNL implements and maintains a waste management program to safely manage wastes as a result of CNL's licensed activities, including the decommissioning of its facilities, at the CRL site. The waste management program ensures the safe management of low, intermediate and high-level radioactive wastes, and hazardous wastes. Of note, the proposed NSDF will accept only solid low-level waste.

CNL provided a waste management plan for the NSDF [51] that describes the management of wastes generated during site preparation, construction, operation, and decommissioning (or closure) of the ECM, the WWTP and equalization tanks, support facilities (such as a vehicle decontamination facility) and site infrastructure. CNSC staff's assessment of the plan determined that the waste would be managed in accordance with the existing CNL waste management program requirements, applicable regulatory requirements (CSA Group standards N292.0-14, *General principles for the management of radioactive waste and irradiated fuel* and N292.3-14, *Management of low- and intermediate-level radioactive waste*) and industry good practice.

The proposed NSDF location is in a non-disturbed forested area and construction activities are not expected to generate radioactive, mixed or hazardous wastes. In case radioactive, mixed or hazardous wastes are found, CNL will, in accordance with the existing program and procedures, take the adequate actions to halt the work, remove the contamination, address the situation, clean the area and evaluate management (including disposal) options.

CNL will verify and characterize as necessary any radioactive wastes that might be generated during operation, to confirm that the waste meets the NSDF waste acceptance criteria prior to its disposal in the ECM. Wastes that might not meet or comply with the NSDF waste acceptance criteria would be temporarily stored in a separate and controlled area for subsequent management and dispositioning in accordance with existing waste management procedures. Only waste that can be demonstrated to meet the waste acceptance criteria will be placed into the NSDF.

Waste Minimization

Waste minimization activities at the CRL site are currently carried out in accordance with the existing CNL waste management program. Likely contaminated or known contaminated low-level radioactive or hazardous waste is sorted and segregated from clearable/likely clean waste. If radioactive contamination is found, CNL would perform cleanup or decontamination operations by following the appropriate NSDF and CRL site procedures, to minimize the amount of contaminated radioactive waste requiring further management. Based on CNSC staff's review of CNL's waste management program and CNL's past performance in waste minimization, CNSC staff are satisfied with the measures in place for waste minimization during the different lifecycle stages of the NSDF.

Waste Characterization

Based on CNSC staff's review of CNL's waste management program and CNL's past performance in waste characterization, CNSC staff are satisfied with the measures in place for waste characterization of the wastes generated and managed during the different lifecycle phases of the NSDF.

Wastes generated from construction, operation and decommissioning

Wastes resulting from the construction of the NSDF are expected to be clearable/likely clean. CNL may perform a verification process to ensure that it is indeed clean. Low-level waste generated during operation activities will be subject to gross alpha and gross beta/gamma screening before their transfer to the WWTP for treatment or to the ECM for disposal. As part of the CRL site environmental protection program, CNL will screen treated wastewater from the WWTP and the leachate collection/processing and maintenance operations for metals and/or chemical constituents prior discharging it to the environment. Waste generated from NSDF decommissioning activities would be screened for contamination in accordance with the detailed decommissioning plan and managed accordingly. Waste generated from decommissioning of the NSDF-associated facilities are not proposed to be placed in the ECM.

Waste accepted for emplacement in the ECM

CNL proposes to use the NSDF to dispose of waste currently in storage at the CRL waste management facilities, waste arising from building decommissioning and environmental remediation activities, ongoing laboratory operations, and commercial sources. Waste accepted in the NSDF shall comply with the facility waste acceptance criteria (WAC). In the past, waste characterization activities at the CRL site were carried out primarily for the safe storage of waste, but not contemplated nor directed by a disposal end objective. Legacy waste characteristics data (physical, mechanical, chemical, biological, thermal, and/or radiological) currently available are not sufficient to demonstrate compliance with the NSDF WAC. Therefore, CNSC staff conducted a waste characterization compliance inspection on NSDF in late September 2017 to verify how waste proposed to be emplace in the NSDF is being characterized. The inspection covered the waste characterization program, process and procedures in place and improvements to further foster the program and focused particularly on provisions and requirements applied to the different NSDF waste streams. One of the main findings and the associated action was that for all waste intended to be emplaced in the NSDF, CNL shall re-characterize waste for which the collected characterization data is not sufficient to ensure compliance with the NSDF WAC. CNSC staff issued 6 action notices and 12 recommendations from this inspection [52]. CNL responded to the inspection actions to the satisfaction of CNSC staff, and CNSC staff have closed all actions from this inspection [53].

Waste Management Practices

CNSC staff assess CNL's management of radioactive wastes through desktop reviews of documents and reportable events and through the conduct of inspections. As a result of CNSC staff's ongoing compliance verification activities, CNSC staff are satisfied that CNL continues to implement and maintain effective programs to safely manage radioactive and hazardous wastes at the CRL site, including at the proposed NSDF.

CNSC staff assessment of CNL's waste management program, processes and procedures, and NSDF-specific documentation, concludes that CNL considers waste segregation, waste minimization, and the associated operating practices, through the use of approved engineered principles and practices, and CNL's internal work permit and engineering change control processes. CNL continues to develop processes and equipment and enabling facilities such as the waste characterization facility, the sort and segregate facility to support waste segregation and characterization for NSDF or other disposal/storage routes.

Decommissioning Plans

In accordance with paragraph 3(k) of the *Class I Nuclear Facilities Regulations*, CNL is required to maintain a decommissioning plan throughout the life of the NSDF. CNSC staff have assessed the Preliminary Decommissioning Plan (PDP) for the NSDF [54] and conclude that it is in compliance with CSA Group standard N294-09, *Decommissioning of facilities containing nuclear substances* and CNSC guidance document G-219, *Decommissioning Planning for Licensed Activities*.

4.11.3 Regulatory Focus

CNSC staff will continue to monitor CNL's performance in the waste management SCA through regulatory oversight activities, including inspections, desktop reviews of compliance reports and relevant program documentation.

4.11.4 Conclusion

Based on CNSC staff's assessment of CNL's application, supporting documents and past performance, CNSC staff conclude that CNL continues to implement and maintain an effective waste management program in compliance with regulatory requirements, and international and industry best practice associated with waste characterization, waste minimization and waste management practices. CNL's existing waste management program is adequate to support the proposed construction of the NSDF.

Should the Commission approve the construction of the NSDF, CNL will update the NSDF waste management plan and the preliminary decommissioning plan as per the applicable regulatory requirements to reflect further information on waste streams generated and projected future waste generation as they become available. Reviews of these plans will be undertaken by staff during the construction phase to verify readiness to move to the operation phase.

In addition, CNSC staff will continue to verify, monitor and evaluate CNL's compliance with regulatory requirements through compliance oversight of the NSDF waste management and decommissioning plans and procedures, with a focus on the ongoing waste characterization program. CNSC staff inspections will cover all waste streams (legacy waste, facilities decommissioning, operational wastes, and environmental remediation). Actual waste characterization information will support confidence in the waste inventory, the source term, validate the post closure safety assessment assumptions and the facility safety case, to ensure that the waste identified to be emplaced in the ECM complies with the facility WAC.

4.12 Security

The Security SCA covers the programs required to implement and support the security requirements stipulated in the regulations, the licence, orders, or expectations for the facility or activity. The programs also ensure that all workers are instructed on the facility security program at the CRL site.

4.12.1 Discussion

In order to meet regulatory requirements in this area, CNL must implement and maintain a security program in accordance with the GNSCR, the *Nuclear Security Regulations*, REGDOC-2.12.3, *Security of Nuclear Substances: Sealed Sources and Category I, II and III Nuclear Material*, the CRL Operating Licence and LCH for facilities and activities conducted at the CRL site.

In conformity with these requirements, CNL implements and maintains security systems and devices as required at the CRL site. Specific details on the measures implemented by CNL to meet the requirements of this SCA are considered prescribed information.

Based on CNSC staff's assessment of CNL's licence application and supporting documents for the construction of the NSDF, focused highlights are provided for the following specific areas:

- Facilities and equipment
- Response arrangements
- Security practices
- Drills and exercises
- Cybersecurity

4.12.2 CNSC Staff Assessment

CNSC staff assess CNL's performance in the security SCA through desktop reviews of documents and reportable events and also through the course of inspections. As part of CNSC staff's ongoing compliance verification activities, CNSC staff are satisfied that all security systems and devices required have been implemented and maintained at the CRL site. Specific details on the measures implemented by the applicant to meet the requirements of each specific area are considered prescribed information as identified in section 21 of the GNSCR. CNL has submitted program documentation that adequately identifies how the applicant meets CNSC expectations for all five specific areas. This documentation has been reviewed by CNSC staff and has been accepted as satisfactorily meeting the requirements of the GNSCR.

Specific to the NSDF Project, CNL submitted a Site Security Proposal [55] to the CNSC. This proposal was reviewed by CNSC staff and assessed as meeting the necessary regulatory requirements [56].

Facilities and Equipment

CNL has submitted an acceptable application that provides sufficient details on NSDF's security systems and devices for the facility and the areas that would involve the storage of nuclear substances. In addition, CNL has identified processes for testing and maintaining the security devices and assessment and detection systems.

Response Arrangements

CNL continuously monitors alarm detection and assessment systems. CNL has established a response protocol with local law enforcement to ensure response of armed police officers in a timely manner, should a security related incident at the NSDF occur.

Security Practices

CNSC staff assessed CNL NSDF's implementation of the physical protection program from the access control perspective. Measures for controlling access to persons and vehicles were assessed as being satisfactory. Furthermore, security measures for controlling access to and from areas where nuclear substances are stored are also satisfactory. The facility's physical protection program includes administrative and technical measures that meet current CNSC regulatory requirements for nuclear security.

Drills and Exercises

CNL presently conducts security drills and exercises under the CRL operating licence. The conduct of drills and exercises for security would not be a regulatory requirement applicable to NSDF during the construction phase, as there is no nuclear material involved during this phase.

Cybersecurity

CNL has implemented a cyber security program [57] in accordance with CSA N290.7-14 which is in the CRL LCH. As part of the review of the NSDF SAR [25], CNL confirmed that they are performing a cybersecurity risk assessment as per their cyber security program.

4.12.3 Regulatory Focus

CNSC staff will continue to monitor CNL's performance for the security SCA through regulatory oversight activities, including on-site inspections and technical assessments of relevant program documentation.

4.12.4 Conclusion

Based on CNSC staff's assessment of CNL's licence application for the NSDF, supporting documents and past performance at the CRL site, CNSC staff conclude that the existing CRL site security program and NSDF-specific programs and documents are adequate to properly carry out the proposed NSDF construction activities in accordance with security requirements.

Should the Commission approve the construction of the NSDF, CNSC staff will monitor that NSDF-specific activities meet security requirements through the conduct of regular compliance verification activities.

4.13 Safeguards and Non-Proliferation

The safeguards and non-proliferation SCA covers the programs and activities required for the successful implementation of the obligations arising from the Canada/IAEA safeguards agreements as well as other measures arising from the *Treaty on the Non-Proliferation of Nuclear Weapons* (NPT). This SCA comprises a safeguards program and a non-proliferation program.

4.13.1 Discussion

CNL is required to have an effective safeguards program that conforms to measures required by the CNSC to meet Canada's international safeguards obligations as well as other measures arising from the *Treaty on the Non-Proliferation of Nuclear Weapons*.

The CNSC regulatory mandate includes ensuring conformity with measures required to implement Canada's international obligations on the peaceful uses of nuclear energy. Pursuant to the *Treaty on the Non-Proliferation of Nuclear Weapons*, Canada has entered into a Comprehensive Safeguards Agreement and Additional Protocol with the IAEA (hereafter, the safeguards agreements). The objective of the Canada/IAEA safeguards agreements is for the IAEA to provide annual assurance to Canada and to the international community that all declared nuclear material is in peaceful, non-explosive uses and that there is no indication of undeclared material.

The CNSC provides the mechanism, through the *Nuclear Safety and Control Act*, regulations and a licence condition, for the IAEA to implement the safeguards agreements. The CRL operating licence and LCH contain conditions for the application of IAEA safeguards and the criteria in order to meet the conditions.

CNSC staff assess CNL's performance in the safeguards and non-proliferation SCA through desktop reviews of documents and reportable events and also through the course of inspections. As part of CNSC staff's ongoing compliance verification activities, CNSC staff are satisfied that CNL continues to maintain and implement effective safeguards and non-proliferation programs at the CRL site that are required by the CNSC to meet Canada's international obligations and commitments arising from the NPT.

Based on CNSC staff's assessment of CNL's licence application and supporting documents for the construction of the NSDF, focused highlights are provided for the following specific areas:

- Access and Assistance to the IAEA
- Operational and Design Information

4.13.2 CNSC Staff Assessment

Access and Assistance to the IAEA

No inventory currently subject to safeguards is intended to be emplaced in the NSDF ECM. While there is no inventory under safeguards, CNL is expected to provide access and assistance to the IAEA, and the CNSC, in the event that the IAEA requests to perform further Complementary Access activities. The IAEA performed a complementary access activity on October 20, 2021. At that time, the IAEA sought and has been provided further information on CNL's process to characterize and verify wastes prior to emplacement in the NSDF.

Operational and Design Information

CNSC staff confirm that CNL has provided specific information on the design and operation of facilities at the CRL site to CNSC staff that are acceptable and meet regulatory requirements.

4.13.3 Regulatory Focus

CNSC staff will continue to monitor CNL's performance in this SCA through participation in IAEA field activities, evaluations independent of the IAEA, and ongoing assessments of compliance with the various reporting and access requirements.

4.13.4 Conclusion

Based on CNSC staff's assessment of CNL's application, supporting documents and past performance at the CRL site, CNSC staff conclude that CNL continues to implement and maintain an effective safeguards and non-proliferation program in accordance with regulatory requirements.

No inventory currently subject to safeguards is intended to be emplaced in the NSDF. Should the Commission approve the construction of the NSDF, CNL is expected, during the construction period, to continue to provide the IAEA and the CNSC operational and design information specific to the NSDF. CNL is also expected to provide access and assistance to the IAEA, and the CNSC, in the event that the IAEA requests to perform a Complementary Access activity.

4.14 Packaging and Transport

The packaging and transport SCA covers programs for the safe packaging and transport of nuclear substances to and from the licensed facility.

4.14.1 Discussion

Packaging and transport requirements apply to programs for the safe packaging and transport of nuclear substances and radiation devices to and from the CRL site, these requirements do not apply to movements of radioactive materials within the CRL site, and are not applicable to NSDF construction activities. Given CNL's licence application is limited to the construction of the NSDF and does not include activities to transport off-site waste to the CRL site for emplacement in the NSDF, this SCA was not assessed for this licensing stage.

However, for transparency, CNSC staff have provided information in this section on the packaging and transport requirements and measures in place for the movement of solid low-level radioactive waste into the NSDF.

In order to meet regulatory requirements in this area, CNL must implement and maintain a packaging and transport program in accordance with the *Packaging and Transport of Nuclear Substances Regulations, 2015* (PTNSR) and the *Transportation of Dangerous Goods Regulations* (TDGR).

In conformity with these requirements, CNL has developed and implemented a packaging and transport program to ensure compliance with the PTNSR and TDGR. This program covers elements of package design, package maintenance, and the registration for use of certified packages as required by the regulations.

CNSC staff assess CNL's performance in the packaging and transport SCA through desktop reviews of documents and reportable events and by conducting inspections. As a result of CNSC staff's ongoing compliance oversight, CNSC staff are satisfied that CNL has performed packaging and transport activities related to the CRL site in compliance with the licensing basis. CNSC staff conclude that CNL's program and performance in this SCA remain satisfactory.

In particular, CNL (and previously AECL) has been transporting wastes for over 50 years without any safety significant incident. CNL continues to carry out the transport of radioactive wastes in a safe manner through the implementation of a packaging and transport program that complies with the applicable Canadian regulatory requirements and best industry practices. Although the requirements of the PTNSR and TDGR do not apply to on-site movements of radioactive materials, CNL ensures an equivalent level of safety as is required for off-site transportation to protect the health and safety of workers, the public, and the environment.

Should the Commission approve the construction of the NSDF, CNSC staff will monitor CNL's performance over the licensing period to ensure that CNL continues to meet packaging and transport requirements, as part of ongoing compliance oversight at the CRL site.

5. INDIGENOUS CONSULTATION AND ENGAGEMENT

5.1 CNL's Indigenous Engagement Activities

5.1.1 Discussion

CNSC's REGDOC-3.2.2 *Indigenous Engagement*, sets out requirements and guidance for licensees whose proposed projects may raise the Crown's duty to consult. While the CNSC cannot delegate its obligation, it can delegate procedural aspects of the consultation process to licensees, where appropriate. The information collected and measures proposed by licensees to avoid, mitigate, or offset potential adverse impacts from the proposed NSDF Project may be used in the CNSC meetings its consultation obligations.

CNSC staff have determined that REGDOC-3.2.2 applies because the NSDF Project proposes a new permanent low-level radioactive waste disposal facility in an area of importance for many Indigenous Nations and communities. In accordance with REGDOC-3.2.2, early in the regulatory review process for the NSDF Project, CNL prepared a preliminary Indigenous Engagement Report, which includes a list of Indigenous Nations and communities identified for engagement, a summary of any Indigenous engagement activities conducted to date, and a description of planned Indigenous engagement activities. CNL provided a detailed summary of its engagement activities in the NSDF EIS. In addition, CNL is required to provide a revised Indigenous Engagement Report as part of its CMD submission to the Commission.

5.1.2 Conclusion

CNSC staff are satisfied with CNL's approach to Indigenous engagement in relation to the NSDF Project, which is in accordance with the requirements and guidance of REGDOC-3.2.2. CNL has met the requirements set out in REGDOC-3.2.2 pertaining to Indigenous engagement. CNL has meaningfully engaged with the identified Indigenous Nations and communities throughout the regulatory review process and has worked to collaborate with each Indigenous Nation and community to address their questions and concerns. CNSC staff's assessment of CNL's Indigenous engagement activities is provided in detail in section 9.2.2 of the EA report.

CNSC staff encourage CNL to continue to engage with interested Indigenous peoples on the broader CRL site and other ongoing activities of interest. Should the Commission approve construction of the NSDF, CNSC staff anticipate that CNL will continue to work with the identified Indigenous Nations and communities on an ongoing basis to ensure that CNL continues to build relationships, provide regular updates on the NSDF Project, and address any concerns by implementing all related commitments and measures as outlined in CNL's commitments report [58]. CNSC staff will continue to monitor CNL's engagement activities and implementation of all regulatory commitments outlined in CNL's commitments report, including the meaningful involvement of interested Indigenous peoples in follow-up and monitoring programs for the NSDF Project.

5.2 CNSC Staff Consultation and Engagement Activities

The CNSC is committed to meaningful engagement and consultation with Indigenous Nations and communities that have an interest in CNSC regulated facilities and activities. The CNSC ensures that its licensing decisions under the NSCA and EA decisions under the CEAA 2012 uphold the honour of the Crown and consider Indigenous peoples' potential or established Indigenous and/or treaty rights pursuant to section 35 of the *Constitution Act, 1982*.

5.2.1 Discussion

This section of the CMD summarizes the Indigenous consultation and engagement activities conducted by CNSC staff in relation to the regulatory process for the NSDF Project. Details of CNSC staff's Indigenous consultation and engagement activities, as well as an assessment of potential impacts on Indigenous and/or treaty rights are provided in section 9.2.1 of the EA report.

CNSC staff have identified the First Nation and Métis peoples who may have an interest in and/or could potentially be impacted by the proposed NSDF Project.

These Nations and communities are the Anishinabek Nation, Algonquin Anishinabeg Nation Tribal Council, Kebaowek First Nation, Kitigan Zibi Anishinabeg First Nation, Algonquins of Ontario (AOO), Algonquins of Pikwakanagan First Nation (AOPFN), Algonquin Nation Secretariat, Métis Nation of Ontario (MNO), Alderville First Nation, Beausoleil First Nation, Chippewas of Georgina Island, Chippewas of Mnjikaning, Curve Lake First Nation, Hiawatha First Nation, and Mississaugas of Scugog Island First Nation.

These Indigenous Nations and communities were identified due to the proximity of their communities, treaty areas and/or unceded traditional territories to the proposed NSDF Project's location, or due to previously expressing interest in being kept informed of CNSC licensed activities occurring in or proximal to their territories.

Throughout the CNSC's regulatory review process, CNSC staff have corresponded and met with all identified Indigenous Nations and communities to discuss the review process, seek comments and feedback and respond to any concerns raised with respect to the NSDF Project's potential impacts on their Indigenous and/or treaty rights.

Starting in 2016, CNSC staff sent letters to the identified Indigenous Nations and communities to notify them of the proposed NSDF Project and requested their comments on CNL's NSDF Project Description. CNSC staff also notified them by letter and phone call of the availability of participant funding to facilitate their review of CNL's draft EIS and participate in the EA and licensing regulatory processes.

In spring 2017, CNSC staff sent letters to all identified Indigenous Nations and communities informing them of the review and comment period of the draft EIS, and then conducted follow-up emails and phone calls.

Throughout 2018, the draft EIS was revised by CNL. While CNSC staff did not conduct NSDF-specific engagement activities during that time, CNSC staff continued to share information with Indigenous Nations and communities via letters, emails and phone calls, including updates on the EA and licensing regulatory processes including consultation opportunities.

In March 2019, CNSC staff informed all identified Indigenous Nations and communities of the availability of the second phase of funding through the Participant Funding Program (PFP) for the remaining steps of the regulatory processes, including the review of the CNSC's EA report, licensing CMD and participation in the Commission hearing process.

In 2020, CNSC staff, in collaboration with each Indigenous Nation and community listed above, adjusted the process for consultation and engagement by shifting to virtual meetings, increasing email correspondence and adjusting process timelines and requests as appropriate due to the COVID-19 pandemic. CNSC staff were able to successfully maintain relationships, information sharing, regular contact and collaboration with all identified Indigenous Nations and communities who are engaged in the process.

In June 2020, CNSC staff sent letters to all identified Indigenous Nations and communities to provide an update on the NSDF Project's EA and licensing regulatory processes as well as a recommended consultation approach for the remaining steps in the processes. CNSC staff worked with the AOPFN and the MNO to negotiate Terms of References for the EA and licensing regulatory processes for the NSDF Project. The agreement with the MNO was signed in late 2020 and the agreement with AOPFN was signed in early 2021.

CNSC staff worked with the AOO, the AOPFN and the MNO to collaboratively develop Rights Impact Assessments and sections of the Environmental Assessment Report. CNSC staff supported the gathering of Indigenous Knowledge and Land Use information specific to the NSDF Project through multiple large scale studies for the AOO, the AOPFN and the MNO, funded through the PFP. CNSC staff offered a similar approach to the Algonquin Anishinabeg Nation Tribal Council, Kebaowek First Nation and Kitigan Zibi Anishinabeg; however CNSC staff have not as yet received a response with their interest in collaborating with the CNSC on these initiatives and consultation processes to date.

CNSC staff have worked to keep all seven Williams Treaties First Nations informed and up to date on the project and regulatory review processes. To date, Curve Lake First Nation and Hiawatha First Nation have expressed the most interest in the NSDF Project. CNSC staff have worked closely with both of these First Nations to understand and address their concerns with respect to the NSDF Project and continue to keep them aware of the EA and licensing regulatory processes via ongoing meetings and information updates.

In early 2021, CNSC staff sent each identified Indigenous Nation and community summaries of the issues and concerns raised by throughout the EA and licensing regulatory processes for their review and comment. Some Indigenous Nations and communities raised specific concerns relating to potential impacts on their Indigenous and/or treaty rights. These concerns are related to effects on species used in the exercise of their rights, such as fish, wildlife and plants, effects on changes to access of areas where their rights are practiced, and impacts to important cultural sites such as Pointe au Baptême and the Kichi-Sibi (Ottawa River). All of the identified Indigenous Nations and communities raised concerns with respect to the broader CRL site's impacts on their Indigenous and/or treaty rights. These concerns were noted by CNSC staff. However, CNSC staff clarified that these concerns are outside of the scope of the EA and licensing regulatory processes in relation to the NSDF Project. Further information regarding concerns raised and how they have been addressed by CNL and CNSC staff is provided in section 9 of the EA report. CNSC staff ensured that all concerns raised were considered in the EA and licensing regulatory review processes and that appropriate mitigation, follow-up and monitoring programs or measures were proposed to minimize potential impacts on Indigenous and/or treaty rights.

All identified Indigenous Nations and communities have been encouraged to participate in the EA and licensing regulatory processes and in the public hearing process to advise the Commission directly of any concerns they may have in relation to the NSDF Project. A complete description of CNSC staff's consultation process with each identified Indigenous Nation and community is provided in section 9.2.1 of the EA report.

CNSC staff continue to consult and engage with each identified Indigenous Nation and community with regards to the NSDF Project, and are committed to ongoing collaboration and engagement.

5.2.2 Conclusion

Although the risks of the NSDF Project causing potential impacts on the environment and Indigenous rights and interests are considered by CNSC staff to be low, CNSC staff conducted extensive consultation activities with the identified Indigenous Nations and communities to ensure their full participation in the EA and licensing regulatory processes, and to ensure their concerns were heard and addressed by CNL, AECL and CNSC staff in a meaningful way. CNSC staff are committed to ongoing consultation and engagement with the identified Indigenous Nations and communities and are committed to working collaboratively to address any concerns they may have with regards to the NSDF Project and the EA and licensing regulatory processes.

CNSC staff deem the consultation and engagement process for the NSDF Project to be meaningful, reasonable, responsive, and consistent with best practices.

Based on the analysis of environmental effects of the NSDF Project on Indigenous peoples and assessment of impacts of the project on Indigenous and/or treaty rights, CNSC staff are satisfied that the potential impacts of the project on Indigenous and/or treaty rights have been adequately identified and appropriately mitigated to the greatest extent possible. Based on the information available to date and notwithstanding the opportunities for Indigenous Nations and communities to express their views to the Commission during the public hearing process, CNSC staff are of the view, and recommend to the Commission that they determine the duty to consult under section 35 of the *Constitution Act* as having been discharged in an appropriate and adequate manner.

6. OTHER MATTERS OF REGULATORY INTEREST

6.1 Public Engagement

6.1.1 CNL Public Information and Disclosure

6.1.1.1 Discussion

CNL is required to maintain a Public Information and Disclosure Program (PIDP) for the CRL site in accordance with REGDOC-3.2.1, *Public Information and Disclosure*. The PIDP is applicable to all licensed facilities and activities at the CRL site.

The primary goal of the PIDP is to ensure that information related to the health, safety and security of persons and the environment, and other issues associated with the lifecycle of nuclear facilities and activities are effectively communicated to the public and Indigenous Nations and communities. The program must include a commitment to, and protocol for, ongoing, timely communication of information related to the licensed facility during the course of the licence period.

6.1.1.2 CNSC Staff Assessment

CNSC staff reviewed CNL's PIDP document [59]. CNSC staff determined that the PIDP:

- identifies clear goals and objectives in terms of dissemination of information to multiple target audiences such as local residents, elected and government representatives, media, business leaders, youth, interest groups, and community organizations
- recognizes the importance of actively providing updates and briefings to Indigenous Nations and communities
- is available to the public and posted on CNL's website

CNSC staff conclude that CNL continues to implement and maintain an effective PIDP for the CRL site that meets the requirements of REGDOC-3.2.1.

As the proposed NSDF is not specifically included in CNL's current PIDP, CNSC staff assessed the effectiveness of CNL's public engagement activities for the NSDF Project by conducting desktop reviews of CNL's NSDF stakeholder engagement reports [60, 61, 62, 63]. These reports summarize CNL's public engagement and stakeholder communication activities for the NSDF Project, CNL's assessment of those activities, the outcomes, feedback received, and actions taken. To further assess the effectiveness of CNL's public engagement activities, CNSC staff observed several in-person and virtual engagement activities. CNSC staff also assessed the public engagement information provided in CNL's EIS submission [18]. In addition, CNSC staff reviewed CNL's project specific webpage (www.CNL.ca/NSDF) as a forum for communicating NSDF Project information to the public.

Based on CNSC staff's assessment and observations, staff have determined that CNL has demonstrated their commitment to disseminating information about the proposed NSDF through a variety of activities. CNSC staff also observed that CNL's public communications related to the NSDF Project were accessible, easy to understand, and presented in a manner that was tailored to the target audience being engaged.

In assessing their stakeholder engagement reports, responses to public and Indigenous Nations and communities' comments on the draft EIS, and observations of their engagement activities and communication products, CNSC staff are of the view that CNL has made significant efforts to seek feedback and respond to project-specific issues raised by potentially affected communities and interested parties in an adequate manner and to the extent possible. In particular, CNL has identified and developed commitments to address project-specific concerns to mitigate potential impacts to the environment and people (although out of scope of this application, CNL has also made reasonable efforts to identify a path forward in addressing site-wide concerns raised during this process). Taking into consideration CNL's list of EA regulatory commitments (including mitigation measures and follow-up program measures) identified to address potential impacts and project-specific concerns, CNSC staff have determined that CNL has conducted a thorough engagement process with the public, Indigenous Nations and communities, and other stakeholders. CNSC staff are satisfied with the level and quality of engagement that CNL has conducted, including identifying and addressing project-specific issues and concerns raised, to the extent possible.

CNL began engagement activities for the NSDF proposal in 2015 with outreach campaigns designed to introduce the project, and continued outreach activities as the project progressed through the CNSC's EA and licensing processes. In terms of communications vehicles, and in both official languages, CNL provided information to community members and the public through face-to-face and virtual meetings, project-specific postings on CNL's website and social media, direct mailouts, newsletters, fact sheets, FAQs, infographics, videos, site visits and tours, public radio, local newspapers, press kit, media interviews, and paid advertisements. In addition, they conducted outreach through multiple public and community information sessions, online webinars, and participation at local community and public events (prior to the pandemic). CNL also routinely engages with the community through their Environmental Stewardship Council meetings, which has membership including Indigenous Nations and communities, non-governmental organizations, community leaders, and elected representatives. In addition, a number of interviews and meetings were conducted with regional organizations, businesses, municipalities and other interested parties.

In 2020 CNL faced challenges due to the COVID-19 pandemic, and adapted their engagement activities accordingly. This included moving away from traditional in-person meetings and events, and offering webinars and increased digital communications whenever possible.

6.1.1.3 Conclusion

CNSC staff conclude that CNL's PIDP for the CRL site continues to meet regulatory requirements for public information and disclosure [64].

CNSC staff have and will continue to closely monitor CNL's engagement and outreach strategy for the NSDF Project. CNSC staff conclude that CNL made reasonable efforts to keep targeted audiences, including the public, Indigenous Nations and communities, and other stakeholders, informed about the NSDF Project and address project-specific issues and concerns raised.

Should the Commission approve construction of the NSDF, it is CNSC staff's expectation that CNL update its CRL site-wide PIDP to align with CNL's formal, written commitments to public information and disclosure for this project. CNSC staff also encourage CNL to complete frequent reviews and update its PIDP to adapt communications to suit the needs of its multiple audiences, as well conduct a yearly review of the PIDP with impacted communities to ensure its content maintains relevance and importance to those communities. CNSC staff further recommend that CNL adapt their current media strategy to ensure that CNL is prepared with updated tools for both reactive and proactive media relations both during and after the NSDF hearings.

CNSC staff will continue to oversee the ongoing implementation and updating of the PIDP to ensure that CNL meets its obligations regarding disseminating information, and notifying target audiences of updates related to the CRL site, as well as any impacts on health, safety and the environment specific to its licensed facilities and activities. Should the Commission approve construction of the NSDF, CNSC staff will also monitor and track the implementation of CNL's list of EA regulatory commitments (please refer to sections 1.2.3 and part two of this CMD).

6.1.2 CNSC Staff Public Engagement

This section of the CMD summarizes CNSC staff's public engagement activities related to the NSDF Project. This section does not specifically address Indigenous engagement, as CNSC staff's Indigenous consultation and engagement activities are detailed in section 5.2 of this CMD. In addition, CNSC staff's EA-specific public engagement activities are detailed in section 10 of the EA report.

6.1.2.1 Discussion

The main objectives of the CNSC's public engagement activities with respect to the NSDF Project are to:

- disseminate objective scientific, technical and regulatory information to the public, Indigenous Nations and communities and other stakeholders
- demonstrate CNSC's commitment to protecting the health, safety, security and the environment
- identify and engage with people and organizations potentially affected by or interested in the NSDF Project so they understand and have confidence in the regulatory review process and CNSC's role in the technical assessment of this proposal
- foster two-way lines of communications with the public, Indigenous Nations and communities and other stakeholders to encourage participation in the CNSC regulatory review (EA and licensing) process and public hearing for the NSDF Project

6.1.2.2 CNSC Staff Public Engagement Activities

The regulatory review process for the NSDF Project was launched in 2016. CNSC staff's public engagement activities have focused on the objectives of introducing the project, providing information on the EA and licensing processes and the role of the CNSC in the review of the project, bringing awareness to participation opportunities, and encouraging the public, Indigenous Nations and communities and other stakeholders to participate in the process.

During the early stages of the regulatory review process, between 2017 and 2019, CNSC staff hosted or attended multiple in-person engagement activities, such as open houses, local community events and Meet the Nuclear Regulator sessions. In particular, CNSC staff hosted a total of 8 public open house sessions on the NSDF regulatory review process in communities in Ontario and Quebec near the CRL site including Deep River, Pembroke and Sheenboro. In all, a total of 169 participants attended these sessions. CNSC staff answered participants' questions, including explaining the regulatory review process and CNSC's role in the technical assessment of this proposal. During this period, staff also attended annual local community fairs and public outreach events in the CRL area, such as the Renfrew County Fair and the Petawawa Showcase. In addition, CNSC staff hosted two (2) Meet the Nuclear Regulator sessions in June 2018, 1 in Ottawa and 1 in Gatineau. These sessions began with a short introductory presentation on the CNSC's role and then CNSC staff were available to answer regulatory, technical and facility specific questions from the public, including questions about the NSDF Project. Over a dozen participants attended these sessions. Generally, the participants from these in-person engagement activities appreciated having one-on-one time with several CNSC experts from a variety of areas.

Since 2016, the CNSC has also held or participated in multiple engagement sessions with various councils (e.g., Ottawa City Council), committees, municipalities, and Members of Parliament (e.g., MP Gatineau riding, MP Pontiac riding) concerning the NSDF Project.

In 2020, CNSC staff undertook an exercise of updating its public engagement approach for the NSDF Project for several reasons:

- To enhance engagement as this project was approaching the remaining steps in the regulatory process
- To pivot towards other engagement tools in response to the COVID-19 pandemic
- To respond to feedback from intervenors and the Commission at recent proceedings around the lack of trust in the regulator and need for increased transparency

The following key issues and concerns raised during the regulatory review process for the NSDF Project, as well as other files, informed this exercise:

- Regulatory review processes: CNSC processes are complex and not well understood. There is a need to more clearly explain how staff conduct regulatory oversight and to present the regulatory review process more effectively by using different tools and approaches than staff have used in the past
- Show staff's work: Increase transparency on staff's technical review process in a way that is publicly digestible
- Evaluate: Evaluating the success of staff's engagement beyond just using metrics (e.g., unique visitors to the project web page or number of meetings held with the public)

As a result of this exercise and to address the above issues and concerns, CNSC staff shifted their public engagement approach for the NSDF Project to use new and different tools:

- consolidated project portal online – in one location, easy to search and navigate
- regular and consistent status updates – e.g., project bulletins
- topical discussions with two-way dialogue focused on explaining the regulatory review process and showing staff's work– e.g., online webinars, one-on-one sessions, technical focused sessions
- contextualizing the project – e.g., video and/or written FAQs
- evaluating the success of the engagement – e.g., polling questions and surveys during or post engagement activities

Since 2020, despite the COVID-19 pandemic circumstances, CNSC staff enhanced its public engagement activities and implemented the use of all the tools identified above.

With respect to a consolidated project portal online, CNSC staff developed and launched an NSDF landing page ([Near Surface Disposal Facility – Chalk River Laboratories - Canadian Nuclear Safety Commission](#)), which provides an easily understandable starting point on CNSC's website for anyone interested in the NSDF review process and looking for more information. With respect to contextualizing the project, the NSDF landing page includes high-level messaging, responses to commonly asked questions/themes on the project, profiles on several CNSC staff experts involved in the review of the NSDF proposal, and a link to the updated facility page. The landing page also features a link to CNSC's NSDF video (<https://youtu.be/PSGkPT7qQyk>), which focuses on the regulatory review process, how CNSC staff ensure safety, and specifically addresses concerns raised regarding the Ottawa River. The video has also been utilized as a key source of content on CNSC's social media platforms.

With respect to regular and consistent status updates, CNSC staff distributed two installments of an NSDF project bulletin (in both official languages) to an email list of over 600 interested parties and Indigenous communities, interested in being kept apprised of project updates. The information in these project bulletins also featured as articles ([spring 2021 update](#), [summer 2021 update](#)) on the CNSC website. A third installment of the NSDF project bulletin is set to be distributed at the end of January 2022. Examples of information provided in the bulletins include an update on the status of the project and review process, information on upcoming engagement activities and how to participate, and what staff heard as feedback from recent engagement activities held. An update on the status of the NSDF Project was also provided at the beginning of each webinar hosted by CNSC staff (further described below).

With respect to topical discussions, CNSC staff led online webinars, one-on-one sessions and technical focused sessions with registered/interested participants. At the time of development of this CMD, CNSC staff hosted a series of webinars with a total of 10 online webinars held to date and 1 remaining webinar to be held in early February. Both English and French sessions were held for each webinar. These webinars ran from December 2020 to February 2022, on the following topics and address various key themes and feedback requested by the public and stakeholders related to the NSDF project:

- overview and updates on the regulatory review process for the NSDF project (December 2020)
- CNSC's licensing regulatory review process and technical assessments (March 2021)
- waste classification and characterization (April 2021)
- compliance verification (May 2021)
- overview of CNSC environmental assessment reports and licensing commission member documents (June 2021)
- transportation of radioactive waste (October / November 2021)
- long-term safety of disposal facilities (October 2021)
- protection of people and the environment (November 2021)
- CNSC hearing processes (January 2022)
- walkthrough of CNSC staff's environmental assessment and licensing findings for the NSDF project (February 2022)

To have a broad reach, a mail drop to approximately 50,000 mailboxes was sent out in late August 2021 promoting the fall webinar series, to a large radius of both surrounding and directly affected communities related to NSDF. In addition, all the webinars have been recorded and CNSC staff are posting them on CNSC's YouTube channel for viewing.

All webinars were well-attended with a highly engaged audience of generally over 100 registered participants in the English sessions and approximately 10 or less in the French sessions. CNSC staff addressed all questions raised by participants before, during and after the webinar sessions either live during the Q&A portion of the sessions, time permitting, or by detailed written responses sent to all participants for any outstanding questions.

Upon request, CNSC staff held a few one-on-one sessions with individuals/organizations (e.g., Ottawa City Council staff) in response to detailed questions raised by email or during a public engagement activity, such as a webinar. These sessions provided the opportunity to have a topical, two-way dialogue to respond to specific questions raised by the individual/organization in a timely manner and any follow-up questions that arose through the discussion.

In addition to the above, CNSC staff hosted technical sessions facilitated by an external moderator as a pilot initiative. This pilot was launched in response to requests from involved participants on the NSDF Project, and other files, for more information on the “back and forth” between CNSC staff and applicants during technical evaluations. As such, CNSC staff committed to providing greater transparency through these technical sessions, on how issues raised by CNSC staff during the technical assessments of CNL’s NSDF documentation were handled/addressed.

CNSC staff hosted 3 NSDF-specific focused technical sessions in fall 2021 on the following topics, selected by registered participants:

- waste acceptance criteria
- waste inventory
- long-term safety

The sessions were targeted toward technical audiences looking for more in-depth and detailed information and discussion on these topics. The offer of participating in the technical sessions was made to the NSDF email distribution list of over 600 contacts - of these, approximately a dozen registered as participants and another dozen requested observer status only. All sessions were recorded and shared with participants and observers.

During each session, CNSC staff presented a walkthrough of their key comments on each selected technical topic and identified the steps that were taken between CNSC staff and CNL to address these comments. The remainder of the sessions was dedicated to CNSC staff responding to questions raised by participants on the material presented, time permitting, and any outstanding questions were provided responses in writing to all participants.

Polling questions and post-session surveys were utilized to evaluate the success of CNSC staff’s webinars and technical focused sessions. While acknowledging that not all participant requests could be met, CNSC staff are of the view that overall these sessions were a success, taking into consideration the participation rate metrics, the high level and quality of engagement of participants during each session and the feedback received. Each session provided an excellent opportunity for participants to better understand CNSC’s regulatory oversight role in the review of the NSDF proposal and to ask as many questions they had or seek clarity on any of the information shared. In the case of both the webinars and technical sessions, the audience was highly engaged and active in asking questions. With respect to webinars, the majority of participants indicated that following staff’s presentation, they had a greater understanding of the topic covered in each session than they did prior to the presentation. Many participants expressed their appreciation for CNSC staff’s efforts in sharing information on such complex matters, that the presenters were very knowledgeable, the presentations were well structured and well delivered, and valued the open dialogue in the Q&A portion of the sessions.

Several participants also provided comments on areas of improvement for future webinars and technical sessions. Each of these suggestions was carefully considered by CNSC staff and adjustments were made in advance of the next session (e.g., providing more graphics/visuals and examples to illustrate processes/concepts, providing sources and explaining graphs/charts/figures). CNSC staff's consideration on the feedback received was also shared transparently through several mechanisms (i.e., project bulletins, introductory remarks at the next webinar/technical session).

Common themes heard during CNSC staff's engagement activities include concerns about the proximity of the proposed NSDF to the Ottawa River and protection of the river, inventory and types of wastes proposed for emplacement, transportation of radioactive waste from locations outside of the CRL site, engineering considerations and adequacy of the NSDF design, and long-term safety. The CNSC's regulatory review process is designed to consider and assess all of the aspects raised in participants' themes of concerns. To address these concerns to the extent possible, CNSC staff used new and different tools to explain and transparently provide information on the regulatory review process and staff's technical assessments of the NSDF proposal specific to these topics, as well as answer questions raised during engagement activities and email inquiries. While CNSC staff acknowledge that some participants have outstanding concerns or views diverging from staff's technical assessments, all participants have been strongly encouraged to participate in the upcoming public hearing to express their views directly to the Commission.

6.1.2.3 CNSC Participating Funding Program (PFP)

The CNSC made funding available through its PFP to assist Indigenous peoples, members of the public and stakeholders in participating in the regulatory review process for the NSDF Project and providing value-added information to the Commission through informed and topic-specific interventions.

The CNSC offered funding for the NSDF Project in two phases. The first phase was to assist with reviewing CNL's draft EIS. The second phase was to assist with the review of CNSC staff's EA report, CMD and participation at the public Commission hearing. The deadline for applications for the first phase was September 2, 2016. The deadline for applications for the second phase was May 24, 2019. A Funding Review Committee, independent of CNSC staff, reviewed the funding applications received, and made recommendations on the allocations of funding to eligible applicants. Based on recommendations from the Funding Review Committee, the CNSC awarded \$124,824.79 for the first phase to the following participants for review of the draft EIS:

- Algonquin Anishinabeg Nation Tribal Council (for coordination with Kebaowek First Nation and Kitigan Zibi Anishinabeg First Nation)
- Métis Nation of Ontario
- Canadian Environmental Law Association
- William Turner

- Northwatch
- Nuclear Waste Watch
- Ottawa Riverkeeper
- David Thompson
- Gregory Csullog

Based on recommendations from the Funding Review Committee, the CNSC awarded an additional \$192,328.92 in funding for the second phase to the following recipients, who are required to submit a written intervention and make an oral presentation at the Commission's public hearing:

- Algonquin Anishinabeg Nation Tribal Council (for coordination with Kebaowek First Nation and Kitigan Zibi Anishinabeg First Nation)
- Algonquins of Ontario
- Algonquins of Pikwakanagan First Nation
- Métis Nation of Ontario
- Canadian Environmental Law Association
- Canadian Nuclear Workers Council
- Concern Citizens of Renfrew County
- Northwatch
- Nuclear Waste Watch
- Ottawa Riverkeeper
- William Turner, David Raman and James Walker

In addition, the CNSC awarded over \$475, 000 to help support a number of Indigenous Nations and communities conduct Indigenous Knowledge studies, collaborate with CNSC staff on Rights Impact Assessments, as well as support for multiple meetings with CNSC staff throughout the regulatory review process.

6.1.2.4 Conclusion

Taking into consideration the above, CNSC staff has actively been open and transparent and conducted extensive engagement activities during the review process for the public, Indigenous peoples and other stakeholders to participate. Through the use of new and different tools and reasonable efforts to address comments raised, CNSC staff are of the view that its public engagement objectives have been met, taking into consideration the participation rate metrics, the high level and quality of engagement of participants during each engagement session and the feedback received to date. Through the PFP, the CNSC has offered assistance to interested members of the public, Indigenous peoples, and stakeholders to prepare for and participate in the Commission's public hearing. Should the Commission approve the NSDF project, CNSC staff's engagement efforts will continue as the project will move into future licensing stages.

6.2 Cost Recovery

It is a requirement of the [Nuclear Safety and Control Act](#) under paragraph 24(2)I, that the licence application is accompanied by the prescribed fee. The [CNSC Cost Recovery Fees Regulations](#) (CNSC CRFR) set out the specific requirements based on the activities to be licensed. An applicant for a Class I facility licence is subject to "Part 2" of CRFR, which is based on "Regulatory Activity Plan Fees".

6.2.1 Discussion

Through the review of CNSC records, CNSC staff have determined that CNL is in good standing with respect to the CNSC CRFR requirements for CRL. CNL's licence amendment application is not an initial application, and as such, the applicant is not required to submit the initial fee of C\$25,000 as described in paragraph 7(1)(a) of the CNSC CRFR, which is only for initial applicants. CNL has paid their cost recovery fees in full.

6.2.2 Conclusion

After assessing CNSC records, CNSC staff conclude that CNL is in good standing with respect to the CNSC CRFR requirements for CRL. Based on CNL's payment history, CNSC staff do not have concerns regarding payment of future cost recovery fees.

No licence condition is required for this matter.

6.3 Financial Guarantees

The CRL operating licence requires CNL to maintain in effect a financial guarantee for decommissioning of the CRL site that is acceptable to the Commission. REGDOC-2.11.2, *Decommissioning* and REGDOC-3.3.1, *Financial Guarantees for Decommissioning Nuclear Facilities and Termination of Licensed Activities* provide requirements and guidance on calculating the financial guarantees.

6.3.1 Discussion

With respect to a financial guarantee required by the paragraph 3(1)(l) of the *General Nuclear Safety and Control Regulations*, REGDOC-3.3.1 states that an expressed commitment from a federal or provincial government is an acceptable form of financial guarantee.

AECL is a Schedule III, Part 1 Crown Corporation under the *Financial Administration Act* and an agent of Her Majesty in Right of Canada. As an agent of Her Majesty in Right of Canada, AECL's liabilities are ultimately liabilities of Her Majesty in Right of Canada. While the restructuring of AECL has seen the ownership of CNL transferred to a private-sector contractor, the Canadian National Energy Alliance, AECL retains ownership of the lands, assets and liabilities associated with CNL's licences.

These liabilities have been officially recognized by the Federal Minister of Natural Resources in a letter dated July 31, 2015 [65]. This letter states that AECL will retain ownership of the lands, assets and liabilities associated with CNL's licences, including the CRL site, and states that the liabilities of AECL are the liabilities of Her Majesty in Right of Canada. CNL confirmed that the provisions in the 2015 letter [65] remain valid on August 25, 2020 [66].

6.3.2 Conclusion

CNSC staff conclude that the financial guarantee is sufficient for the decommissioning of the CRL site, including the NSDF supporting facilities and infrastructure, should it be approved by the Commission.

6.4 Improvement Plan and Significant Future Activities

This section discusses the activities to be completed and information to be submitted by CNL, to CNSC staff for review, in each phase of the NSDF project. CNL submission of the information pertaining to the construction phase is captured in the licensing regulatory actions table facility-specific condition G.7 of the proposed LCH. For subsequent phases of the NSDF, a similar approach will be used. CNSC staff will report on the status of the project during updates provided as part of the CNL regulatory oversight report or another appropriate mechanism.

6.4.1 Activities to be Completed – Construction Phase

At this stage of the NSDF project, CNL has not selected the construction contractor nor awarded a construction contract. Should the Commission grant approval to construct the NSDF, CNL will provide the following documents prior to the commencement of the NSDF construction, to CNSC staff for review:

- NSDF Blasting Plan and Blasting Safety Plan
- Construction Sequence Plan
- Construction Schedule
- Contractor Health and Safety Plan

- Contractor Environmental Protection Plan
- Updated Commissioning Plan
- Sheet Piling Design (in case this is the confirmed method)
- Any other related/support information

CNL's submission of these documents is captured as a regulatory action in the licensing regulatory actions table of the proposed LCH and will be tracked by CNSC staff.

6.4.1.1 Geological Verification Plan

Suitable site characteristics and properties of the host geological formation is key for the safe disposal of low-level radioactive waste. CNSC staff review of the NSDF safety case, identified that uncertainties on fracture zones in the bedrock at the NSDF site remain.

Should the Commission approve construction of the NSDF, CNL has indicated that further geological verification will be undertaken during the construction phase. CNL has committed to submit the NSDF geological verification plan, to CNSC staff for review and acceptance. At the time this CMD was being developed, CNL submitted the geological verification plan [67] and has been reviewed by CNSC staff. CNSC staff's review conclude that the NSDF geological verification plan is acceptable and includes the necessary information to proceed with the geological verification activities of the ECM footprint. Should the Commission approve the NSDF construction, CNSC staff will verify the construction mapping activities planned prior and after rock blasting.

CNL's submission and implementation of the geological verification plan is captured as a regulatory action in the licensing regulatory actions table of the proposed LCH and will be tracked by CNSC staff.

6.4.1.2 Research and Development Program

The design, construction and performance of the NSDF base liner, cover and engineered barriers systems, and features to contain and isolate the waste need to be monitored and validated in the post-closure period. CNSC staff have requested that CNL develop a research & development program to further substantiate the ECM design, cover system, engineered and natural barriers, HDPE geomembrane testing (particularly for phase 2 construction as the geomembrane that will be used in phase 1 will no longer be available 25 years from now), compacted clay, etc. This research and development program would be used by CNL to manage and reduce uncertainties in modelling, verify assumptions and confirm models' inputs and outputs.

CNL's development of a research and development program is captured as a regulatory action in the licensing regulatory actions table of the proposed LCH and will be tracked by CNSC staff.

6.4.1.3 Performance Monitoring and Surveillance Plan

CNSC staff requested CNL to develop a Monitoring & Surveillance (M&S) plan for NSDF and recommended CNL to use the guidance provided in the IAEA guide SSG-31, *Monitoring and Surveillance of Radioactive Waste Disposal Facilities*. In addition, section 11.6 of REGDOC-2.11.1, Volume I, *Management of Radioactive Waste*, directs the licensee to develop a monitoring and surveillance plan for the disposal facility.

The M&S plan is applicable throughout the entire lifetime of the disposal facility (pre-closure and post-closure) and should be customized to each of these periods.

It is CNSC staff's expectation that the NSDF M&S plan should achieve and meet the following objectives, as outlined in the IAEA SSG-31:

- Demonstrate compliance with regulatory requirements
- Verify that the disposal facility is performing as expected
- Verify that the key assumptions made and models used to assess safety continue to be consistent with actual conditions
- Maintain records of the disposal facility, the site and the environment
- Ensure the protection and preservation of passive safety features

CNL developed and submitted the NSDF M&S plan in February 2021 [68]. CNSC staff's review concludes that the NSDF monitoring and surveillance plan meets the IAEA SSG-31 requirements and guidance. The M&S plan is an evergreen document that may be revised and updated at any phase of the facility development and implemented by CNL and subject to CNSC inspection. This is part of the compliance oversight plan for the NSDF project that will be developed before the commencement of the construction activities, should the Commission grant CNL approval to construct the NSDF.

6.4.1.4 EA Follow-up Monitoring Program

CNL proposed an EA Follow-up Monitoring Program to address compliance and effective monitoring for each phase of the NSDF Project development, as well as long-term monitoring requirements. For further details, please refer to section 11 of the EA report appended to the CMD.

6.4.1.5 Weather Cover Structure

The NSDF design provided and considered measures to contain and isolate the waste during emplacement in the ECM and temporary storage in the dedicated storage and receiving area. These “means and measures” address the operation phase to prevent and minimize the generation of contact water, leachate, contaminants and radionuclide migration. The NSDF design includes limiting the active disposal cell area to a maximum of 2.1 hectares (21,000 m²), separate management of contact water and non-contact water within the ECM, and the use of interim covers and sacrificial liners over waste areas that will be inactive for greater than 30 days. In addition, the design included a dedicated WWTP to process wastewater that includes leachate and contact water generated at the ECM.

CNL is required to fulfill section 5.11.2 (a) of CSA N292.0, *General Principles for the Management of Radioactive Waste and Irradiated Fuel*, which states that “radioactive waste management system performance under normal operating conditions shall be assessed to a) maintain waste containment for the duration of facility operation”. During the review of the NSDF design, CNSC staff raised concerns regarding the NSDF proposed water management and its effectiveness in preventing and minimizing contact water during waste operations. The proposed measures at the time were considered by CNSC staff insufficient to adequately manage contact water and keep the waste dry. In order to address the concern and resolve the problem at the source, CNSC staff directed CNL to assess other effective methods to contain the waste such as the design and installation of a weather cover structure to prevent precipitation from coming into contact with the waste during operation. This method has previously been used for projects at the CRL site as well as internationally and has been proven to be effective.

CNL accepted CNSC staff’s request and committed to developing a weather cover structure to address water management during the operation phase. CNL will further develop and assess the weather cover structure concept and finalize the design. Prior to operation, CNL will have to revise the NSDF Safety Analysis Report (as discussed in section 4.4 of this CMD) to include the weather cover structure as a containment feature during the operation phase. The implementation of the weather cover structure concept at the NSDF aligns with international and industry best practice to prevent and minimize the generation of contact water and will be credited during the operation phase.

CNSC staff have issued a regulatory action to track submission of the weather cover structure design requirements and design description documents for CNSC staff review and acceptance and installation of the weather cover structure prior to submission of a licence application to operate the NSDF.

At the time this CMD was being developed, CNL submitted the weather cover concept design requirements document [69] and is presently being reviewed by CNSC staff.

This regulatory action is included in the licensing regulatory actions table of the proposed LCH, and will be tracked by CNSC staff.

6.4.2 Activities to be Completed – Operation Phase

Should the Commission approve CNL's proposal to construct the NSDF, and to proceed with operation of the NSDF, CNL will be required to submit a licence application seeking approval to operate the NSDF. The licence application to operate the NSDF must contain the necessary information to support a licensing decision by the Commission or a person designated by the Commission. The application must include information necessary to operate a Class I nuclear facility as required by the NSCA and its associated regulations.

CNL are expected to address commitments made during the regulatory review process and technical assessments which are outlined in the licensing regulatory actions table of the proposed LCH, including implementing mitigating measures and EA follow-up program commitments. These activities will also support the information necessary for CNL's application for a licence to operate.

CNL are not authorized to operate the NSDF (commence waste emplacement in the NSDF) or put the WWTP into service, until a decision is made by the Commission or a person designated by the Commission. Information in support of a licence application to operate the NSDF would include, but not be limited to, the following:

- Inactive commissioning reports
- Emergency plans and procedures for the facility
- Updated fire hazard analysis for the facility
- As-built reports
- Design and construction completion assurance certificate(s)
- Updated preliminary decommissioning plan
- Updated ALARA assessment and RP plan
- Systematic approach to training for the facility
- In-service inspection and maintenance plans
- Operation procedures and operating manuals, site access, communications, etc.
- Facility organization and management
- Emergency operating procedures
- Licensee's Safety Review Committee's (SRC) confirmation to operate the facility
- Revised/updated facility authorization
- Revised/updated safety analysis report along with licensee's SRC associated confirmation
- Revised/updated post-closure safety assessment along with licensee's SRC associated confirmation

- Revised/updated safety case along with licensee's SRC associated confirmation
- A statement confirming completion of all necessary work and that the facility is ready to safely proceed with WWTP active commissioning

6.5 Nuclear Liability Insurance

*The Nuclear Liability and Compensation Act (NLCA) [70] establishes a compensation and liability regime in the unlikely event of a nuclear accident resulting in civil injury and damages. This law entered into force on January 1, 2017 and replaced the previous *Nuclear Liability Act* [71].*

There is no requirement for nuclear liability insurance for an approval to construct the NSDF at the CRL site as this facility during this licensing phase is not considered a nuclear installation and as such, the NLCA does not apply.

6.6 Delegation of Authority

The Commission may include in a licence any condition it considers necessary for the purposes of the NSCA. The Commission may authorize CNSC staff with respect to the administration of licence conditions, or portions thereof.

There are two proposed facility-specific licence conditions in the proposed licence that contain the phrase “the Commission or a person authorized by the Commission”:

Near Surface Disposal Facility (NSDF) – Facility-Specific:

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

As indicated in the proposed LCH, CNL will be required to update and report on the progress of the implementation of licensing regulatory actions and EA regulatory commitments to CNSC staff on an annual basis or as required by the Commission. These will be tracked and monitored by CNSC staff using the Regulatory Information Bank database.

CNSC staff recommend the Commission for the purposes described in the above licence conditions, authorize the following staff:

- Director, Canadian Nuclear Laboratories Regulatory Program Division
- Director General, Directorate of Nuclear Cycles and Facilities Regulation
- Executive Vice-President and Chief Regulatory Operations Officer, Regulatory Operations Branch

7. OVERALL CONCLUSIONS AND RECOMMENDATIONS

7.1 Overall Conclusions

An EA under CEAA 2012 was conducted for the proposed NSDF Project. Based on the regulatory review and technical assessments of CNL's EIS and supporting documentation, CNSC staff determined that the proposed NSDF Project is not likely to cause significant adverse environmental effects, taking into account the implementation of all identified EA regulatory commitments.

Based on the licensing regulatory review and technical assessments, CNSC staff have determined that the proposed NSDF project is protective of people and the environment, taking into account the implementation of all identified EA regulatory commitments and licensing regulatory actions. CNSC staff conclude that CNL's licence application to construct the NSDF at the CRL site complies with all applicable regulatory requirements.

With respect to the CNSC's duty to consult obligations, CNSC staff conducted extensive consultation activities with identified Indigenous Nations and communities to ensure their full participation in the regulatory review process, and to ensure their concerns were heard and addressed by CNL, AECL and the CNSC in a meaningful way. CNSC staff consider that the consultation and engagement process for the NSDF Project was meaningful, reasonable, responsive, and followed best practices. Taking into consideration the location of the NSDF site and CNL's identified mitigation measures and follow-up program measures, CNSC staff conclude that there will be no new impacts on any potential or established Indigenous and/or treaty rights as a result of the NSDF Project.

7.2 Overall Recommendations

With respect to the Commission's licensing decision, the regulatory basis and technical basis for CNSC staff's recommendations are provided in Addendum B, "*Basis for the Recommendation(s)*" of this CMD.

CNSC staff recommend the Commission:

1. Determine that the NSDF Project is not likely to cause significant adverse environmental effects referred to in section 5 of CEAA 2012.
2. Conclude, pursuant to paragraphs 24(4)(a) and (b) of the *Nuclear Safety and Control Act* in that CNL:
 - a) Is qualified to carry on the activities authorized by the licence
 - b) Will make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed
3. Approve CNL's application to proceed with the construction of the NSDF at the CRL site, including the conditions with which CNL must comply as articulated in the proposed licence and proposed LCH (Part two of the CMD).

4. Based on the information available to date and notwithstanding the opportunities for Indigenous Nations and communities to express their views to the Commission during the public hearing process, determine that the CNSC, as an agent of the Crown, has upheld the Honour of the Crown and has fulfilled its common law obligations to consult, and where appropriate accommodate, Indigenous peoples, pursuant to section 35 of the *Constitution Act*, 1982.
5. Authorize staff as set out in section 6.6 of this CMD.
6. Reflect in their decisions on this matter, the following commitments that CNSC staff have made in an ongoing effort to enhance transparency and to foster confidence and trust in the regulator:
 - 6.1 engaging with members of the public, Indigenous Nations and communities, and local authorities and seeking feedback early on future IEMP sampling campaigns related to the NSDF and/or CRL site.
 - 6.2 long-term relationships with each of the identified Indigenous Nations and communities and to involving them in the ongoing monitoring and oversight of the implementation of mitigation measures and follow-up program measures, should the NSDF Project proceed.
 - 6.3 conducting engagement activities with Indigenous Nations and communities at a frequency mutually agreed upon with each of the Indigenous Nations and communities.
 - 6.4 conducting regular outreach activities related to the NSDF Project and/or the CRL site with local communities.

CNSC staff will systematically track the implementation of these commitments and will report publicly on any updates and the progress made towards achieving these objectives.

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18. CNL document, *Final EIS Report 232-509220-REPT-004*, Revision 3, May 2021 (e-Doc 6574859).
19. CNL document, *NSDF Geotechnical Report* (e-Doc 6282778).
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34. CNSC letter, *CNL NSDF – Technical Review of Seismic and Structural Design Documentation*, May 29, 2018 (e-Doc 5543413).
35. CNSC letter, *CNL Disposition of Revised Seismic-related Documents for the Near Surface Disposal Facility (NSDF) Project Review Comments – CNSC Staff Review*, July 29, 2019 (e-Doc 5957909).
36. CNL document, Management Control Procedure, Engineering Change Control, 900-508130-MCP-001, Revision 1 (e-Doc 5673626).
37. CNL document, *Human Factors Verification and Validation Report* (e-Doc 6284176).
38. CNL document, *Human Factors Engineering Summary Report* (e-Doc 5261050).
39. CNSC letter, Near Surface Disposal Facility (NSDF) New Probabilistic Seismic Hazard Assessment (PSHA), May 24, 2018 (e-Doc 5539994).
40. CNSC letter, M. C. Gacem to M. Vickerd, Decision on Broadband Seismograph Stations in Support of Near Surface Disposal Facility Project, May 3, 2019, (e-Doc 5894148).
41. *Large scale centrifuge test of a geomembrane-lined landfill subject to waste settlement and seismic loading*, Kavazanjian Jr, E. and A. Gutierrez, 2017 (e-Doc 6710591).
42. CNL document, Base liner and final cover performance and life cycle evaluation, Rev 1, 2019 September 26, (e-Doc 6288307).
43. CNSC letter, M. C. Gacem to M. Vickerd, CNL Near Surface Disposal Facility (NSDF) Design Requirements, October 31, 2019, e-Doc 6032489.
44. CNL document, NSDF Hazard Identification and Analysis, 232-503230-HA-002, Revision 1 (e-Doc 5978379).
45. CNL document, Operations and Maintenance Plan, 232-508220-PLA-006, Revision 0, September 2019 (e-Doc 6001161).
46. CNL responses to CNSC comments/questions/clarifications on the NSDF O&M Plan, (e-Doc 5961866).
47. CNL document, *NSDF Environmental Protection Plan*, 232-509200-PLA-001, 2017 March. (e-Doc 5252994).
48. CNL document, *Dust Management Plan*, 232-03700-PLA-001, 2018 August. (e-Doc 5968908).
49. International Standards Organization (ISO) 14001:2015 Standard, Environmental Management Systems – Requirements with Guidance for Use.

50. CSA Group, CSA N393-13, Fire protection for facilities that process, handle or store nuclear substances.
51. CNL document, Waste Management Plan, 232-508600-PIA-005, Revision 0, May 2017 (e-Doc 5252992).
52. CNSC Compliance Inspection Report, Compliance Inspection of the Near Surface Disposal Facility (NSDF) Waste Characterization Process at CNL's Chalk River Laboratories, CNL-NSDF -2017-02, dated December 18, 2018 (e-Doc 5402625).
53. CNSC letter, Subject: CNL Response to Recommendations from CNSC Compliance Inspection of the Near Surface Disposal Facility (NSDF) Waste Characterization Process (CNL NSDF-2017-02) – CNSC Staff Review, dated July 24, 2019 (e-Doc 5956920).
54. CNL document, Preliminary Decommissioning Plan, 232-508300-PLA-001, Revision 1, September 2018 (e-Doc 5639047).
55. CNL letter, Keith Lafreniere to Liana Ethier, Subject: Security NSDF, April 28, 2017(e-Doc 5240460), Protected B-Prescribed Information.
56. CNSC letter, Liana Ethier to Chris Clark, Subject: Security Near Surface Disposal Facility, August 11, 2017 (e-Doc 5314953), Protected B-Prescribed Information.
57. Program Requirements Document, Cyber Security, 900-511400-PRD-001, Revision 2, 30/11/2020 (e-Doc 6437272).
58. CNL's commitments report (e-Doc 6575214).
59. CNL document, Public Information Program for Canadian Nuclear Laboratories (CNL), Company Wide, CW-513430-REPT-001, Revision 8, January 2021 (e-Doc 6465869).
60. Environmental Assessment Stakeholder Activities Report (e-Doc 6045479).
61. Stakeholder Engagement Report (e-Doc 6045487).
62. Stakeholder Engagement Report (e-Doc 6045488).
63. Stakeholder Engagement Report (e-Doc 6576276).
64. CNSC letter, W. Islam to P. Quinn, Subject: *CNSC Staff Review: Public Information Program (PIP) for Canadian Nuclear Laboratories (CNL):CW-513430-REPT-001*, January 22, 2021 (e-Doc 6466866).
65. Letter from The Honourable Greg Rickford, Minister of Natural Resources and Minister for the Federal Economic Development Initiative for Northern Ontario to M. Binder, President and Chief Executive Officer (CNSC), July 31, 2015 (e-Doc 6373442).
66. CNL letter, P. Boyle to M. Kavita, Subject: *Submission of Information Regarding Financial Guarantees for all Atomic Energy of Canada Limited Sites Operated by Canadian Nuclear Laboratories*, August 25, 2020 (e-Doc 6373440).

67. CNL document, *Geological Verification Plan for a Near Surface Disposal Facility*, 232-10180-PLA-001, Revision 1, November 2021 (e-Doc 6679758).
68. CNL document, *Near Surface Disposal Facility Monitoring and Surveillance Plan*, 232-508660-PLA-001, Revision 0, February 2021 (e-Doc 6499945).
69. CNL document, *NSDF Weather Cover Concept Design Requirements*, 232-01290-10035226, Revision 0, August 11, 2021 (e-Doc 6623260).
70. *Nuclear Liability and Compensation Act* <http://www.laws.justice.gc.ca/eng/acts/N-28.1/FullText.html>.
71. *Nuclear Liability Act* <http://laws-lois.justice.gc.ca/eng/acts/N-28/FullText.html>.

GLOSSARY

For definitions of terms used in this document, see *REGDOC-3.6 Glossary of CNSC Terminology*, which includes terms and definitions used in the *Nuclear Safety and Control Act* (NSCA) and the regulations made under it, and in CNSC regulatory documents and other publications. REGDOC-3.6 is provided for reference and information.

ACRONYMS

Additional items and acronyms used in the CMD are listed below:

Acronym	Term
a	Annum (per annum or year)
AECL	Atomic Energy of Canada Limited
ALARA	As Low as Reasonably Achievable
AOO	Anticipated Operational Occurrence
AOO	Algonquins of Ontario
AOPFN	Algonquins of Pikwakanagan First Nation
ASL	Above Sea Level
BDBA	Beyond Design Basis Accident
BE	Below Expectations
CCME	Canadian Council of the Minister of the Environment
CCOHS	Canadian Center for Occupational Health and Safety
CE	Common Era
CEAA	Canadian Environmental Assessment Act, 2012
CMD	Commission Member Document
CNL	Canadian Nuclear Laboratories
CNSC	Canadian Nuclear Safety Commission
CQA	Construction Quality Assurance
CRFR	Cost Recovery Fees Regulations
CRL	Chalk River Laboratories
CSA	Canadian Standards Association, CSA Group
CW	Contact Water
DBA	Design Basis Accident
DBE	Design Basis Earthquake
DBT	Design Basis Tornado
DC	Direct Current
DEC	Design Extension Condition
DIAD	Design Input and Assumptions Database
EA	Environmental Assessment
ECC	Engineered Change Control
ECM	Engineered Containment Mound
EMP	Environmental Monitoring Program

EMR	East Mattawa Road
EMS	Environmental Management System
EP	Environmental Protection
EPP	Environmental Protection Program
EQG	Environmental Quality Guidelines
ERA	Environmental Risk Assessment
ESDC	Employment and Social Development Canada
EVMP	Effluent Verification Monitoring Program
FA	Facility Authorization document or Facility Authority
FAQ	Frequently Asked Questions
FEP	Features, Events and Processes
FPRT	Federal Provincial Review Team
GNSCR	General Nuclear Safety and Control Regulations
GSC	Geological Survey of Canada
HDPE	High-Density Polyethylene
IAA	Impact Assessment Act
IAEA	International Atomic Energy Agency
IC	Institutional Requests
ICRP	International Commission on Radiological Protection
IEMP	Independent Environmental Monitoring Program
IR	Information Requests
IM	Information Management
ISO	International Organization for Standardization
K	hydraulic conductivity (m/s)
Km	Kilometer
LCH	Licence Conditions Handbook
LCS	Leachate Collection System
LDS	Leak Detection System
M	Meter
M ²	Square Meter
M ³	Cubic Meter
MECP	Ministry of Environment, Conservation and Parks
mm	Millimeter
MNO	Métis Nation of Ontario
MOE	Ministry of Environment, Ontario
mSv	Milli-sievert
M&S	Monitoring & Surveillance
NBCC	National Building Code of Canada
NES	Normal Evolution Scenario
NEW	Nuclear Energy Worker
NFCC	National Fire Code
NFPA	National Fire Protection Associations
NLCA	Nuclear Liability and Compensation Act
NPP	Nuclear Power Plant
NPT	Treaty on Non-Proliferation of Nuclear Weapons
NRCan	Natural Resources Canada

NRU	Nuclear Reactor Universal
NSCA	Nuclear Safety and Control Act
NSDF	Near Surface Disposal Facility
OBE	Operating Basis Earthquake
ODEQ	Oregon Department of Environmental Quality
OPEX	Operating Experience
O&M	Operations & Maintenance
PCSA	Post-Closure Safety Assessment
PDD	Program Description Document
PDP	Preliminary Decommissioning Plan
PFP	Participant Funding Program
PIDP	Public Information and Disclosure Program
PIE	Postulated Initiating Event
PMP	Probable Maximum Precipitation
PRD	Program Requirements Document
PSHA	Probabilistic Seismic Hazard Analysis
PTNSR	Packaging and Transport of Nuclear Substances Regulations
QA	Quality Assurance
REGDOC	Regulatory Document
RFI	Request for Information
RLTI	Recordable Lost-Time Injuries
RP	Radiation Protection
RPP	Radiation Protection Program
SA	Satisfactory
SAR	Safety Analysis Report or Safety Assessment Report
SCA	Safety and Control Area
SON	Saugeen Ojibway Nation
SRC	Safety Review Committee
SSC	Structures, Systems & Components
TARM	Technical Assessment Reference Matrix
TSSA	Technical Standards and Safety Authority
UA	Unacceptable
UPS	Uninterrupted Power Source
WAC	Waste Acceptance Criteria
WWTP	Wastewater Treatment Plant
y	Year

A. RISK RANKING

The CNSC uses a risk-informed regulatory approach in the management and control of regulated facilities and activities. CNSC staff have therefore established an approach to identifying appropriate levels of regulatory monitoring and control for specific classes of licensed facilities and types of licensed activities based on risk ranking.

Risk ranking is applied to each SCA, and is determined by considering the probability and consequence of adverse incidents associated with each SCA as it relates to the given facility and activity types.

The methodology used to determine risk ranking is based on Canadian Standards Association guideline CAN/CSA-Q850, Risk Management: Guideline for Decision Makers. This guideline provides a description of the major components of the risk management decision process and their relationship to each other, and describes a process for acquiring, analyzing, evaluating, and communicating information that is necessary for making decisions.

In section 2.2 of the CMD, in the Relevant Safety Control Areas table, the “Risk Ranking” column shows a high (H), moderate (M) or low (L) indicator for each SCA that is relevant to the current facility and activities being addressed in this CMD. The risk rankings are not static and will change over time for a given facility and activities (e.g., facilities age, facilities and equipment are upgraded, activities cease or begin, licensees change, technology and programs mature, knowledge and understanding of impacts and probabilities increase, etc.).

The following matrix provides a high-level overview of risk ranking, and the management and monitoring approach associated with the various degrees of risk.

APPROACH TO ASSESSING AND MANAGING POTENTIAL RISK			
CONSEQUENCE	MANAGEMENT/MONITORING APPROACH		
Significant Impact	Considerable management of risk is required	Must manage and monitor risk with occasional control	Extensive management is essential. Constant monitoring and control
Moderate Impact	Occasional monitoring	Management effort is recommended	Management effort and control is required
Low Impact	Random monitoring	Regular monitoring	Manage and monitor
Probability of Occurrence	Unlikely to Occur	Might Occur	Expected to Occur

RISK RANKING SCALE			
L	Low Risk	M	Moderate Risk
		H	High Risk

On this basis, a high-risk SCA would be subject to increased regulatory scrutiny and control while a low-risk SCA would generally require minor verification and control.

B. SAFETY PERFORMANCE RATING LEVELS

Satisfactory (SA)

Licensee meets all of the following criteria:

Performance meets CNSC staff expectations. Licensee non-compliances or performance issues, if any, are not risk-significant. Any non-compliances or performance issues have been, or are being, adequately corrected.

Below Expectations (BE)

One or more of the following criteria apply:

Performance does not meet CNSC staff expectations. Licensee has risk-significant non-compliance(s) or performance issue(s). Non-compliances or performance issues are not being adequately corrected.

Unacceptable (UA)

One or both of the following criteria apply:

Risk associated with a non-compliance or performance issue is unreasonable. At least one significant non-compliance or performance issue exists with no associated corrective action.

C. BASIS FOR THE RECOMMENDATION(S)

C.1 Regulatory Basis

The recommendations presented in this CMD are based on compliance objectives and expectations associated with the relevant SCAs and other matters. The regulatory basis for the matters that are relevant to this CMD are as follows.

Management System

- It is a requirement of the *Class I Nuclear Facilities Regulations* under paragraph 3(d) that an application for a licence for a Class I nuclear facility shall contain the proposed management system for the activity to be licensed, including measures to promote and support safety culture.
- The *General Nuclear Safety and Control Regulations* require that an application for a licence shall contain, under the following paragraph:
 - 3(1)(k), the applicant's organizational management structure insofar as it may bear on the applicant's compliance with the NSCA [3] and the Regulations made under the NSCA, including the internal allocation of functions, responsibilities and authority.
 - 15(a), the persons who have the authority to act for them (the applicant/licensee) in their dealings with the Commission.
 - 15(b), the names and position titles of the persons who are responsible for the management and control of the licensed activity and the nuclear substance, nuclear facility, prescribed equipment or prescribed information encompassed by the licence.

Human Performance Management

- It is a requirement of the *General Nuclear Safety and Control Regulations* under section 12, that the licensee shall:
 - 12(1)(a), ensure the presence of a sufficient number of qualified workers to carry on the licensed activity safely and in accordance with the NSCA, the Regulations made under the NSCA, and the licence.
 - 12(1)(b), train the workers to carry on the licensed activity in accordance with the NSCA, the Regulations made under the NSCA, and the licence.
 - 12(1)(e), require that every person at the site of the licensed activity to use equipment, devices, clothing, and procedures in accordance with the NSCA, the Regulations made under the NSCA, and the licence.
- It is a requirement of the *Class I Nuclear Facilities Regulations* under paragraph 3(d.1) that a licence application contain the proposed human performance program for the activity to be licensed, including measures to ensure workers' fitness for duty.

- It is a requirement of the *Class I Nuclear Facilities Regulations* under paragraph 6(m) that a licence application contain information on the proposed responsibilities, qualification requirements, and training program for workers including the procedures for the requalification of workers.

It is a requirement of the *Class I Nuclear Facilities Regulations* under paragraph 6(n) that a licence application contain information on the results that have been achieved in implementing the program for recruiting, training, and qualifying workers in respect of the operation and maintenance of the nuclear facility.

Operating Performance

- Paragraph 6(d) of the *Class I Nuclear Facilities Regulations* requires that an application for a licence to operate a Class I nuclear facility contains the proposed measures, policies, methods and procedures for operating and maintaining the nuclear facility.
- Subsection 24(5) of the *Nuclear Safety and Control Act* (NSCA) states that the licence may contain any term or condition that the Commission considers necessary for the purpose of the NSCA.

Safety Analysis

- 3(1)(i) of the *General Nuclear Safety and Control Regulations* requires that an application for a licence shall contain a description and the results of any test, analysis, or calculation performed to substantiate the information included in the application.
- It is a requirement of the *Class I Nuclear Facilities Regulations* that an application for a licence to operate a Class I nuclear facility shall contain the following information under paragraph:
 - 6(c), a final safety analysis report demonstrating the adequacy of the design of the nuclear facility.
 - 6(h), the effects on the environment and the health and safety of persons that may result from the operation and decommissioning of the nuclear facility, and the measures that will be taken to prevent or mitigate those effects.

Physical Design

- Paragraph 3(1)(d) of the *General Nuclear Safety and Control Regulations* requires that an application for a licence shall contain a description of any nuclear facility, prescribed equipment, or prescribed information to be encompassed by the licence.
- Other requirements set out in paragraphs 3(a), 3(b), 6(a) and 6(b) of the *Class I Nuclear Facilities Regulations* require more specific information to be submitted in the licence application related to the site and design of the facility and the final safety analysis report.
- Paragraphs 6(c) and 6(d) of the *Class I Nuclear Facilities Regulations* require that an application for a licence contain a final safety analysis report demonstrating the adequacy of the design of the facility and proposed measures, policies, methods, and procedures for operating and maintaining the facility.

Fitness for Service

- It is a requirement of the *Class I Nuclear Facilities Regulations* under paragraph 6(d) that an application for a licence to operate a Class I nuclear facility contain the proposed measures, policies, methods, and procedures for operating and maintaining the nuclear facility.

Radiation Protection

- The *General Nuclear Safety and Control Regulations* require, under subsection 3(1) that a licence application contain the following information under paragraph:
 - 3(1)(e), the proposed measures to ensure compliance with the *Radiation Protection Regulations*.
 - 3(1)(f), any proposed action level for the purpose of section 6 of the *Radiation Protection Regulations*
- The *Radiation Protection Regulations* require, under sections 4 to 6 that the licensee implements a radiation protection program, ascertain and record doses, and take the required actions in the case that an action level has been reached.
- The *Class I Nuclear Facilities Regulations* require that an application for a licence to operate a Class I nuclear facility contain the following information under paragraph:
 - 6(e), the proposed procedures for handling, storing, loading, and transporting nuclear substances and hazardous substances.
 - 6(h), the effects on the environment and the health and safety of persons that may result from the operation and decommissioning of the nuclear facility, and the measure that will be taken to prevent or mitigate those effects.

Conventional Health and Safety

- It is a requirement of the *Class I Nuclear Facilities Regulations* under paragraph 3(f) that an application for a licence in respect of a Class I nuclear facility, other than a licence to abandon, shall contain the proposed worker health and safety policies and procedures.
- The CRL's activities and operations must comply with the *Canada Labour Code, Part II: Occupational Health and Safety*.

Environmental Protection

- The *General Nuclear Safety and Control Regulations*, under paragraphs 12(1)(c) and (f) require that each licensee take all reasonable precautions to protect the environment and the health and safety of persons, and to control the release of radioactive nuclear substances and hazardous substances within the site of the licensed activity and into the environment.
- The *Radiation Protection Regulations* prescribe the dose limit for the general public, which under subsection 1(3) is 1mSv per calendar year.
- In addition, Sections 3 and 6 of the *Class I Nuclear Facilities Regulations* must be met by the applicant. The application for a licence shall contain under paragraph:

- 3(e), the name, form, characteristics, and quantity of any hazardous substances that may be on the site while the activity to be licensed is carried on.
- 3(g), the proposed environmental protection policies and procedures.
- 3(h), the proposed effluent and environmental monitoring programs.
- 6(e), the proposed procedures for handling, storing, loading, and transporting nuclear substances and hazardous substances.
- 6(h), the effects on the environment and the health and safety of persons that may result from the operation and decommissioning of the nuclear facility, and the measures that will be taken to prevent or mitigate those effects.
- 6(i), the proposed location of points of release, the proposed maximum quantities and concentrations, and the anticipated volume and flow rate of releases of nuclear substances and hazardous substances into the environment, including their physical, chemical, and radiological characteristics.
- 6(j), the proposed measures to control releases of nuclear substances and hazardous substances into the environment.

Emergency Management and Fire Protection

- 12(1)(c) of the *General Nuclear Safety and Control Regulations* states that every licensee shall “take all reasonable precautions to protect the environment and the health and safety of persons and to maintain the security of nuclear facilities, and of nuclear substances”.
- 12(1)(f) of the *General Nuclear Safety and Control Regulations* states that every licensee shall “take all reasonable precautions to control the release of radioactive nuclear substances or hazardous substances within the site of the licensed activity and into the environment of the licensed activity...”.
- It is a requirement of the *Class I Nuclear Facilities Regulations* under paragraph 6(k) that a licence application contain information on the licensee’s proposed measures to prevent or mitigate the effects of accidental releases of nuclear substances and hazardous substances on the environment, the health and safety of persons and the maintenance of national security, including measures to:
 - Assist offsite authorities in planning and preparing to limit the effects of an accidental release.
 - Notify offsite authorities of an accidental release or the imminence of an accidental release.
 - Report information to offsite authorities during and after an accidental release.
 - Assist offsite authorities in dealing with the effects of an accidental release.
 - Test the implementation of the measures to prevent or mitigate the effects of an accidental release.

Waste Management

- It is a requirement of the *General Nuclear Safety and Control Regulations* under paragraph 3(1)(j) that an application for a licence include the name, origin, quantity, form, and volume of any radioactive waste or hazardous waste that may result from the activity to be licensed, including waste that may be stored, managed, processed, or disposed of at the site of the activity to be licensed, and the proposed method for managing and disposing of that waste.

Security

- Paragraph 3(1)(e) of the *General Nuclear Safety and Control Regulations* requires that an application for a licence contains the proposed measures to ensure compliance with the *Radiation Protection Regulations*, the *Nuclear Security Regulations* and the *Packaging and Transport of Nuclear Substances Regulations, 2015*.
- Paragraph 12(1)(c) of the *General Nuclear Safety and Control Regulations* requires the licensee to take all reasonable precautions to protect the environment and the health and safety of persons and to maintain the security of nuclear facilities and of nuclear substances.
- Paragraph 6(k) of the *Class I Nuclear Facilities Regulations* requires that an application for a licence to operate a Class I nuclear facility contains the proposed measures to prevent or mitigate the effects of accidental releases of nuclear substances and hazardous substances to the environment, the health and safety of persons and the maintenance of national security.
- Paragraph 2(a) of Part 1 of *Nuclear Security Regulations* states that Part 1 applies to Category I, II or III nuclear material.
- Subsection 24(5) of the *Nuclear Safety and Control Act* (NSCA) [3] states that the licence may contain any term or condition that the Commission considers necessary for the purpose of the NSCA.

Safeguards and Non-Proliferation

- Paragraph 12(1)(i) of the *General Nuclear Safety and Control Regulations* requires the licensee to take all necessary measures to facilitate Canada's compliance with any applicable safeguard agreement.
- Paragraph 6(f) of the *Class I Nuclear Facilities Regulations* requires that an application for a licence to operate a Class I nuclear facility contains the proposed measures to facilitate Canada's compliance with any applicable safeguards agreement. The applicable safeguards agreements are:
 - Agreement Between the Government of Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/164); and
 - Protocol Additional to the Agreement Between Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/164/Add. 1).

Packaging and Transport

- CNL is required to comply with the Packaging and Transport of Nuclear Substances Regulations, 2015, and Transport Canada's Transportation of Dangerous Goods Regulations.

Cost Recovery

- Paragraph 24(2)(c) of the *Nuclear Safety and Control Act* requires that a licence application is accompanied by the prescribed fee.
- The *Canadian Nuclear Safety Commission Cost Recovery Fees Regulations* (CRFR) set out the specific requirements based on the activities to be licensed.

Financial Guarantee

- The *General Nuclear Safety and Control Regulations* requires under paragraph 3(1)(l) that a licence application contains a description of any proposed financial guarantee relating to the activity to be licensed.

Licensee Public Information Program

- It is a requirement of the *Class I Nuclear Facilities Regulations* under paragraph 3(j) that an application for a licence in respect of a Class I nuclear facility, other than a licence to abandon, shall contain information on the licensee's public information program.

C.2 Technical Basis

The technical basis for the recommendations presented in this CMD are as follows:

Management System

- CSA N286-12, Management system requirements for nuclear facilities
- CSA N286.0.1:21, Commentary on N286-12, Management system requirements for nuclear facilities

Human Performance Management

- REGDOC-2.2.4, Fitness for Duty: Managing Workers Fatigue
- RD-363, Nuclear Security Officer Medical, Physical, and Psychological Fitness
- G-323, Ensuring Presence of Sufficient Qualified Staff at Class I Nuclear Facilities: Minimum Staff Complement
- REGDOC-2.2.2, Personnel Training, version 2

Operating Performance

- REGDOC-2.3.1, Conduct of Licensed Activities: Construction and Commissioning Programs
- REGDOC-2.3.2, Accident Management, version 2

Safety Analysis

- REGDOC-2.4.1, Deterministic Safety Analysis
- REGDOC-2.4.3, Nuclear Criticality Safety
- REGDOC-2.11.1, Waste Management, Volume III: Assessing the Long Term Safety of Radioactive Waste Management, May 2018
- IAEA SSR-5, Disposal of Radioactive Waste, 2011
- IAEA SSG-23, The Safety Case and Safety Assessment of Disposal of Radioactive Waste, 2012
- IAEA SSG-29, Near Surface Disposal Facilities for Radioactive Waste, 2014
- Safety of Nuclear Fuel Cycle Facilities, IAEA SSR-4
- Safety Assessment for Facilities and Activities, IAEA No. GSR Part 4 (Rev.1)

Physical Design

- RD-367, Design of Small Reactor Facilities
- RD/GD-352, Design, Testing and Performance of Exposure Devices
- National Building Code of Canada
- REGDOC-2.5.2, Design of Reactor Facilities: Nuclear Power Plants
- G-276, Human Factors Engineering Program Plans
- G-278, Human Factors Verification and Validation Plans
- CSA N285.0/N285.6 Series, General requirements for pressure-retaining system and components in CANDU nuclear power plants / Material standards for reactor components for CANDU nuclear power plants
- CSA B51, Boiler, pressure vessel, and pressure piping code
- CSA N285.0.1, Commentary on CSA N285.0-12, General requirements for pressure retaining systems and components in CANDU nuclear power plants

Fitness for Service

- REGDOC-2.6.3, Aging Management
- CSA N291, Requirements for Safety-Related Structures for CANDU Nuclear Power Plants
- RD/GD-210, Maintenance Programs for Nuclear Power Plants

Radiation Protection

- G-129, Revision 1, Keeping Radiation Exposures and Doses “As Low as Reasonably Achievable (ALARA)”
- G-228, Developing and Using Action Levels

Conventional Health and Safety

- CSA Z460, Control of hazardous energy – Lockout and other methods
- CSA Z462, Workplace Electrical Safety

Environmental Protection

- REGDOC-2.9.1, Environmental Protection: Environmental Principles, Assessments and Protection Measures, version 1.1
- N288.1, Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities
- N288.2, Guidelines for calculating the radiological consequences to the public of a release of airborne radioactive material for nuclear reactor accidents
- N288.3.4, Performance testing of nuclear air-cleaning systems at nuclear facilities
- N288.4, Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills
- N288.5, Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills facilities
- N288.6, Environmental risk assessment at class I nuclear facilities and uranium mines and mills
- N288.7, Groundwater protection programs at Class I nuclear facilities and uranium mines and mills
- N288.8, Establishing and implementing action levels for releases to the environment from nuclear facilities

Emergency Management and Fire Protection

- REGDOC-2.10.1, Nuclear Emergency Preparedness and Response, version 2
- N-1600, General requirements for nuclear emergency management programs
- N393, Fire protection for facilities that process, handle, or store nuclear substances
- National Fire Code of Canada
- Canadian Nuclear Safety Commission (CNSC), Accident Management, REGDOC-2.3.2, Version 2, 2015

Waste Management

- CSA N292.1, Wet storage of irradiated fuel and other radioactive materials
- CSA N292.3, Management of low- and intermediate-level radioactive waste
- CSA N292.0, General principles for the management of radioactive waste and irradiated fuel
- CSA N292.5, Guideline for the exemption or clearance from regulatory control of materials that contain, or potentially contain, nuclear substances
- CSA N294, Decommissioning of facilities containing nuclear substances

- G-219, Decommissioning Planning for Licensed Activities
- G-320, Assessing the Long-term Safety of Radioactive Waste Management
- REGDOC-2.11.1, Waste Management, Volume III: Assessing the Long-Term Safety of Radioactive Waste Management, May 2018.
- IAEA SSR-5, Disposal of Radioactive Waste, 2011.
- IAEA SSG-23, The Safety Case and Safety Assessment of Disposal of Radioactive Waste, 2012.
- IAEA SSG-29, Near Surface Disposal Facilities for Radioactive Waste, 2014.
- Classification of Radioactive Waste, IAEA Safety Standard, Series No. GSG-1, 2009
- Monitoring and Surveillance of Radioactive Waste Disposal Facilities, IAEA Safety Guide SSG-31
- Safety of Nuclear Fuel Cycle Facilities, IAEA SSR-4
- Safety Assessment for Facilities and Activities, IAEA No. GSR Part 4 (Rev.1)

Security

- RD-321, Criteria for Physical Protection Systems and Devices at High-Security Sites (document contains prescribed information)
- RD-361, Criteria for Explosive Substance Detection, X-ray Imaging, and Metal Detection Devices at High-Security Sites (document contains prescribed information)
- REGDOC-2.12.1, *High-Security Sites: Nuclear Response Force* (document contains prescribed information)
- REGDOC-2.12.2, *Site Access Security Clearance*
- REGDOC-2.12.3, *Security of Nuclear Substances: Sealed Sources*
- G-208, *Transportation Security Plans for Category I, II or III Nuclear Material*
- G-274, *Security Programs for Category I or II Nuclear Material or Certain Nuclear Facilities*
- N290.7, Cyber-security for nuclear power plants and small reactor facilities

Safeguards and Non-Proliferation

- REGDOC 2.13.1 Safeguards and Nuclear Material Accountancy
- REGDOC-2.13.2, Import and Export

Packaging and Transport

- RD-364, Joint Canada-United States Guide for Approval of Type B(U) and Fissile Material Transportation Packages
- REGDOC-2.14.1, Information Incorporated by Reference in Canada's Packaging and Transport of Nuclear Substances Regulations, 2015

Indigenous Consultation

- REGDOC-3.2.2, Indigenous Engagement

Financial Guarantee

- G-206, Financial Guarantee for the Decommissioning of Licensed Activities Licensee
Public Information Program

D. SAFETY AND CONTROL AREA FRAMEWORK

D.1 Safety and Control Areas Defined

The safety and control areas identified in section 2.2, and discussed in summary in sections 4.1 through 4.14 are comprised of specific areas of regulatory interest which vary between facility types.

The following table provides a high-level definition of each SCA. The specific areas within each SCA are to be identified by the CMD preparation team in the respective areas within section 4 of this CMD.

SAFETY AND CONTROL AREA FRAMEWORK		
Functional Area	Safety and Control Area	Definition
Management	Management System	Covers the framework which establishes the processes and programs required to ensure an organization achieves its safety objectives and continuously monitors its performance against these objectives and fostering a healthy safety culture.
	Human Performance Management	Covers activities that enable effective human performance through the development and implementation of processes that ensure that licensee staff is sufficient in number in all relevant job areas and that licensee staff have the necessary knowledge, skills, procedures and tools in place to safely carry out their duties.
	Operating Performance	This includes an overall review of the conduct of the licensed activities and the activities that enable effective performance.
Facility and Equipment	Safety Analysis	Maintenance of the safety analysis that supports that overall safety case for the facility. Safety analysis is a systematic evaluation of the potential hazards associated with the conduct of a proposed activity or facility and considers the effectiveness of preventative measures and strategies in reducing the effects of such hazards.

SAFETY AND CONTROL AREA FRAMEWORK		
Functional Area	Safety and Control Area	Definition
	Physical Design	Relates to activities that impact on the ability of systems, components and structures to meet and maintain their design basis given new information arising over time and taking changes in the external environment into account.
	Fitness for Service	Covers activities that impact on the physical condition of systems, components and structures to ensure that they remain effective over time. This includes programs that ensure all equipment is available to perform its intended design function when called upon to do so.
Core Control Processes	Radiation Protection	Covers the implementation of a radiation protection program in accordance with the RP Regulations. This program must ensure that contamination and radiation doses received are monitored and controlled.
	Conventional Health and Safety	Covers the implementation of a program to manage workplace safety hazards and to protect personnel and equipment.
	Environmental Protection	Covers programs that identify, control and monitor all releases of radioactive and hazardous substances and effects on the environment from facilities or as the result of licensed activities.
	Emergency Management and Fire Protection	Covers emergency plans and emergency preparedness programs which exist for emergencies and for non-routine conditions. This also includes any results of exercise participation.
	Waste Management	Covers internal waste-related programs which form part of the facility's operations up to the point where the waste is removed from the facility to a separate waste management facility. Also covers the planning for decommissioning.
	Security	Covers the programs required to implement and support the security requirements stipulated in the regulations, in their licence, in

SAFETY AND CONTROL AREA FRAMEWORK		
Functional Area	Safety and Control Area	Definition
		orders, or in expectations for their facility or activity.
	Safeguards and Non-Proliferation	Covers the programs and activities required for the successful implementation of the obligations arising from the Canada/IAEA safeguards agreements as well as other measures arising from the <i>Treaty on the Non-Proliferation of Nuclear Weapons</i> .
	Packaging and Transport	Programs that cover the safe packaging and transport of nuclear substances and radiation devices to and from the licensed facility.

D.2 Specific Areas for this Facility Type

The following table identifies the specific areas that comprise each SCA for the proposed NSDF at the CRL site:

SPECIFIC AREAS FOR THIS FACILITY TYPE		
Functional Area	Safety and Control Area	Specific Areas
Management	Management System	<ul style="list-style-type: none"> Management System Management of Contractors
	Human Performance Management	<ul style="list-style-type: none"> Human Performance Programs Work Organization and Job Design Fitness for Duty Personnel Training
	Operating Performance	<ul style="list-style-type: none"> Facility Design Procedures Reporting and Trending
Facility and Equipment	Safety Analysis	<ul style="list-style-type: none"> Deterministic Safety Analysis Hazard Analysis Nuclear Criticality Safety
	Physical Design	<ul style="list-style-type: none"> Design Governance Site Characterization Structure Design System Design Components Design
	Fitness for Service	<ul style="list-style-type: none"> Maintenance Chemistry Control Aging Management
Core Control Processes	Radiation Protection	<ul style="list-style-type: none"> Application of ALARA Worker Dose Control Radiation Protection Program Performance Radiological Hazard Control
	Conventional Health and Safety	<ul style="list-style-type: none"> Performance Practices Awareness
	Environmental Protection	<ul style="list-style-type: none"> Effluent and Emissions Control (releases)

SPECIFIC AREAS FOR THIS FACILITY TYPE		
Functional Area	Safety and Control Area	Specific Areas
		<ul style="list-style-type: none"> ▪ Assessment and Monitoring ▪ Environmental Management System ▪ Protection of People ▪ Environmental Risk Assessment (ERA)
	Emergency Management and Fire Protection	<ul style="list-style-type: none"> ▪ Conventional Emergency Preparedness and Response ▪ Nuclear Emergency Preparedness and Response ▪ Fire Emergency Preparedness and Response
	Waste Management	<ul style="list-style-type: none"> ▪ Waste Characterization ▪ Waste Minimization ▪ Waste Management Practices ▪ Decommissioning Plans
	Security	<ul style="list-style-type: none"> ▪ Facilities and Equipment ▪ Response Arrangements ▪ Security Practices ▪ Drills and Exercises ▪ Cybersecurity
	Safeguards and Non-Proliferation	<ul style="list-style-type: none"> ▪ Access and Assistance to the IAEA ▪ Operational and Design Information
	Packaging and Transport	N/A

E. SUPPORTING DETAILS

E.1 Mapping of CNSC Regulatory Requirements To CNL Submission – Regulatory Compliance Matrix

E.1.1 - GENERAL NUCLEAR SAFETY AND CONTROL REGULATIONS (GNSCR) - SOR/2000-202

GENERAL NUCLEAR SAFETY AND CONTROL REGULATIONS (GNSCR) - SOR/2000-202		
Paragraph	Regulatory Requirement	CNL Submissions Addressing the Regulatory Requirement
3 (1) (a)	an application for a licence shall contain the following information: (a) the applicants name and business address	CNL/ CRL Operating Licence Licence Application
3 (1) (b)	the activity to be licensed and its purpose	CNL Submission to construct the NSDF (March 31, 2017 application) and updated CNL submission, March 2021
3 (1) (c)	the name, maximum quantity and form of any nuclear substance to be encompassed by the licence	<ul style="list-style-type: none"> ▪ Post closure safety assessment ▪ Safety Analysis Report ▪ Safety Case
3 (1) (d)	a description of any nuclear facility, prescribed equipment or prescribed information to be encompassed by the licence	<ul style="list-style-type: none"> ▪ Design Description ▪ Design Requirements ▪ Safety Analysis Report ▪ Performance Assessment ▪ Post Closure Safety Assessment ▪ Safety Case ▪ Waste Acceptance Criteria
3 (1) (e)	the proposed measures to ensure compliance with the <i>Radiation Protection Regulations</i> and the <i>Nuclear Security Regulations</i>	<ul style="list-style-type: none"> ▪ Licence Condition 7.1: Radiation Protection Program of the CRL LCH ▪ Licence Condition 12.1: Security Program of the CRL LCH ▪ ALARA Assessment ▪ Safety Analysis Report
3 (1) (f)	any proposed action level for the purpose of section 6 of the <i>Radiation Protection Regulations</i>	<ul style="list-style-type: none"> ▪ Licence Condition 9.1: Environmental Protection Program of the CRL LCH (Environmental action levels) ▪ Licence Condition 7.1: Radiation Protection Program of the CRL LCH (Radiation Protection action levels)
3 (1) (g)	the proposed measures to control access to the site of the activity to be licensed and the nuclear substance, prescribed equipment or prescribed information	<ul style="list-style-type: none"> ▪ Compliance with the Nuclear Security Regulations and CNL Security Program ▪ Cyber Security Program as per ▪ as required by Licence Condition 12.1: Security Program of the CRL LCH.

GENERAL NUCLEAR SAFETY AND CONTROL REGULATIONS (GNSCR) - SOR/2000-202		
Paragraph	Regulatory Requirement	CNL Submissions Addressing the Regulatory Requirement
3 (1) (h)	the proposed measures to prevent loss or illegal use, possession or removal of the nuclear substance, prescribed equipment or prescribed information	<ul style="list-style-type: none"> Compliance with the Nuclear Security Regulations and CNL Security Program and Cyber Security Program as per as required by Licence Condition 12.1: Security Program of the CRL LCH
3 (1) (i)	a description and the results of any test, analysis or calculation performed to substantiate the information included in the application	<ul style="list-style-type: none"> Safety Analysis Report Post Closure Safety Assessment Safety Case
3 (1) (j)	the name, quantity, form, origin and volume of any radioactive waste or hazardous waste that may result from the activity to be licensed, including waste that may be stored, managed, processed or disposed of at the site of the activity to be licensed, and the proposed method for managing and disposing of that waste	<ul style="list-style-type: none"> Safety Analysis Report Post Closure Safety Assessment Safety Case
3 (1) (k)	the applicant's organizational management structure insofar as it may bear on the applicant's compliance with the Act and the regulations made under the Act, including the internal allocation of functions, responsibilities and authority	<ul style="list-style-type: none"> <i>CNL Management System Manual</i>, 900-514100-MAN-001, Revision 1, August 2020 Management System SCA Licence Condition 1.1 Requirements
3 (1) (l)	a description of any proposed financial guarantee relating to the activity to be licensed	<ul style="list-style-type: none"> Rickford, G., (NRCAN), Letter to Binder, M., (CNSC), <i>untitled, relating to provision of financial guarantees for CNL sites in Canada</i>, 145-NRCANNO-15-0001-L, 2015 July 31 (e-Doc 4815508) Boyle, P. (CNL), Letter to Murthy, K. (CNSC), <i>Submission of Information Regarding Financial Guarantees for All Atomic Energy of Canada Limited Sites Operated by Canadian Nuclear</i>

GENERAL NUCLEAR SAFETY AND CONTROL REGULATIONS (GNSCR) - SOR/2000-202		
Paragraph	Regulatory Requirement	CNL Submissions Addressing the Regulatory Requirement
		<i>Laboratories</i> , 145-CNNO-20-0028-L, 2020 August 25 (6373440 and 6373441)
3 (1) (m)	any other information required by the Act or the regulations made under the Act for the activity to be licensed and the nuclear substance, nuclear facility, prescribed equipment or prescribed information to be encompassed by the licence	<ul style="list-style-type: none"> Operating Performance SCA Licence Condition 3.2: Reporting Requirements of the CRL LCH
3 (1.1) (a)	the Commission or a designated officer authorized under paragraph 37(2)(c) of the Act, may require any other information that is necessary to enable the Commission or the designated officer to determine whether the applicant is qualified to carry on the activity to be licensed; or	<ul style="list-style-type: none"> <i>CNL Management System Manual</i>, 900-514100-MAN-001, Revision 1, August 2020 Management System SCA Licence Condition 1.1 Requirements Safety Case
3 (1.1) (b)	will, in carrying on that activity, make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed	<ul style="list-style-type: none"> <i>Environmental Protection Program Requirements Document, and Program Description Document</i> and associated Licence Condition 9.1 requirements <i>Occupational Safety and Health Program Requirements and Program Description Documents</i> and associated Licence Conditions requirements <i>Nuclear Materials and Safeguards Management Program Requirements and Program Description documents</i> and associated Licence Conditions requirements
6 (a)	<p>an application for the amendment, revocation or replacement of a licence shall contain the following information:</p> <p>a description of the amendment, revocation or replacement and of the measures that will be taken and the methods and procedures that will be used to implement it</p>	<ul style="list-style-type: none"> CNL letter dated March 26, 2021 (e-Doc 6523912) Safety Case

GENERAL NUCLEAR SAFETY AND CONTROL REGULATIONS (GNSCR) - SOR/2000-202		
Paragraph	Regulatory Requirement	CNL Submissions Addressing the Regulatory Requirement
6 (b)	a statement identifying the changes in the information contained in the most recent application for the licence	<ul style="list-style-type: none"> ▪ CNL letter dated March 26, 2021 (e-Doc 6523912) ▪ Safety Case
6 (c)	a description of the nuclear substances, land, areas, buildings, structures, components, equipment and systems that will be affected by the amendment, revocation or replacement and of the manner in which they will be affected; and	<ul style="list-style-type: none"> ▪ Safety Analysis Report ▪ Safety Case
6 (d)	the proposed starting date and the expected completion date of any modification encompassed by the application	<ul style="list-style-type: none"> ▪ CNL letter dated March 26, 2021 (e-Doc 6523912) ▪ Planned Starting date - Construction: September 2022 ▪ Planned Starting date - Operations: 2025 and will continue for 50 years
15 (a)	every applicant for licence and every licensee shall notify the Commission of the persons who have authority to act for them in their dealings with the Commission	<ul style="list-style-type: none"> ▪ <i>CNL Management System Manual</i>, 900-514100-MAN-001, Revision 1, August 2020 ▪ Management System SCA Licence Condition 1.1 Requirements
15 (b)	the names and position titles of the persons who are responsible for the management and control of the licensed activity and the nuclear substance, nuclear facility, prescribed equipment or prescribed information encompassed by the licence	<ul style="list-style-type: none"> ▪ <i>CNL Management System Manual</i>, 900-514100-MAN-001, Revision 1, August 2020 ▪ Management System SCA Licence Condition 1.1 Requirements
27	Every licensee shall keep a record of all information relating to the licence that is submitted by the licensee to the Commission	<ul style="list-style-type: none"> ▪ CNL letter dated March 26, 2021 (e-Doc 6523912) ▪ <i>CNL Management System Manual</i>, 900-514100-MAN-001, Revision 1, August 2020 ▪ Creation, Capture and Use of Information Assets standard (e-Doc 6616838)

E.1.2 - Class I Nuclear Facilities Regulations (SOR/2000-204)

CLASS I NUCLEAR FACILITIES REGULATIONS (SOR/2000-204)		
Paragraph	Regulatory Requirements	CNL submission addressing the Regulatory Requirements
3 (a)	An application for a licence in respect of a Class I nuclear facility, other than a licence to abandon, shall contain the following information in addition to the information required by section 3 of the <i>General Nuclear Safety and Control Regulations</i> : a description of the site of the activity to be licensed, including the location of any exclusion zone and any structures within that zone	<ul style="list-style-type: none"> ▪ Design Description ▪ Design Requirements ▪ Safety Case ▪ Safety Analysis Report
3 (b)	plans showing the location, perimeter, areas, structures and systems of the nuclear facility	<ul style="list-style-type: none"> ▪ Design Description ▪ Design Requirements ▪ Safety Case ▪ Safety Analysis Report
3 (c)	evidence that the applicant is the owner of the site or has authority from the owner of the site to carry on the activity to be licensed	<ul style="list-style-type: none"> ▪ Rickford, G., (NRCan), Letter to Binder, M., (CNSC), <i>untitled, relating to provision of financial guarantees for CNL sites in Canada</i>, 145-NRCANNO-15-0001-L, 2015 July 31 (e-Doc 4815508) ▪ Boyle, P. (CNL), Letter to Murthy, K. (CNSC), <i>Submission of Information Regarding Financial Guarantees for All Atomic Energy of Canada Limited Sites Operated by Canadian Nuclear Laboratories</i>, 145-CNNO-20-0028-L, 2020 August 25 (6373440 and 6373441) ▪ Licence Condition G.5 of the CRL LCH
3 (d)	the proposed quality assurance program for the activity to be licensed	<ul style="list-style-type: none"> ▪ <i>CNL Management System Manual</i>, 900-514100-MAN-001, Revision 1, August 2020 ▪ Safety Case ▪ Safety Analysis Report
3 (d.1)	the proposed human performance program for the activity to be	<ul style="list-style-type: none"> ▪ "Human Performance Management" SCA Licence condition 2.1 requirements of the CRL LCH

CLASS I NUCLEAR FACILITIES REGULATIONS (SOR/2000-204)		
Paragraph	Regulatory Requirements	CNL submission addressing the Regulatory Requirements
	licensed, including measures to ensure workers' fitness for duty	
3 (e)	the name, form, characteristics and quantity of any hazardous substances that may be on the site while the activity to be licensed is carried on	<ul style="list-style-type: none"> ▪ Safety Case ▪ Safety Analysis Report ▪ Waste acceptance Criteria WAC ▪ Design description ▪ Inventory of contaminants of potential concern
3 (f)	the proposed worker health and safety policies and procedures	<ul style="list-style-type: none"> ▪ Occupational Safety and Health Program requirements as per Licence Condition 8.1 ▪ NSDF Conventional Health and Safety documents
3 (g)	the proposed environmental protection policies and procedures	<ul style="list-style-type: none"> ▪ Environmental Protection Program Requirements Document, and Program Description Document and associated Licence Condition 9.1 requirements
3 (h)	the proposed effluent and environmental monitoring programs	<ul style="list-style-type: none"> ▪ Safety Case ▪ Safety Analysis Report ▪ Environmental Impact Statement (EIS)
3 (j)	the proposed program to inform persons living in the vicinity of the site of the general nature and characteristics of the anticipated effects on the environment and the health and safety of persons that may result from the activity to be licensed; and	<ul style="list-style-type: none"> ▪ Public Information Program and Public Disclosure as per licence condition G6 requirements ▪ Emergency Preparedness Program Management and Fire Protection Licence Condition 10.1 of the CRL LCH ▪ Environmental Impact Statement (EIS) ▪ Safety Case
3 (k)	the proposed plan for the decommissioning of the nuclear facility or of the site	<ul style="list-style-type: none"> ▪ Preliminary Decommissioning Plan (PDD) ▪ Safety Analysis Report ▪ Safety Case
4 (a)	<p>an application for a licence to prepare a site for a Class I nuclear facility shall contain the following information in addition to the information required by section 3:</p> <p>a description of the site evaluation process and of the investigations and preparatory work that have been and will be one on the site and in the surrounding area</p>	<ul style="list-style-type: none"> ▪ Safety Case ▪ EIS ▪ Design Description

CLASS I NUCLEAR FACILITIES REGULATIONS (SOR/2000-204)		
Paragraph	Regulatory Requirements	CNL submission addressing the Regulatory Requirements
4 (b)	a description of the site's susceptibility to human activity and natural phenomena, including seismic events, tornadoes and floods	<ul style="list-style-type: none"> ▪ Safety Analysis Report ▪ Safety Case ▪ Post Closure Safety Assessment ▪ EIS
4 (c)	the proposed program to determine the environmental baseline characteristics of the site and the surrounding area	<ul style="list-style-type: none"> ▪ EIS
4 (d)	the proposed quality assurance program for the design of the nuclear facility; and	<ul style="list-style-type: none"> ▪ <i>CNL Management System Manual</i>, 900-514100-MAN-001, Revision 1, August 2020 ▪ Management System SCA Licence Condition 1.1 Requirements ▪ Design Description ▪ Safety Analysis Report ▪ Safety Case
4 (e)	the effects on the environment and the health and safety of persons that may result from the activity to be licensed, and the measures that will be taken to prevent or mitigate those effects	<ul style="list-style-type: none"> ▪ EIS ▪ Post Closure Safety Assessment ▪ Safety Analysis Report ▪ Safety Case
5 (a)	<p>an application for a licence to construct a Class I nuclear facility shall contain the following information in addition to the information required by section 3:</p> <p>a description of the proposed design of the nuclear facility, including the manner in which the physical and environmental characteristics of the site are taken into account in the design</p>	<ul style="list-style-type: none"> ▪ EIS ▪ Design Description ▪ Safety Analysis Report ▪ Safety Case
5 (b)	a description of the environmental baseline characteristics of the site and the surrounding area	<ul style="list-style-type: none"> ▪ EIS
5 (c)	the proposed construction program, including its schedule	<ul style="list-style-type: none"> ▪ Construction activities will be performed in accordance with the CNL Construction Program

CLASS I NUCLEAR FACILITIES REGULATIONS (SOR/2000-204)		
Paragraph	Regulatory Requirements	CNL submission addressing the Regulatory Requirements
		<ul style="list-style-type: none"> ▪ Licence condition 3.1: Operating Program of the CRL LCH ▪ NSDF Construction Quality Assurance Program ▪ Design description ▪ Construction Schedule (updated) ▪ Safety Analysis Report ▪ Safety Case
5 (d)	a description of the structures proposed to be built as part of the nuclear facility, including their design and their design characteristics	<ul style="list-style-type: none"> ▪ NSDF Construction Quality Assurance Program ▪ Design description ▪ Safety Analysis Report ▪ Safety Case
5 (e)	a description of the systems and equipment proposed to be installed at the nuclear facility, including their design and their design operating conditions	<ul style="list-style-type: none"> ▪ Design description ▪ Safety Analysis Report ▪ Safety Case
5 (f)	a preliminary safety analysis report demonstrating the adequacy of the design of the nuclear facility	<ul style="list-style-type: none"> ▪ Design description ▪ Safety Analysis Report ▪ Safety Case ▪ All safety assessment supporting the Safety Case
5 (g)	the proposed quality assurance program for the design of the nuclear facility	<ul style="list-style-type: none"> ▪ Design description ▪ Safety Analysis Report ▪ Safety Case ▪ <i>CNL Management System Manual</i>, 900-514100-MAN-001, Revision 1, August 2020
5 (h)	the proposed measures to facilitate Canada's compliance with any applicable safeguards agreement	<ul style="list-style-type: none"> ▪ CNL Nuclear Materials and Safeguards Management Program ▪ Licence Condition 13.1; Safeguards Program requirements of the CRL LCH
5 (i)	the effects on the environment and the health and safety of persons that may result from the construction, operation and decommissioning of the nuclear facility, and the measures that will be taken to prevent or mitigate those effects	<ul style="list-style-type: none"> ▪ EIS ▪ Design Description ▪ Safety Analysis Report ▪ Safety Case
5 (j)	the proposed location of points of release, the proposed maximum	<ul style="list-style-type: none"> ▪ EIS ▪ Safety Analysis Report

CLASS I NUCLEAR FACILITIES REGULATIONS (SOR/2000-204)		
Paragraph	Regulatory Requirements	CNL submission addressing the Regulatory Requirements
	quantities and concentrations, and the anticipated volume and flow rate of releases of nuclear substances and hazardous substances into the environment, including their physical, chemical and radiological characteristics	<ul style="list-style-type: none"> ▪ Safety Case
5 (k)	the proposed measures to control releases of nuclear substances and hazardous substances into the environment	<ul style="list-style-type: none"> ▪ EIS ▪ Safety Analysis Report ▪ Safety Case
5 (l)	the proposed program and schedule for recruiting, training and qualifying workers in respect of the operation and maintenance of the nuclear facility	<ul style="list-style-type: none"> ▪ CNL Training and Development Program ▪ Licence condition 2.2: Training Program of the CRL LCH
6(a)	<p>an application for a licence to operate a Class I nuclear facility shall contain the following information in addition to the information required by Section 3 :</p> <p>a description of the structures at the nuclear facility, including their design and their design operating conditions</p>	<ul style="list-style-type: none"> ▪ Design Description ▪ Safety Analysis Report ▪ Safety Case
6(b)	a description of the systems and equipment at the nuclear facility, including their design and their design operating conditions	<ul style="list-style-type: none"> ▪ Design Description ▪ Safety Analysis Report ▪ Safety Case
6(c)	a final safety analysis report demonstrating the adequacy of the design of the nuclear facility	<ul style="list-style-type: none"> ▪ Design Description ▪ Safety Analysis Report ▪ Safety Case
6(d)	the proposed measures, policies, methods and procedures for operating and maintaining the nuclear facility	<ul style="list-style-type: none"> ▪ Safety Analysis Report ▪ Safety Case ▪ CNL Conduct of Operations Program ▪ Licence condition 3.1: Operating Program of the CRL LCH ▪ CNL Maintenance and Work Management Program

CLASS I NUCLEAR FACILITIES REGULATIONS (SOR/2000-204)		
Paragraph	Regulatory Requirements	CNL submission addressing the Regulatory Requirements
		<ul style="list-style-type: none"> ▪ Licence condition 6.1: Fitness for ▪ Service Program of the CRL LCH
6(e)	the proposed procedures for handling, storing, loading and transporting nuclear substances and hazardous substances	<ul style="list-style-type: none"> ▪ Safety Analysis Report ▪ Safety Case ▪ CNL Transportation of Dangerous Goods Program ▪ Licence condition 3.1: Operating Program of the CRL LCH ▪ CNL Maintenance and Work Management Program ▪ Licence ▪ 14.1: Packaging and Transport Program of the CRL LCH
6(f)	the proposed measures to facilitate Canada's compliance with any applicable safeguards agreement	<ul style="list-style-type: none"> ▪ CNL Nuclear Materials and Safeguards Management Program ▪ Licence Condition 13.1; Safeguards Program requirements of the CRL LCH
6(g)	the proposed commissioning program for the systems and equipment that will be used at the nuclear facility	<ul style="list-style-type: none"> ▪ CNL Commissioning Program ▪ Licence Condition 3.1; Operating Performance requirements of the CRL LCH
6(h)	the effects on the environment and the health and safety of persons that may result from the operation and decommissioning of the nuclear facility, and the measures that will be taken to prevent or mitigate those effects	<ul style="list-style-type: none"> ▪ EIS ▪ Safety Analysis Report ▪ Safety Case
6 (i)	the proposed location of points of release, the proposed maximum quantities and concentrations, and the anticipated volume and flow rate of releases of nuclear substances and hazardous substances into the environment, including their physical, chemical and radiological characteristics	<ul style="list-style-type: none"> ▪ EIS ▪ Safety Analysis Report ▪ Safety Case
6(j)	the proposed measures to control releases of nuclear substances and hazardous substances into the environment	<ul style="list-style-type: none"> ▪ EIS ▪ Safety Analysis Report ▪ CNL Environmental Protection Program ▪ Licence Condition 9.1: EPP requirements of the CRL LCH

CLASS I NUCLEAR FACILITIES REGULATIONS (SOR/2000-204)		
Paragraph	Regulatory Requirements	CNL submission addressing the Regulatory Requirements
6(k)	the proposed measures to prevent or mitigate the effects of accidental releases of nuclear substances and hazardous substances on the environment, the health and safety of persons and the maintenance of national security, including measures to	<ul style="list-style-type: none"> ▪ EIS ▪ Safety Analysis Report ▪ CNL Environmental Protection Program ▪ Licence Condition 9.1: EPP requirements of the CRL LCH ▪ CNL Emergency Preparedness Program ▪ Licence Condition 10.1: Emergency Preparedness requirements of the CRL LCH ▪ CNL Radiation Protection Program ▪ Licence Condition 7.1: RPP requirements of the CRL LCH
6(k) (i)	assist off-site authorities in planning and preparing to limit the effects of an accidental release	<ul style="list-style-type: none"> ▪ EIS ▪ Safety Analysis Report ▪ CNL Environmental Protection Program ▪ Licence Condition 9.1: EPP requirements of the CRL LCH ▪ CNL Emergency Preparedness Program ▪ Licence Condition 10.1: Emergency Preparedness requirements of the CRL LCH ▪ CNL Radiation Protection Program ▪ Licence Condition 7.1: RPP requirements of the CRL LCH
6(k) (ii)	notify off-site authorities of an accidental release or the imminence of an accidental release	<ul style="list-style-type: none"> ▪ EIS ▪ Safety Analysis Report ▪ CNL Environmental Protection Program ▪ Licence Condition 9.1: EPP requirements of the CRL LCH ▪ CNL Emergency Preparedness Program ▪ Licence Condition 10.1: Emergency Preparedness requirements of the CRL LCH ▪ CNL Radiation Protection Program ▪ Licence Condition 7.1: RPP requirements of the CRL LCH
6(k) (iii)	report information to off-site authorities during and after an accidental release	<ul style="list-style-type: none"> ▪ EIS ▪ Safety Analysis Report ▪ CNL Environmental Protection Program ▪ Licence Condition 9.1: EPP requirements of the CRL LCH ▪ CNL Emergency Preparedness Program ▪ Licence Condition 10.1: Emergency Preparedness requirements of the CRL LCH ▪ CNL Radiation Protection Program

CLASS I NUCLEAR FACILITIES REGULATIONS (SOR/2000-204)		
Paragraph	Regulatory Requirements	CNL submission addressing the Regulatory Requirements
		<ul style="list-style-type: none"> ▪ Licence Condition 7.1: RPP requirements of the CRL LCH
6(k) (iv)	assist off-site authorities in dealing with the effects of an accidental release, and	<ul style="list-style-type: none"> ▪ EIS ▪ Safety Analysis Report ▪ CNL Environmental Protection Program ▪ Licence Condition 9.1: EPP requirements of the CRL LCH ▪ CNL Emergency Preparedness Program ▪ Licence Condition 10.1: Emergency Preparedness requirements of the CRL LCH ▪ CNL Radiation Protection Program ▪ Licence Condition 7.1: RPP requirements of the CRL LCH
6(k) (v)	test the implementation of the measures to prevent or mitigate the effects of an accidental release	<ul style="list-style-type: none"> ▪ EIS ▪ Safety Analysis Report ▪ CNL Environmental Protection Program ▪ Licence Condition 9.1: EPP requirements of the CRL LCH ▪ CNL Emergency Preparedness Program ▪ Licence Condition 10.1: Emergency Preparedness requirements of the CRL LCH ▪ CNL Radiation Protection Program ▪ Licence Condition 7.1: RPP requirements of the CRL LCH
6(l)	the proposed measures to prevent acts of sabotage or attempted sabotage at the nuclear facility, including measures to alert the licensee to such acts	<ul style="list-style-type: none"> ▪ Compliance with the Nuclear Security Regulations and CNL Security Program ▪ Cyber Security Program as per as required by Licence Condition 12.1: Security Program of the CRL LCH.
6(m)	the proposed responsibilities of and qualification requirements and training program for workers, including the procedures for the requalification of workers; and	<ul style="list-style-type: none"> ▪ CNL Training and Development Program ▪ Licence condition 2.2: Training Program of the CRL LCH ▪ Safety Analysis Report
6(n)	the results that have been achieved in implementing the program for recruiting, training and qualifying workers in respect of the operation and maintenance of the nuclear facility	<ul style="list-style-type: none"> ▪ CNL Training and Development Program ▪ Licence condition 2.2: Training Program of the CRL LCH ▪ Safety Analysis Report
14 (1)	every licensee shall keep a record of the results of the effluent and	<ul style="list-style-type: none"> ▪ CNL information Management Program Documents (PRD and PDD)

CLASS I NUCLEAR FACILITIES REGULATIONS (SOR/2000-204)		
Paragraph	Regulatory Requirements	CNL submission addressing the Regulatory Requirements
	environmental monitoring programs referred to in the licence	
14 (2) (a)	every licensee who operates a Class I nuclear facility shall keep a record of operating and maintenance procedures	<ul style="list-style-type: none"> ▪ As per the CRL licence and LCH ▪ CNL internal program and procedures
14 (2) (b)	the results of the commissioning program referred to in the licence	<ul style="list-style-type: none"> ▪ As per the CRL licence and LCH ▪ CNL internal program and procedures
14 (2) (c)	the results of the inspection and maintenance programs referred to in the licence	<ul style="list-style-type: none"> ▪ As per the CRL licence and LCH ▪ CNL internal program and procedures
14 (2) (d)	the nature and amount of radiation, nuclear substances and hazardous substances within the nuclear facility; and	<ul style="list-style-type: none"> ▪ Waste inventory ▪ Safety Analysis Report ▪ Safety Case
14 (2) (e)	the status of each worker's qualifications, requalification and training, including the results of all tests and examinations completed in accordance with the licence	<ul style="list-style-type: none"> ▪ CNL Training and Development Program ▪ Licence condition 2.2: Training Program of the CRL LCH Safety Analysis Report
14 (3)	<p>Every licensee who decommissions a Class I nuclear facility shall keep a record of</p> <ul style="list-style-type: none"> (a) the progress achieved in meeting the schedule for the decommissioning (b) the implementation and results of the decommissioning (c) the manner in which and the location at which any nuclear or hazardous waste is managed, stored, disposed of or transferred (d) the name and quantity of any radioactive nuclear substances, hazardous substances and radiation 	<ul style="list-style-type: none"> ▪ As per the CRL operating Licence and associated LCH ▪ Preliminary Decommissioning Report ▪ Future Detailed Decommissioning Report ▪ Safety Analysis Report ▪ Safety Case ▪ EIS ▪ CNL Training and Development Program ▪ Licence condition 2.2: Training Program of the CRL LCH ▪ Safety Analysis Report

CLASS I NUCLEAR FACILITIES REGULATIONS (SOR/2000-204)		
Paragraph	Regulatory Requirements	CNL submission addressing the Regulatory Requirements
	that remain at the nuclear facility after completion of the decommissioning; and (e) the status of each worker's qualifications, requalification and training, including the results of all tests and examinations completed in accordance with the licence	
14 (4)	every person who is required by this section to keep a record referred to in paragraph (2)(a) to (d) or (3)(a) to (d) shall retain the record for 10 years after the expiry date of the licence to abandon issued in respect of the Class I nuclear facility	<ul style="list-style-type: none"> ▪ As per the CRL operating Licence and associated LCH ▪ Preliminary Decommissioning Report ▪ Future Detailed Decommissioning Report ▪ Safety Analysis Report ▪ Safety Case ▪ EIS ▪ CNL Training and Development Program ▪ Licence condition 2.2: Training Program of the CRL LCH ▪ Safety Analysis Report
14 (5)	every person who is required by this section to keep a record referred to in paragraph (2)(e) or (3)(e) shall retain the record for the period that the worker is employed by the licensee and for five years after the worker ceases to be so employed	<ul style="list-style-type: none"> ▪ As per the CRL operating Licence and associated LCH ▪ Preliminary Decommissioning Report ▪ Future Detailed Decommissioning Report ▪ Safety Analysis Report ▪ Safety Case ▪ EIS ▪ CNL Training and Development Program ▪ Licence condition 2.2: Training Program of the CRL LCH ▪ Safety Analysis Report

E.2 Mapping of NSDF Technical documentation to the IAEA SSR-5

SSR-5: DISPOSAL OF RADIOACTIVE WASTE, IAEA		
Paragraph	Regulatory Requirement	CNL Submissions Addressing the Regulatory Requirement
Requirement 1: Government responsibilities	The government is required to establish and maintain an appropriate governmental, legal and regulatory framework for safety within which responsibilities shall be clearly allocated for disposal facilities for radioactive waste to be sited, designed, constructed, operated and closed. This shall include: confirmation at a national level of the need for disposal facilities of different types; specification of the steps in development and licensing of facilities of different types; and clear allocation of responsibilities, securing of financial and other resources, and provision of independent regulatory functions relating to a planned disposal facility.	Canada's approach to radioactive waste management is founded upon the Government of Canada's <i>Policy Framework for Radioactive Waste</i> (the Policy Framework). Natural Resources Canada is the lead Department responsible for federal radioactive waste policy matters. NRCAN has undertaken an initiative to review/ update the 1996 Radioactive Waste Policy Framework to meet current international practices, is based on the best available science, and reflects the values and principles of Canadians. The policy consists of a set of principles governing the institutional and financial arrangements for disposal of radioactive waste by waste producers and owners and is supported by three pieces of legislation: Nuclear Safety Control Act, Nuclear Fuel Waste Act, and Impact Assessment Act.
Requirement 2: Responsibilities of the regulatory body	The regulatory body shall establish regulatory requirements for the development of different types of disposal facility for radioactive waste and shall set out the procedures for meeting the requirements for the various stages of the licensing process. It shall also set conditions for the development, operation and closure of each individual disposal facility and shall carry out such activities as are necessary to ensure that the conditions are met.	<ul style="list-style-type: none"> ▪ Nuclear Safety and Control Act (NSCA) ▪ Regulations made under the NSCA ▪ CRL Operating License ▪ Applicable Regulatory Documents ▪ Applicable CSA Standards
Requirement 3: Responsibilities of the operator	The operator of a disposal facility for radioactive waste shall be responsible for its safety. The operator shall carry out safety assessment and develop and maintain a safety case, and shall carry out all the necessary activities for site selection and evaluation, design, construction, operation, closure and, if necessary, surveillance after closure, in accordance with national strategy, in compliance with the regulatory requirements and within the legal and regulatory infrastructure.	<ul style="list-style-type: none"> ▪ Application for Approval of a Modification to the Waste Management Areas at Chalk River Laboratories: Construction of the Near Surface Disposal Facility ▪ Management System Manual ▪ Design Description ▪ Design Requirements ▪ Safety Analysis Report ▪ Performance Assessment ▪ Post Closure Safety Assessment ▪ Safety Case

SSR-5: DISPOSAL OF RADIOACTIVE WASTE, IAEA		
Paragraph	Regulatory Requirement	CNL Submissions Addressing the Regulatory Requirement
		<ul style="list-style-type: none"> ▪ Waste Acceptance Criteria ▪ Base Liner and Final Cover Evaluation ▪ Base Liner and Final Cover Performance and Life Cycle Evaluation ▪ Slope Stability Analysis ▪ Selection of Geomembrane ▪ Environmental Impact Statement ▪ ALARA Assessment ▪ Radiation Protection Plan ▪ Site Selection ▪ Environmental Protection Plan ▪ NSDF Facility Authorization ▪ Closure Plan ▪ Updated Application for Licence Amendment to add the Near Surface Disposal Facility to the Chalk River Laboratories Licensing Basis (e-Doc 6523912)
Requirement 4: Importance of safety in the process of development and operation of a disposal facility	Throughout the process of development and operation of a disposal facility for radioactive waste, an understanding of the relevance and the implications for safety of the available options for the facility shall be developed by the operator. This is for the purpose of providing an optimized level of safety in the operational stage and after closure.	<ul style="list-style-type: none"> ▪ Site Selection Report, ▪ Seismic Analysis ▪ Safety Analysis Report ▪ Hazard Identification and Analysis ▪ Design Description ▪ Safety Analysis Report ▪ Performance Assessment ▪ Environmental Impact Statement ▪ Post Closure Safety Assessment ▪ Safety Case
Requirement 5: Passive means for the safety of the disposal facility	The operator shall evaluate the site and shall design, construct, operate and close the disposal facility in such a way that safety is ensured by passive means to the fullest extent possible and the need for actions to be taken after closure of the facility is minimized.	<ul style="list-style-type: none"> ▪ Safety Analysis Report ▪ Performance Assessment ▪ Waste Acceptance Criteria ▪ Design Requirements ▪ Design Description ▪ Safety Analysis Report ▪ Operations and Maintenance Plan ▪ Post-Closure Care Plan ▪ Post Closure Plan
Requirement 6: Understanding of a disposal	The operator of a disposal facility shall develop an adequate understanding of the features of the facility and its host environment and of the factors that influence its	<ul style="list-style-type: none"> ▪ Design Description ▪ Design Requirements ▪ Seismic Analysis ▪ Safety Analysis Report

SSR-5: DISPOSAL OF RADIOACTIVE WASTE, IAEA		
Paragraph	Regulatory Requirement	CNL Submissions Addressing the Regulatory Requirement
facility and confidence in safety	safety after closure over suitably long time periods, so that a sufficient level of confidence in safety can be achieved.	<ul style="list-style-type: none"> ▪ Operations and Maintenance Plan ▪ Performance Assessment ▪ Post Closure Safety Assessment ▪ Safety Case ▪ Waste Acceptance Criteria ▪ Groundwater Flow Modelling ▪ Base Liner and Final Cover Evaluation ▪ Material Source Evaluation ▪ Base Liner and Final Cover Performance and Life Cycle Evaluation ▪ Slope Stability Analysis ▪ Selection of Geomembrane ▪ Environmental Impact Statement ▪ Closure Plan
Requirement 7: Multiple safety functions	The host environment shall be selected, the engineered barriers of the disposal facility shall be designed and the facility shall be operated to ensure that safety is provided by means of multiple safety functions. Containment and isolation of the waste shall be provided by means of a number of physical barriers of the disposal system. The performance of these physical barriers shall be achieved by means of diverse physical and chemical processes together with various operational controls. The capability of the individual barriers and controls together with that of the overall disposal system to perform as assumed in the safety case shall be demonstrated. The overall performance of the disposal system shall not be unduly dependent on a single safety function.	<ul style="list-style-type: none"> ▪ Application for Approval of a Modification to the Waste Management Areas at Chalk River Laboratories: <i>Construction of the Near Surface Disposal Facility</i> ▪ Site Selection Report, ▪ Design Description ▪ Design Requirements ▪ Safety Analysis Report ▪ Performance Assessment ▪ Post Closure Safety Assessment ▪ Safety Case ▪ Waste Acceptance Criteria ▪ Base Liner and Final Cover Evaluation ▪ Base Liner and Final Cover Performance and Life Cycle Evaluation ▪ Consequence of Failure Safety Analysis Report ▪ NSDF Safety-Related Systems List ▪ Updated Application for Licence Amendment to add the Near Surface Disposal Facility to the Chalk River Laboratories Licensing Basis (e-Doc 6523912)

SSR-5: DISPOSAL OF RADIOACTIVE WASTE, IAEA		
Paragraph	Regulatory Requirement	CNL Submissions Addressing the Regulatory Requirement
Requirement 8: Containment of radioactive waste	<p>The engineered barriers, including the waste form and packaging, shall be designed, and the host environment shall be selected, so as to provide containment of the radionuclides associated with the waste. Containment shall be provided until radioactive decay has significantly reduced the hazard posed by the waste. In addition, in the case of heat generating waste, containment shall be provided while the waste is still producing heat energy in amounts that could adversely affect the performance of the disposal system.</p>	<ul style="list-style-type: none"> ▪ Design Description ▪ Design Requirements ▪ Seismic Analysis ▪ Consequence of Failure ▪ Safety Analysis Report ▪ Waste Placement and Compaction Plan ▪ Operations and Maintenance Plan ▪ Performance Assessment ▪ Post Closure Safety Assessment ▪ Safety Case ▪ Waste Acceptance Criteria ▪ Base Liner and Final Cover Evaluation ▪ Material Source Evaluation ▪ Base Liner and Final Cover Performance and Life Cycle Evaluation ▪ Slope Stability Analysis ▪ Selection of Geomembrane ▪ Environmental Impact Statement ▪ Closure Plan
Requirement 9: Isolation of radioactive waste	<p>The disposal facility shall be sited, designed and operated to provide features that are aimed at isolation of the radioactive waste from people and from the accessible biosphere. The features shall aim to provide isolation for several hundreds of years for short lived waste and at least several thousand years for intermediate and high level waste. In so doing, consideration shall be given to both the natural evolution of the disposal system and events causing disturbance of the facility.</p>	<ul style="list-style-type: none"> ▪ Site Selection Report ▪ Design Description ▪ Design Requirements ▪ Seismic Analysis ▪ Consequence of Failure ▪ Safety Analysis Report ▪ Operations and Maintenance Plan ▪ Environmental Impact Statement ▪ Waste Placement and Compaction Plan ▪ Operations and Maintenance Plan ▪ Performance Assessment ▪ Post Closure Safety Assessment ▪ Post Closure Care Plan ▪ Safety Case ▪ Waste Acceptance Criteria ▪ Base Liner and Final Cover Evaluation ▪ Material Source Evaluation

SSR-5: DISPOSAL OF RADIOACTIVE WASTE, IAEA		
Paragraph	Regulatory Requirement	CNL Submissions Addressing the Regulatory Requirement
		<ul style="list-style-type: none"> ▪ Base Liner and Final Cover Performance and Life Cycle Evaluation ▪ Slope Stability Analysis ▪ Selection of Geomembrane ▪ Environmental Impact Statement ▪ Closure Plan
Requirement 10: Surveillance and control of passive safety features	An appropriate level of surveillance and control shall be applied to protect and preserve the passive safety features, to the extent that this is necessary, so that they can fulfil the functions that they are assigned in the safety case for safety after closure.	<ul style="list-style-type: none"> ▪ Design Description ▪ Design Requirements ▪ Seismic Analysis ▪ Consequence of Failure ▪ Safety Analysis Report ▪ Operations and Maintenance Plan ▪ Environmental Impact Statement ▪ Waste Placement and Compaction Plan ▪ Operations and Maintenance Plan ▪ Performance Assessment ▪ Post Closure Safety Assessment ▪ Post Closure Care Plan ▪ Safety Case ▪ Base Liner and Final Cover Evaluation ▪ Material Source Evaluation ▪ Base Liner and Final Cover Performance and Life Cycle Evaluation ▪ Selection of Geomembrane ▪ Closure Plan ▪ Monitoring and Surveillance Plan
Requirement 11: Step by step development and evaluation of disposal facilities	Disposal facilities for radioactive waste shall be developed, operated and closed in a series of steps. Each of these steps shall be supported, as necessary, by iterative evaluations of the site, of the options for design, construction, operation and management, and of the performance and safety of the disposal system.	<ul style="list-style-type: none"> ▪ Design Description ▪ Design Requirements ▪ Safety Analysis Report ▪ Environmental Impact Statement ▪ Waste Placement and Compaction Plan ▪ Operations and Maintenance Plan ▪ Performance Assessment ▪ Post Closure Safety Assessment ▪ Post Closure Care Plan ▪ Safety Case ▪ Base Liner and Final Cover Evaluation

SSR-5: DISPOSAL OF RADIOACTIVE WASTE, IAEA		
Paragraph	Regulatory Requirement	CNL Submissions Addressing the Regulatory Requirement
		<ul style="list-style-type: none"> Material Source Evaluation Base Liner and Final Cover Performance and Life Cycle Evaluation Closure Plan
Requirement 12: Preparation, approval and use of the safety case and safety assessment for a disposal facility	A safety case and supporting safety assessment shall be prepared and updated by the operator, as necessary, at each step in the development of a disposal facility, in operation and after closure. The safety case and supporting safety assessment shall be submitted to the regulatory body for approval. The safety case and supporting safety assessment shall be sufficiently detailed and comprehensive to provide the necessary technical input for informing the regulatory body and for informing the decisions necessary at each step.	<ul style="list-style-type: none"> Design Description Design Requirements Safety Analysis Report Environmental Impact Statement Waste Acceptance Criteria Performance Assessment Post Closure Safety Assessment Safety Case
Requirement 13: Scope of the safety case and safety assessment	The safety case for a disposal facility shall describe all safety relevant aspects of the site, the design of the facility and the managerial control measures and regulatory controls. The safety case and supporting safety assessment shall demonstrate the level of protection of people and the environment provided and shall provide assurance to the regulatory body and other interested parties that safety requirements will be met.	<ul style="list-style-type: none"> Management System Quality Assurance Plan Construction Quality Assurance Plan Design Description Design Requirements Safety Analysis Report Consequence of Failure Environmental Impact Statement Waste Acceptance Criteria Performance Assessment Post Closure Safety Assessment Safety Case
Requirement 14: Documentation of the safety case and safety assessment	The safety case and supporting safety assessment for a disposal facility shall be documented to a level of detail and quality sufficient to inform and support the decision to be made at each step and to allow for independent review of the safety case and supporting safety assessment.	<ul style="list-style-type: none"> Design Description Design Requirements Safety Analysis Report Environmental Impact Statement Waste Acceptance Criteria Performance Assessment Post Closure Safety Assessment Safety Case
Requirement 15: Site characterization for a disposal facility	The site for a disposal facility shall be characterized at a level of detail sufficient to support a general understanding of both the characteristics of the site and how the site will evolve over time. This shall include its present condition, its probable natural evolution and possible natural events, and also human plans	<ul style="list-style-type: none"> Design Description Design Requirements Safety Analysis Report Consequence of Failure Environmental Impact Statement

SSR-5: DISPOSAL OF RADIOACTIVE WASTE, IAEA		
Paragraph	Regulatory Requirement	CNL Submissions Addressing the Regulatory Requirement
	and actions in the vicinity that may affect the safety of the facility over the period of interest. It shall also include a specific understanding of the impact on safety of features, events and processes associated with the site and the facility.	<ul style="list-style-type: none"> ▪ Subsurface Geotechnical Survey of the Proposed NSDF at CRL ▪ Multidisciplinary Subsurface Investigation ▪ Hydro-geochemistry Study ▪ Groundwater flow Modelling ▪ Seismic Analysis ▪ Performance Assessment ▪ Post Closure Safety Assessment ▪ Safety Case
Requirement 16: Design of a disposal facility	The disposal facility and its engineered barriers shall be designed to contain the waste with its associated hazard, to be physically and chemically compatible with the host geological formation and/or surface environment, and to provide safety features after closure that complement those features afforded by the host environment. The facility and its engineered barriers shall be designed to provide safety during the operational period.	<ul style="list-style-type: none"> ▪ Design Description ▪ Design Requirements ▪ Safety Analysis Report ▪ Consequence of Failure ▪ Criticality Safety Document ▪ Environmental Impact Statement ▪ Landfill Development and Sequencing Plan ▪ Waste Placement and Compaction Plan ▪ Seismic Analysis ▪ Performance Assessment ▪ Post Closure Safety Assessment ▪ Safety Case
Requirement 17: Construction of a disposal facility	The disposal facility shall be constructed in accordance with the design as described in the approved safety case and supporting safety assessment. It shall be constructed in such a way as to preserve the safety functions of the host environment that have been shown by the safety case to be important for safety after closure. Construction activities shall be carried out in such a way as to ensure safety during the operational period.	<ul style="list-style-type: none"> ▪ Construction Quality Assurance Plan ▪ CNL Construction Program ▪ Environmental Impact Statement ▪ Landfill Development and Sequencing Plan ▪ Waste Placement and Compaction Plan ▪ Design Description ▪ Design Requirements ▪ Safety Analysis Report
Requirement 18: Operation of a disposal facility	The disposal facility shall be operated in accordance with the conditions of the licence and the relevant regulatory requirements so as to maintain safety during the operational period and in such a manner as to preserve the safety functions assumed in the safety case that are important to safety after closure.	<ul style="list-style-type: none"> ▪ Design Description ▪ Design Requirements ▪ Safety Analysis Report ▪ ALARA Assessment ▪ Radiation Protection Plan ▪ Criticality Safety Document ▪ Environmental Impact Statement

SSR-5: DISPOSAL OF RADIOACTIVE WASTE, IAEA		
Paragraph	Regulatory Requirement	CNL Submissions Addressing the Regulatory Requirement
		<ul style="list-style-type: none"> ▪ Landfill Development and Sequencing Plan ▪ Waste Placement and Compaction Plan ▪ Safety Case
Requirement 19: Closure of a disposal facility	A disposal facility shall be closed in a way that provides for those safety functions that have been shown by the safety case to be important after closure. Plans for closure, including the transition from active management of the facility, shall be well defined and practicable, so that closure can be carried out safely at an appropriate time.	<ul style="list-style-type: none"> ▪ Construction Quality Assurance Plan ▪ Safety Analysis Report ▪ Performance Assessment ▪ Design Description ▪ Post Closure Safety Assessment ▪ Safety Case ▪ Closure Plan ▪ Post Closure Care Plan
Requirement 20: Waste acceptance in a disposal facility	Waste packages and unpackaged waste accepted for emplacement in a disposal facility shall conform to criteria that are fully consistent with, and are derived from, the safety case for the disposal facility in operation and after closure.	<ul style="list-style-type: none"> ▪ Design Description ▪ Safety Analysis Report ▪ Performance Assessment ▪ Post Closure Safety Assessment ▪ Waste Acceptance Criteria ▪ Safety Case
Requirement 21: Monitoring programmes at a disposal facility	A programme of monitoring shall be carried out prior to, and during, the construction and operation of a disposal facility and after its closure, if this is part of the safety case. This programme shall be designed to collect and update information necessary for the purposes of protection and safety. Information shall be obtained to confirm the conditions necessary for the safety of workers and members of the public and protection of the environment during the period of operation of the facility. Monitoring shall also be carried out to confirm the absence of any conditions that could affect the safety of the facility after closure.	<ul style="list-style-type: none"> ▪ Environmental Protection Plan ▪ Safety Analysis Report ▪ Monitoring and Reporting Plan ▪ Environmental Impact Statement ▪ Safety Case ▪ Monitoring & Surveillance Plan
Requirement 22: The period after closure and institutional controls	Plans shall be prepared for the period after closure to address institutional control and the arrangements for maintaining the availability of information on the disposal facility. These plans shall be consistent with passive safety features and shall form part of the safety case on which authorization to close the facility is granted.	<ul style="list-style-type: none"> ▪ Design Description ▪ Safety Analysis Report ▪ Preliminary Decommissioning Plan ▪ Performance Assessment ▪ Post Closure Safety Assessment ▪ Environmental Impact Statement ▪ Waste Acceptance Criteria ▪ Safety Case ▪ Closure Plan ▪ Post Closure Care Plan

SSR-5: DISPOSAL OF RADIOACTIVE WASTE, IAEA		
Paragraph	Regulatory Requirement	CNL Submissions Addressing the Regulatory Requirement
		<ul style="list-style-type: none"> Environmental Protection Plan Monitoring and Reporting Plan Monitoring & Surveillance Plan
Requirement 23: Consideration of the State system of accounting for, and control of, nuclear material⁹ [9]: State systems of accounting for, and control of, nuclear material are required by IAEA nuclear safeguards agreements	<p>In the design and operation of disposal facilities subject to agreements on accounting for, and control of, nuclear material, consideration shall be given to ensuring that safety is not compromised by the measures required under the system of accounting for, and control of, nuclear material [21–23]. The Agency’s Safeguards System, INFCIRC/66/Rev.2, IAEA, Vienna (1968) [Does not apply in Canada].[22] The Structure and Content of Agreements between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons, INFCIRC/153(Corr.), IAEA, Vienna (1972).</p> <p>[23] Model Protocol Additional to the Agreement(s) Between State(s) and the International Atomic Energy Agency for the Application of Safeguards, INFCIRC/540(Corr.), IAEA, Vienna (1997).</p>	<ul style="list-style-type: none"> CNL Nuclear Materials and Safeguards Management Program Documents Safety Analysis Report Criticality Safety Document
Requirement 24: Requirements in respect of nuclear security measures	<p>Measures shall be implemented to ensure an integrated approach to safety measures and nuclear security measures in the disposal of radioactive waste.</p>	<ul style="list-style-type: none"> CNL Security Program Safety Analysis Report
Requirement 25: Management systems	<p>Management systems¹² to provide for the assurance of quality shall be applied to all safety related activities, systems and components throughout all the steps of the development and operation of a disposal facility. The level of assurance for each element shall be commensurate with its importance to safety.</p> <p>12: the term “management system” includes all the initial concepts of quality control (controlling the quality of products) and its evolution through quality assurance (the systems for ensuring the quality of products) and quality management (the system for management quality).</p>	<ul style="list-style-type: none"> CNL Management System Manual Design engineering and Design Authority Configuration Management Environmental Protection Program Safety Analysis Program Performance Assessment Safety Analysis Report Post Closure Safety assessment Safety Case Construction Quality Assurance Plan
Requirement 26: Existing disposal facilities	<p>The safety of existing disposal facilities shall be assessed periodically until termination of the licence. During this period, the safety shall also be assessed when a safety significant</p>	<ul style="list-style-type: none"> Facility Authorization, FA Performance Assessment Safety Analysis Report

SSR-5: DISPOSAL OF RADIOACTIVE WASTE, IAEA		
Paragraph	Regulatory Requirement	CNL Submissions Addressing the Regulatory Requirement
	modification is planned or in the event of changes with regard to the conditions of the authorization. In the event that any requirements set down in this Safety Requirements publication are not met, measures shall be put in place to upgrade the safety of the facility, economic and social factors being taken into account.	<ul style="list-style-type: none">▪ Post Closure Safety assessment▪ Safety Case

F. ENVIRONMENTAL ASSESSMENT REPORT

e-Doc 6383008 (Word)

e-Doc 6632446 (PDF)



Environmental Assessment Report: Near Surface Disposal Facility Project

January 2022

e-Doc: 6383008 (Word English)
e-Doc: 6706570 (Word French)
e-Doc: 6632446 (PDF English)
e-Doc: 6722404 (PDF French)



Executive summary

Background

Canadian Nuclear Laboratories (CNL) is proposing to construct a radioactive waste disposal facility, the Near Surface Disposal Facility Project (NSDF Project). The NSDF Project is a proposed disposal facility that includes an engineered containment mound for the permanent disposal of solid low-level radioactive waste at the Chalk River Laboratories (CRL) site in Renfrew County, Ontario. The CRL site is adjacent to the Ottawa River, approximately 185 kilometres (km) northwest of the City of Ottawa, within the boundaries of the Corporation of the Town of Deep River, and within the traditional unceded territory of the Algonquin Anishinabeg peoples, as well as the traditional and/or Treaty territories of the Williams Treaty First Nations, and the Métis Nation of Ontario.

The containment mound would have the capacity to hold up to 1,000,000 cubic meters of current and future solid, low-level radioactive waste. The proposed project would also include a wastewater treatment plant (WWTP), supporting facilities and site infrastructure.

Under the *Nuclear Safety and Control Act (NSCA)*, this proposal requires approval by the Canadian Nuclear Safety Commission (CNSC) and involves an amendment to add a new Class 1B nuclear facility (the NSDF Project) to the existing CRL Nuclear Research and Test Establishment Operating Licence.

Environmental assessment requirements

CNSC staff conducted an environmental assessment (EA) of the NSDF Project in accordance with the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). The NSDF Project is subject to CEAA 2012 as it qualifies as a Designated Project as per section 37(b) of the *Regulations Designating Physical Activities*, as follows:

37(b) the construction and operation of a new facility for the long-term management or disposal of irradiated fuel or nuclear waste

On August 28, 2019, the *Impact Assessment Act* (IAA) came into force, repealing the CEAA 2012. The IAA contains transitional provisions (subsection 182) for EAs of designated projects commenced under CEAA 2012 for which the CNSC is responsible authority. These provisions apply to the proposed NSDF Project, and therefore, the NSDF Project was continued under CEAA 2012. The CNSC must ensure an EA is complete in accordance with CEAA 2012 before a licensing decision under the NSCA is rendered.

This EA report summarizes the assessment conducted by CNSC staff, including the information and analysis on the potential environmental effects of the NSDF Project, and CNSC staff's findings on whether the NSDF Project is likely to cause significant adverse environmental effects, after taking into account the implementation of mitigation measures. CNSC staff prepared this EA report with expert advice from the following federal and provincial authorities: Environment and Climate Change Canada, Natural Resources Canada, Health Canada, Parks Canada, the Province of Quebec Ministère de l'Environnement et de la Lutte contre les changements climatiques as well as the Ontario Ministry of the Environment and Climate Change. Many interested Indigenous Nations and communities also collaborated with CNSC staff in the development of sections of this EA report related to information or concerns in respect to potential project impacts on rights, interests, culture, or traditional uses, as well as

traditional Indigenous Knowledge. Furthermore, this EA report was informed by comments submitted throughout the assessment process by Indigenous Nations and communities and the public.

Scope of the assessment

CNSC staff analyzed potential environmental effects that the NSDF Project, throughout its entire lifecycle, is likely to have on the environment on areas of federal jurisdiction as defined in subsections 5(1) and 5(2) of CEEA 2012. The CNSC also assessed the potential adverse effects of a proposed project on species at risk, pursuant to subsection 79(2) of the *Species at Risk Act* and their critical habitat.

This EA report outlines several Indigenous or Treaty rights held by First Nations and Métis that could be potentially affected by the NSDF Project, including hunting, trapping, fishing, plant harvesting, and the use of sites and areas of cultural importance for the exercise of rights.

Potential effects of the project on the environment

The predicted environmental effects from the Project in relation to sections 5 and 19 of CEEA 2012 are as follows:

Subsection 5(1):

- effects to fish and fish habitat from the loss and alteration of habitat and from changes to fish health
- effects on migratory birds due to habitat loss and alteration, and sensory disturbance throughout the construction, operation and closure phases
- effects on Indigenous uses to access and/or quality and quantity of hunting, fishing, trapping, and gathering activities in the regional study area as a result of the Project
- effects on Indigenous uses due to changes in access to cultural resources

Subsection 5(2):

- effects on human health due to dust created during handling of bulk materials and emissions of gases potentially released during storage and disposal of radioactive materials, release of air emissions from the WWTP during operations, and changes to the surface water quality resulting from releases of treated effluent from the WWTP via an exfiltration gallery and into Perch Lake
- effects on species at risk and their recovery through habitat loss

Section 19:

- effects due to potential accidents or malfunctions throughout all phases of the Project
- effects on the Project due to extreme rain and snowmelt events, river flooding, seismic activity, high winds, extreme temperatures, forest fires, climate change, and glaciation

Although the NSDF Project would interact with environmental and human components in various ways, taking into account the implementation of mitigation measures and follow-up monitoring program measures, CNSC staff have determined that the Project is unlikely to result in significant adverse environmental effects. Required mitigation measures would need to be implemented to prevent or reduce potential adverse effects of the Project. CNSC staff reviewed

CNL's identified mitigation measures and follow-up monitoring program measures, taking into consideration expert advice from federal authorities and provincial ministries, and comments from Indigenous Nations and communities and the public, and have deemed the measures are adequate for the protection of human health and the environment and in addressing effects on Indigenous peoples. These measures would also serve to mitigate or prevent potential impacts on Indigenous and/or Treaty rights. CNSC staff recommend that CNL's list of identified mitigation measures, follow-up monitoring program measures and agreed upon commitments with Indigenous Nations and communities, become an enforceable condition that is set out in the Commission's decision.

CNL has worked one-on-one with Indigenous Nations and communities to negotiate commitments that address their specific concerns to mitigate potential impacts to their Indigenous uses and Indigenous and/or Treaty rights. CNL is also negotiating long-term agreements with Indigenous Nations and communities as an additional mechanism for addressing potential impacts. CNSC staff are of the view that the Project's potential impacts on Indigenous and/or Treaty rights have been adequately identified and mitigated to the extent possible.

Indigenous consultation and engagement

As an agent of the Government of Canada, the CNSC recognizes and understands the importance of building relationships with Indigenous peoples in Canada. The CNSC's goal is to build partnerships and trust with Indigenous Nations and communities through collaborative ongoing engagement activities related to CNSC-regulated facilities and activities of interest within their traditional and/or treaty territories.

CNSC staff conducted extensive consultation activities with the identified Indigenous Nations and communities to ensure their full participation in the regulatory review process, and to ensure their concerns were heard and addressed by CNL, Atomic Energy of Canada Limited (AECL) and the CNSC in a meaningful way. CNSC staff consider that the consultation and engagement process for the NSDF Project was meaningful, reasonable, responsive, and followed best practices.

Based on the analysis of environmental effects of the NSDF Project, CNSC staff are satisfied that the potential impacts of the project on Indigenous and/or treaty rights have been adequately identified and appropriately mitigated to the greatest extent possible.

Follow-up monitoring program

Should the Commission issue a positive EA decision, CNL will then be required to further design and implement an EA Follow-Up Monitoring Program (EAFMP) to verify the accuracy of the EA predictions for the NSDF Project, determine the effectiveness of measures taken to mitigate the potential adverse environmental effects of the NSDF Project, and support the implementation of adaptive management measures to address unanticipated adverse environmental effects. Other environmental monitoring will likely be required under permits, licences and authorizations that may be issued upon completion of the EA as part of regulatory oversight for the NSDF Project.

Recommendations

Taking into account the implementation of the proposed mitigation measures, follow-up monitoring program measures and commitments made by CNL to Indigenous Nations and communities, CNSC staff recommend that the Commission conclude that the NSDF Project is not likely to cause significant adverse environmental effects.

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1.0 Introduction

Canadian Nuclear Laboratories (CNL) is proposing the construction of a Near Surface Disposal Facility (the NSDF Project) for the disposal of solid, low-level radioactive waste at the Chalk River Laboratories (CRL) site in Renfrew County, Ontario, within the traditional unceded territory of the Algonquin Anishinabeg peoples, as well as the traditional and/or Treaty territories of the Williams Treaty First Nations, and the Métis Nation of Ontario. The NSDF Project is a designated project under the former *Canadian Environmental Assessment Act of 2012* (CEAA 2012) and as such requires a comprehensive assessment and evaluation of the effects of the proposed project on the environment to be conducted. The NSDF is designed to hold up to 1,000,000 cubic metres (m³) of low-level radioactive waste in 10 waste disposal cells. The proposed project would also include a wastewater treatment plant (WWTP), supporting facilities and site infrastructure. For further information providing an overview of the NSDF Project, the project components and activities, please refer to section 3 of this report and to section 1.1.2 of staff's CMD.

This Environmental Assessment (EA) report summarizes the assessment conducted by the Canadian Nuclear Safety Commission (CNSC) staff to inform the Commission's decision on whether the proposed NSDF Project is likely to cause significant adverse environmental effects, including any adverse effect with respect to Indigenous peoples. Indigenous interests, as described within this EA report, refer to any change to the environment on the health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes and any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

1.1 Environmental assessment requirements

On May 5, 2016, following CNL's submission of the project description (PD), the CNSC issued the notice of commencement of a federal EA for the proposed NSDF Project pursuant to CEAA 2012. The proposed NSDF Project is subject to an EA under CEAA 2012, as it constitutes a designated activity under items 37(b) of the *Regulations Designating Physical Activities*:

37(b) the construction and operation of a new facility for the long-term management of disposal of irradiated fuel or nuclear waste

On August 28, 2019, the *Impact Assessment Act* (IAA) came into force, repealing the CEAA 2012. Subsection 182 of the IAA outlines transitional provisions for the EAs of designated projects commenced under CEAA 2012 for which the CNSC or National Energy Board are responsible authorities (RAs) and for which a decision statement has not been issued:

182 any environmental assessment of a designated project by the Canadian Nuclear Safety Commission or the National Energy Board commenced under the 2012 Act, in respect of which a decision statement has not been issued under section 54 of the 2012 Act before the day on which this Act comes into force, is continued under the 2012 Act as if that Act had not been repealed

The CNSC informed CNL on August 29, 2019 that the EA process for the proposed NSDF Project would continue under CEAA 2012, as a decision statement had not been reached before the implementation of the new Act.

The CNSC carried out the conduct of the EA in consultation with Environment and Climate Change Canada (ECCC), Parks Canada (PC), Health Canada (HC), and Natural Resources Canada (NRCan) as federal authorities (FAs) having specialist and expert information or knowledge needed to support the conduct of the EA in the following areas:

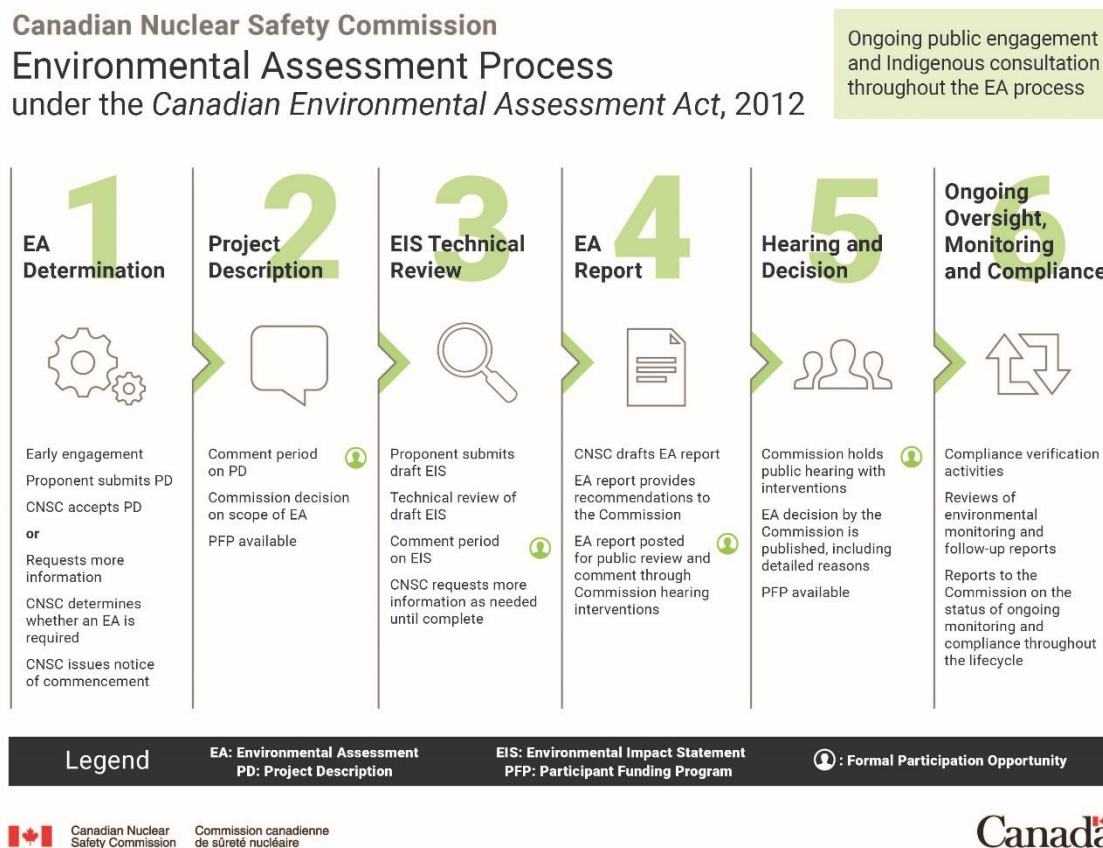
- ECCC: species at risk, effluent discharge, surface water
- PC: archaeology
- HC: noise, human health
- NRCan: geology, seismicity

A provincial EA was not required for the proposed NSDF Project due to its location on federal lands. However, the province of Ontario's Ministry of the Environment, Conservation and Parks (MECP) (formerly Ontario's Ministry of Environment and Climate Change) and the Province of Québec's Ministère de l'Environnement et de la Lutte contre les changements climatiques (MELCC) formed part of the Federal-Provincial Review Team (FPRT) for the NSDF Project, along with FAs. The provincial ministries provided support upon request on areas within their expertise and within the scope of their regulatory roles.

The decision on the EA must be made prior to the Commission making a regulatory decision under the *Nuclear Safety and Control Act* (NSCA) on whether the applicant is qualified to carry out the project and whether people and the environment will be protected from project activities. CNL is requesting an amendment to add a new Class 1B nuclear facility (the NSDF Project) to their existing Nuclear Research and Test Establishment Operating Licence. The Commission's decisions for the Project under CEAA 2012 and the NSCA also trigger the duty to consult Indigenous Nations and communities in order to demonstrate it has considered impacts to Indigenous and/or Treaty rights protected under section 35 of the *Constitution Act, 1982*. This EA report summarizes CNSC and CNL consultation and engagement activities and describes how concerns from Indigenous Nations and communities and the public have been addressed and also includes an assessment of impacts of the Project on Indigenous and/or Treaty rights.

1.2 Environmental assessment process and timeline

The CNSC, as RA, carried out the various stages of the EA process under CEAA 2012 for the proposed NSDF Project. These stages are presented in figure 1. The timeline associated with the NSDF Project EA process can be found in table 1.1.

Figure 1: Environmental assessment process conducted by the CNSC under CEAA 2012

In stage 1, the CNSC determined whether an EA was required for the proposed NSDF Project. CNL submitted a PD for the proposed NSDF Project. CNSC staff assessed the PD against CEAA 2012 guidelines (as identified in CNSC REGDOC-2.9.1 *Environmental Protection: Environmental Principles, Assessments and Protection Measures*, herein referred to as REGDOC-2.9.1). On May 5, 2016, the CNSC deemed the PD complete, and issued the [notice of commencement of a federal EA process for the NSDF Project](#) pursuant to CEAA 2012.

Stage 2 consisted of two main steps: a public comment period on the PD, and a Commission decision on the scope of the EA. A first public comment period was held in spring 2016, and a second one in fall 2016 to allow Indigenous Nations and communities and the public to review the revised PD submitted by CNL. In March 2017, [the Commission issued a decision on the scope of the EA](#), taking into account the comments received from Indigenous Nations and communities and the public related to the PD.

Stage 3 started in March 2017, with the submission of a draft environmental impact statement (EIS) by CNL. This draft EIS was required to meet the [CNSC's Generic Guidelines for the Preparation of and Environmental Impact Statement – Pursuant to the Canadian Environmental Assessment Act, 2012](#) (herein referred to as the CNSC Generic Guidelines), CNSC REGDOC-3.2.2: *Indigenous Engagement* and REGDOC-2.9.1. Once the draft EIS was deemed to conform to those requirements, it was subject to a public comment period in the spring of 2017. CNSC staff and the FPRT also undertook a full technical review of the draft EIS and its technical supporting documents.

In August 2017, CNSC staff completed the initial technical review of the draft EIS for the NSDF Project and its technical supporting documents. As part of the technical review, a consolidated table of FPRT comments and information requests was submitted to CNL. The table included a number of comments and concerns related to the inclusion of intermediate-level waste in the facility, and similar comments were also raised in Indigenous and public submissions received during the public comment period on the EIS.

On October 27, 2017, CNL announced the decision to include only low-level radioactive waste in the NSDF, based on its consideration of federal, provincial and public comments. CNL stated that waste intended for disposal in the NSDF will meet the International Atomic Energy Agency's (IAEA) guidelines for low-level radioactive waste. Intermediate-level waste will continue to be managed in interim storage at CRL until a long-term disposal solution for this category of radioactive waste is developed and approved.

Once CNL provided complete and sufficient responses to all comments and information requests, they submitted a revised final EIS in June 2021. CNSC staff reviewed CNL's final EIS and all supporting documents, including CNL's responses to information requests against the Generic Guidelines and requirements of CEAA 2012, and [deemed CNL's final EIS complete on July 2, 2021](#).

In stage 4 of the EA process, the information contained in the final EIS and from supplemental resources and documents (such as technical supporting documents, responses to information requests) was used to prepare this EA report.

Table 1.1: Timelines associated with the NSDF EA process

Activity or step in EA process	Date
CNL submitted the NSDF project description	May 2016
Public comment period on NSDF project description (30 days)	May- June 2016
CNL submitted the Revised NSDF project description	September 30, 2016
Public comment period on revised NSDF project description (30 days) ¹	October- November 2016
Commission decision on the scope of the NSDF EA	March 2017
CNL submitted the draft EIS	March 2017
Public comment period on the draft EIS (60 days)	March- May 2017
Relaunch of public comment period on the draft EIS (60 days) ²	June- August 2017
Federal and provincial review of draft EIS and transmission of federal and provincial information requests/comments	June-August 2017
CNSC review of public comments and transmission of public information requests/comments to CNL	September 2017
CNL submitted revised draft EIS	November 2019
Federal and provincial review of CNL responses to federal, provincial information requests/comments until all comments are addressed to the satisfaction of the CNSC	April 2020- October 2020
CNL submitted final EIS	December 2020
CNSC review of final EIS – deemed incomplete	January 2021
CNL submitted revised final EIS	May 2021
CNSC deem final EIS complete and post along with comment tables on Canadian Impact Assessment Registry (CIAR) and CNSC web page	July 2021

¹ The CNSC launched a public comment period for 30 days to allow all Indigenous Nations and communities and the public to comment on the revised NSDF project description.

² The CNSC relaunched the public comment period for 60 days to allow all Indigenous Nations and communities and the public to comment on the NSDF Project in the official language of their choice, as CNL made available to the public the French version of the EIS after the original public comment period from March to May, 2017.

2.0 Assessment methods and EA report approach

In order to assess the effects to the environment from a project, and for CNSC staff to perform their analysis of the submission by CNL, three basic elements needed to be in place: the scope of the environmental assessment (section 2.1 of this report), the identification of valued components that were deemed important and for which effects would be assessed (section 2.2), and the spatial and temporal boundaries of the project (section 2.3).

2.1 Scope of the environmental assessment

Scoping is a procedural step in the EA process under CEAA 2012 that establishes the boundaries of the federal EA. The scope identifies which elements of the proposal to consider and include in the EA, and which environmental components are likely to be affected.

Subsection 19(2) of CEAA 2012 requires RAs to determine the scope of the factors to be taken into consideration in the EA of a proposed project. On March 8, 2017, the Commission [issued a decision on the extent of information to be included in the EA](#). The decision took into account the comments received from Indigenous Nations and communities and the public related to the project description, as well as CNSC staff recommendations. The Commission determined that the proposed project must include the factors mandated in [paragraphs 19\(1\)\(a\) to \(h\) of CEAA 2012](#):

- the environmental effects of the designated project as per section 5 of CEAA 2012, including the environmental effects of malfunctions or accidents that may occur in connection with the designated project and any cumulative environmental effects that are likely to result from the designated project in combination with other physical activities that have been or will be carried out
- the significance of the effects referred to above
- comments from the public and Indigenous Nations and communities that are received in accordance with CEAA 2012
- mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the designated project
- the requirements of the follow-up monitoring program in respect of the designated project
- the purpose of the designated project
- alternative means of carrying out the designated project that are technically and economically feasible and the environmental effects of any such alternative means
- any change to the designated project that may be caused by the environment

In addition, CNSC staff recommended that the EA for the NSDF Project should consider potential transboundary effects, community knowledge and Indigenous traditional knowledge. The Commission decision made these a requirement as part of the factors to be considered in the scoping decision.

For the NSDF Project, the EA considered potential environmental effects on areas of federal jurisdiction in relation to subsection 5(1) of CEAA 2012, including:

- fish and fish habitat, migratory birds (5(1)(a))

- a change that may be caused to the environment that would occur on federal lands (5(1)(b))
- with respect to Indigenous peoples, an effect of any change that may be caused to the environment on:
 - health and socio-economic conditions
 - physical and cultural heritage
 - current use of lands and resources for traditional purposes
 - any structure, site or thing that is of historical, archaeological, paleontological or architectural significance for Indigenous peoples (5(1)(c))

Based on other federal legislation, several federal permits, licenses, and authorizations may be required for the proposed NSDF Project to proceed (table 2.1). Therefore, in accordance with subsection 5(2) of CEAA 2012, the EA also considered:

- changes other than those referred to in paragraphs 5(1)(a) and (b), that may be caused to the environment that are directly linked or necessarily incidental to any federal decisions pursuant to other legislation (5(2)(a))
- effects other than those referred to in paragraph 5(1)(c), of any changes that may be caused to the environment, referred above, on health and socio-economic conditions, physical and cultural heritage, or any structure, site, or thing that is of historical, archaeological, paleontological, or architectural significance (5(2)(b))

Table 2.1: Decisions pursuant to other federal legislation that may be required before the project can proceed

Federal Legislation for potential federal decision	Federal authority responsible for authorization, permit or licence	Project component, activity, or effect related to the decision
<i>Fisheries Act</i> <ul style="list-style-type: none"> • Section 35 	Fisheries and Oceans Canada	A project review may be required for the discharge of treated effluent to Perch Lake
<i>Species at Risk Act</i> <ul style="list-style-type: none"> • Section 73 	Environment and Climate Change Canada	A permit will be required if listed wildlife species or their critical habitat are affected by the Project
<i>Canadian Environment Protection Act, 1999</i>	Environment and Climate Change Canada	A petroleum storage tank permit(s) may be required depending on the size of the fuel tanks installed on the site
<i>Explosives Act</i> <ul style="list-style-type: none"> • Section 7 factory license 	Natural Resources Canada	A license may be required for the storage of explosives on site

It is to be noted that while the EA considered the federal legislation in table 2.1, all permits, licenses and authorizations required for the project to proceed would only be issued after an EA decision has been made by the Commission, and therefore the issuance of those other permits is not germane to the Commission's decision.

Federal EAs also consider the potential adverse effects of a proposed project on species at risk, pursuant to subsection 79(2) of the *Species at Risk Act* (SARA) and their critical habitat:

79(2) the person must identify the adverse effects of the project on the listed wildlife species and its critical habitat and, if the project is carried out, must ensure that measures are taken to avoid or lessen those effects at to monitor them

Effects on species designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and provincially designated species of concern are also considered in the NSDF assessment process, as well as species of interest identified by Indigenous Nations and communities and the public.

Given the NSDF Project is located on federal lands and is regulated by the CNSC, it is not anticipated that any provincial permits, licences or other authorizations will be required. Notwithstanding this, it is CNL's responsibility to identify and comply with all applicable regulatory requirements.

2.2 Selection of valued components

A valued component (VC) is a component that is considered to be ecologically, culturally, socially, or economically significant. These are the components for which effects from the project will be assessed. Characterization of the existing environment includes the identification of VCs by CNL, government agencies, Indigenous Nations and communities, and the public. The VCs selected by the CNSC are presented in table 2.2 and were selected based upon CEAA 2012 and SARA legislative requirements. A review by CNSC staff of existing information, baseline data analyses, consultations with Indigenous communities and consideration of Indigenous Knowledge yielded the list of equivalent species and ecosystems of interest presented in table 2.2. The equivalent CNL-identified VCs are also presented in table 2.2.

Table 2.2: Rationale for CNSC-identified VCs and their equivalent CNL-identified VCs

CNSC-identified VCs	Species and ecosystems of interest identified by Indigenous Nations and communities	Equivalent CNL-identified VCs	Rationale
Effects identified pursuant to subsection 5(1) of the CEAA 2012			
Fish and fish habitat (5(1)(a))	<ul style="list-style-type: none"> • Bait fish • Burbot • Catfish • Chub • Northern Pike • Pickerel/Walleye • Lake Trout • Speckled Trout • Brook Trout • Brown Bullhead • Sturgeon • Eel • American Eel • Perch • Bass • Sucker • Sunfish • Yellow Perch • Muskellunge • Whitefish 	<ul style="list-style-type: none"> • Fish habitat • Fish community • Fish species of conservation concern 	Project-related predicted changes to water quality and quantity, and discharge of treated wastewater to Perch Lake could adversely affect fish and fish habitat.
Migratory birds (5(1)(a))	<ul style="list-style-type: none"> • Canadian Goose • Turkey • Grouse • Duck • Geese • Partridge 	<ul style="list-style-type: none"> • Migratory birds 	Project-related predicted changes to surrounding terrestrial environment could adversely affect migratory birds and their habitat.

CNSC-identified VCs	Species and ecosystems of interest identified by Indigenous Nations and communities	Equivalent CNL-identified VCs	Rationale
	<ul style="list-style-type: none"> • Bald Eagle • Barn Swallow • Loon • Osprey • Belted Kingfisher • Hawk • Falcon • American Kestrel • Merlin • Northern Harrier 		
Indigenous uses: Current use of lands and resources for traditional purposes (5(1)(c))	N/A	<ul style="list-style-type: none"> • Traditional land and resource use by Indigenous peoples 	Project-related predicted changes to surrounding terrestrial and aquatic environments could adversely affect the use of lands and resources for traditional purposes by Indigenous peoples.
Transboundary environmental effects: GHG emissions (5(1)(2))	N/A	<ul style="list-style-type: none"> • Greenhouse gases (GHG) 	Project-related predicted changes to GHG emissions could contribute to global climate change.
Effects identified pursuant to subsection 5(2) of the CEAA 2012			
Human Health (5(2)(b)) (Includes Indigenous peoples Health*) (5(1)(c)) *applies to both 5(1) and 5(2)	N/A	<ul style="list-style-type: none"> • Self-sufficient Indigenous peoples • Worker health • Public health 	Project-related predicted changes in water quality and air quality could adversely affect the health of Indigenous peoples, the public and workers.

CNSC-identified VCs	Species and ecosystems of interest identified by Indigenous Nations and communities	Equivalent CNL-identified VCs	Rationale
Wetlands (5(2)(b))	<ul style="list-style-type: none"> • Cat tail • Duckweed • Salamander • Cranberries • Labrador Tea • Wild Rice 	Not identified	Project-related predicted changes to water quantity and quality, and disturbance of terrestrial environment, could adversely affect wetlands, which are difficult to restore and play an important role in ecosystem function. Also related to other federal decisions.
Terrestrial biota (5(2)(b))	<ul style="list-style-type: none"> • Moose • Badgers • Coyote • Fisher • Raccoon • Squirrel • Weasel • Beaver • White-tailed deer • Wolf • Black Bear • Lynx • Otter • Mink • Bullfrog • Marten • Rabbit/hare • Muskrat • Fox • Elk • SAR Turtles • Five-lined skink • Salamander 	<ul style="list-style-type: none"> • Vegetation communities <p>*Many terrestrial mammal species were identified by CNL however all are listed species under SARA and therefore are included in the Species at risk VC</p>	Project-related predicted changes to the terrestrial wildlife and vegetation, and disturbances to the terrestrial environment, could adversely affect the terrestrial environment beyond the boundaries of the project site. Also related to other federal decisions, including SARA.

CNSC-identified VCs	Species and ecosystems of interest identified by Indigenous Nations and communities	Equivalent CNL-identified VCs	Rationale
	<ul style="list-style-type: none"> • Tricoloured bumblebee • Raspberry bush • Blueberry bush • Chokeberry • Oak • Birch • Cedar • Chaga • Dandelions • Juniper Bush • Prickly Ash • Fiddleheads • Labrador Tea • Muskrat root, sweet flag • Cranberry • Ground Hemlock • Pinecone • Poplar • Spruce • Tamarack • Wild leek • Service berries • Duckweed • Cat tail • Eastern white pine • Red Willow • Scouring Rush • Sweet Fern 		

CNSC-identified VCs	Species and ecosystems of interest identified by Indigenous Nations and communities	Equivalent CNL-identified VCs	Rationale
	<ul style="list-style-type: none"> • Spruce scots pine • Mushrooms • Bearberry • Pipsissewa • Indian Cucumber • Madenhair Fern • Jack-in-the-pulpit • Mature white birch stands and trees • Yellow birch stands and trees • Oak stands and trees • Sugar maple stands and trees • Northern white cedar stands and trees • Blackberries • Strawberries • Fire dependant berries • Dry woodland ecosystems • Moist hardwood forest ecosystems 		
Effects identified pursuant to subsection 79(2) of the SARA			
Species at risk	N/A	<ul style="list-style-type: none"> • Canada warbler • Eastern whip-poor-will • Eastern wood-pewee • Golden-winged warbler 	Project-related predicted disturbances of terrestrial and aquatic environments could adversely affect species at risk and their critical habitat.

CNSC-identified VCs	Species and ecosystems of interest identified by Indigenous Nations and communities	Equivalent CNL-identified VCs	Rationale
		<ul style="list-style-type: none">• Wood thrush• Bats (little brown myotis, northern myotis, tri-colored bat)• Eastern milksnake• Monarch butterfly• Blanding's Turtle	Project-related predicted changes to the terrestrial environment and wetlands could adversely affect the Blanding's turtle, which is federally listed as Threatened under the SARA.

2.3 Spatial and temporal boundaries

Spatial boundaries define the areas within which a designated project may cause direct or indirect environmental effects. Temporal boundaries define the timeframe during which an environmental effect may occur in relation to a designated project's activities. Defining spatial and temporal boundaries allows a frame of reference to be established for identifying and assessing the environmental effects associated with a designated project.

Spatial Boundaries

The spatial boundaries for the proposed NSDF Project were determined by CNSC staff to be appropriate for each selected environmental compartment (atmospheric environment, water resources, terrestrial environment, and geological and hydrogeological environment), and associated VCs. Effects on the VCs are caused by changes to the environmental compartments, which may originate from project activities. Consistent with the CNSC Generic Guidelines, the following spatial boundaries identified by CNL were considered for each environmental compartment:

- **Site study area (SSA):** The SSA is the NSDF Project footprint (the area where all project activities are proposed to be undertaken, including facilities, buildings, and infrastructure)
- **Local study area (LSA):** The LSA is the area existing outside the SSA, where measurable changes to the environment may be anticipated due to project activities. These changes may occur during any phase of the project, either through normal activities or from possible accidents or malfunctions.
- **Regional study area (RSA):** The RSA is the maximum area within which the potential effects of the project may interact with the effects of other projects and activities (or anticipated projects and activities), resulting in a potential for cumulative effects.

Table 2.3 summarizes the spatial boundaries for the NSDF Project for each environmental compartment. Maps of the spatial boundaries for each environmental compartment are provided in figures 2 – 8, as illustrated in CNL's final EIS.

Temporal boundaries

Project phases define the time periods for which likely project-specific and cumulative effects would be considered. In the Commission's scoping decision, the Commission directed CNL to consider the longest period of potential effects when defining temporal boundaries, as outlined in section 5.2.2 of the CNSC Generic Guidelines. The temporal boundaries for the proposed NSDF Project were determined by CNSC staff to be appropriate. Consistent with the CNSC Generic Guidelines, the following temporal boundaries identified by CNL were considered for the EA:

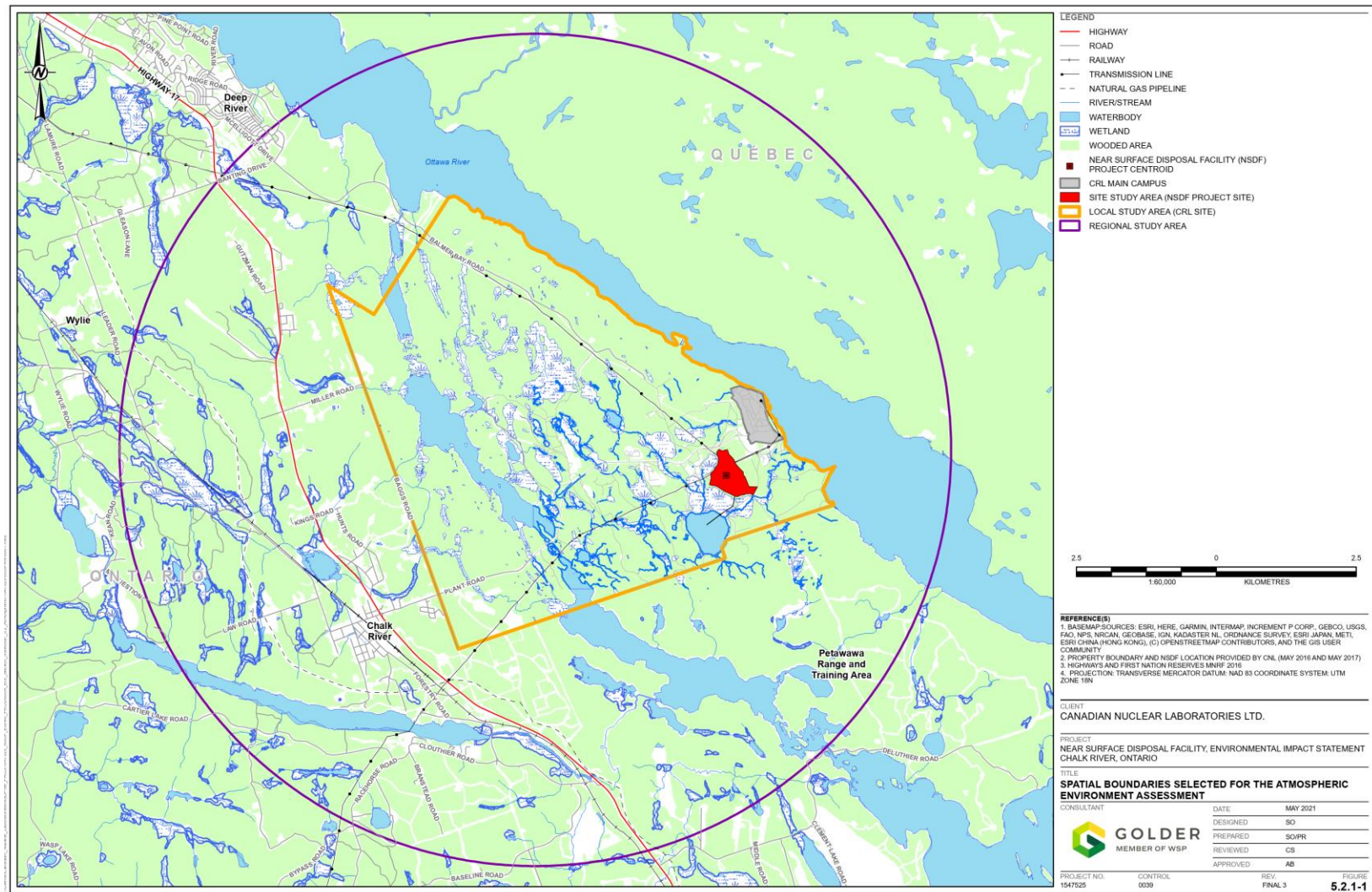
- **Construction phase (2-3 years):** When physical activities relating to site preparation and construction occur, including activities such as installing necessary supporting infrastructure, inactive commissioning, systems testing, and transportation of construction materials.
- **Operations phase (50 years):** When all activities relating to waste placement occur, including water management, WWTP operations, vehicle movements, and maintenance activities.

- **Closure phase** (30 years): After waste storage has permanently ceased, when activities necessary for the installation of the final cover and implementation of long-term monitoring occur.
- **Post-closure phase** (300 years): After closure phase activities have been completed, when long-term environmental monitoring will occur to ensure that the final cover is functioning as intended.

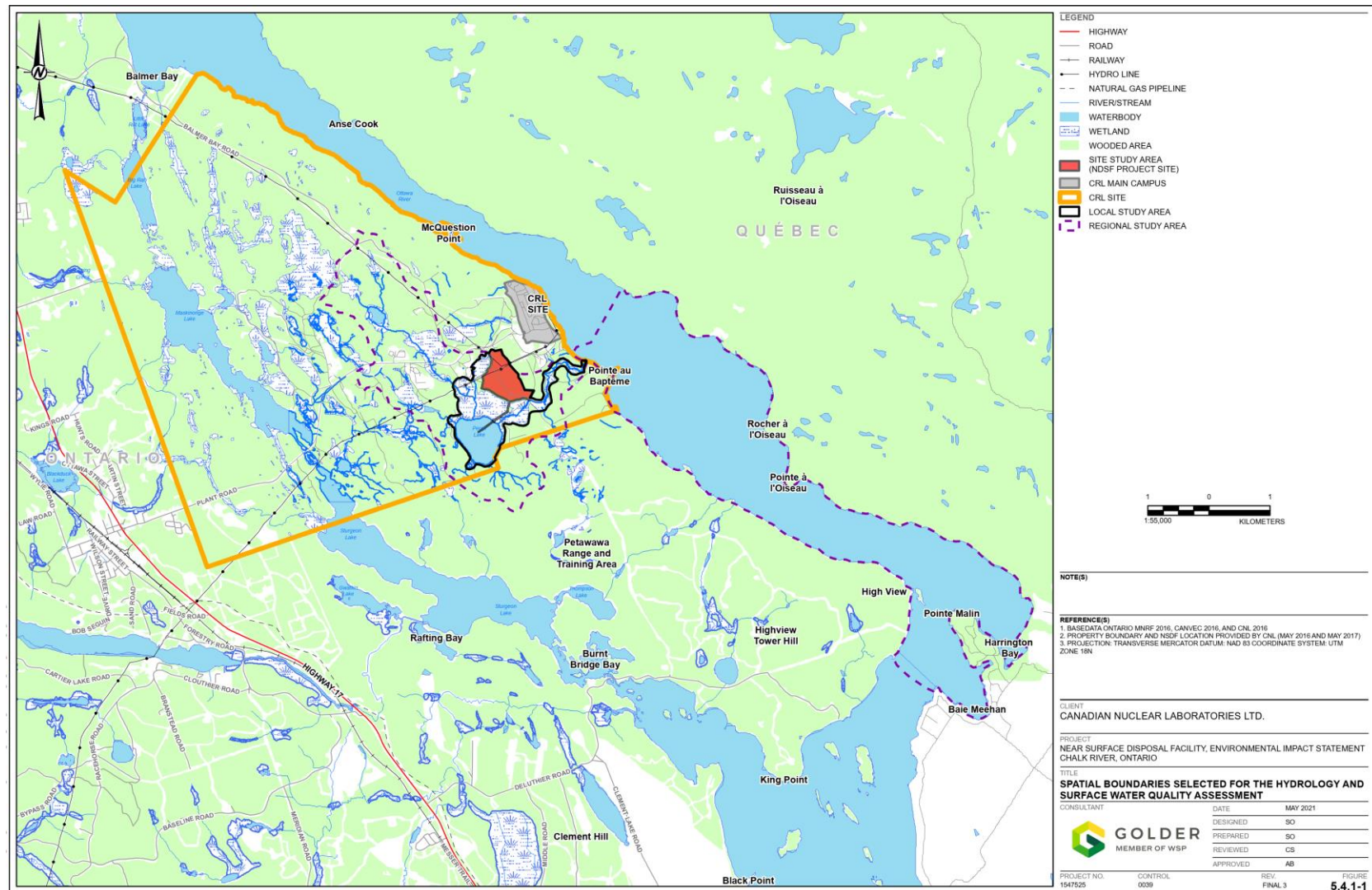
Table 2.3: Spatial boundaries for each environmental compartment considered in the EA

Environmental compartment	Spatial boundaries		
	SSA	LSA	RSA
Atmospheric environment	Synonymous with the NSDF Project footprint	Includes the SSA and corresponds to the CRL site boundaries	A circular area surrounding the LSA with an approximate radius of 7.4 km
Geological and hydrogeological environment	Synonymous with the NSDF Project footprint	Includes the SSA and is bounded by Perch Lake and Perch Creek, and adjacent wetlands	Includes the Perch Lake and Perch Creek basins, and a portion of the Ottawa River (approximately 8 km downstream)
Surface water environment	Synonymous with the NSDF Project footprint	Includes the SSA and is bounded by Perch Lake and Perch Creek, and adjacent wetlands	Includes the Perch Lake and Perch Creek basins, and a portion of the Ottawa River (approximately 8 km downstream)
Aquatic environment	Synonymous with the NSDF Project footprint	Includes the SSA and is bounded by Perch Lake and Perch Creek, and adjacent wetlands	Includes the Perch Lake and Perch Creek basins, and a portion of the Ottawa River (approximately 8 km downstream)
Terrestrial environment	Includes the NSDF Project footprint and 2 sections of East Mattawa Road that will be upgraded to form access roads, for a total area of approximately 37 hectares	Includes a 250 m buffer around the SSA and all surface waterbodies and wetlands intersecting the buffer, for a total area of approximately 210 hectares	Synonymous with the CRL site boundaries
Ambient radioactivity and ecological health	Synonymous with the NSDF Project footprint	Includes the SSA and covers the spatial extent of the Perch Creek and Perch Lake Watershed made up of Perch Lake, its tributaries, Perch Creek, and the	A circular area surrounding the LSA with an approximate radius of 7.4 km and the Perch Lake and Perch Creek basins, and a portion

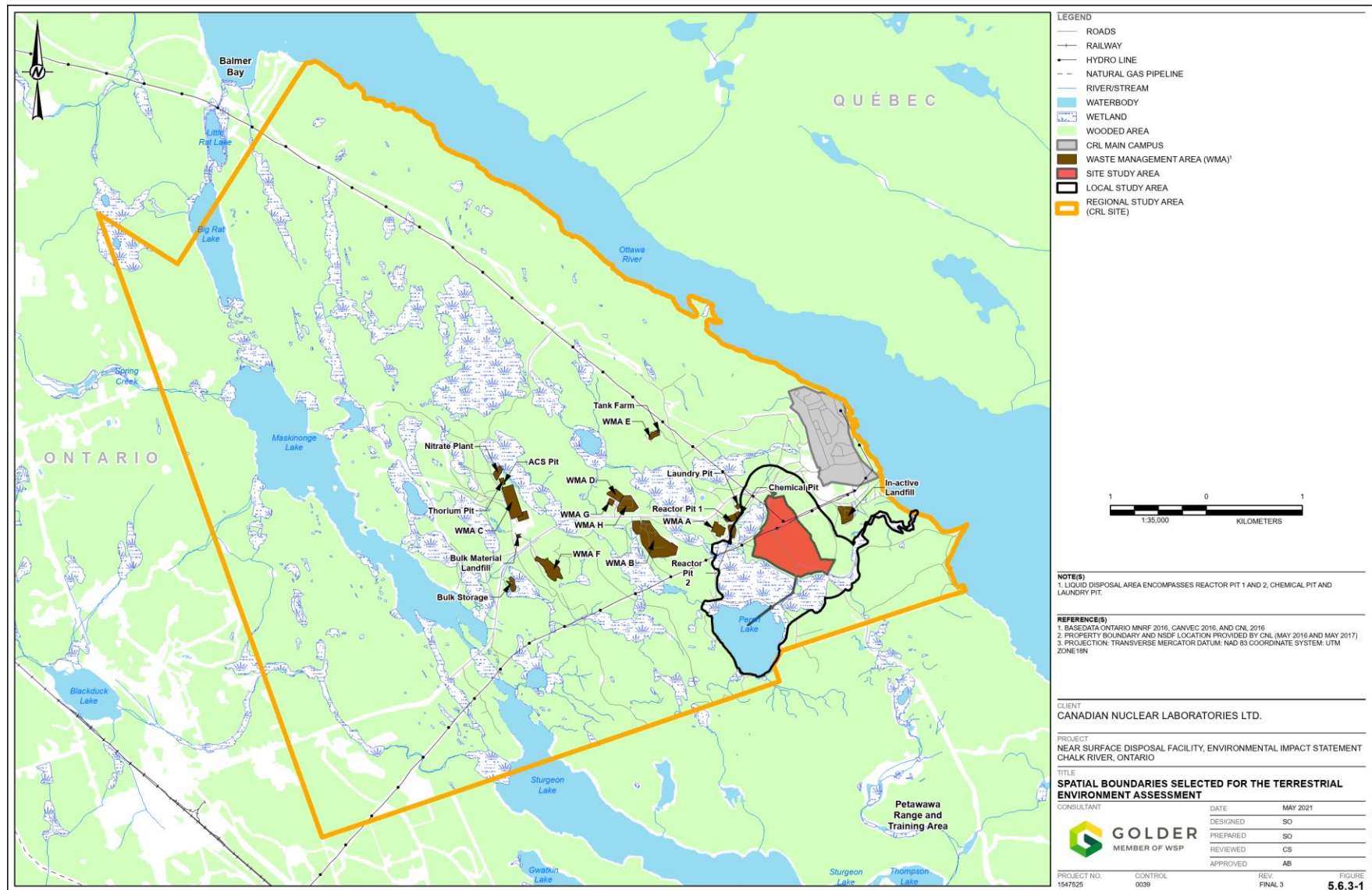
Environmental compartment	Spatial boundaries		
	SSA	LSA	RSA
		Ottawa River near the mouth of Perch Creek	of the Ottawa River (approximately 8 km downstream)
Human health	Synonymous with the NSDF Project footprint	Includes the Perch Creek and Perch Lake watersheds, Perch Lake tributaries, and the Ottawa River in the vicinity of the mouth of Perch Creek	A circular area surrounding the LSA with an approximate radius of 7.4 km and extends roughly 8 km downstream in the Ottawa River
Land and resource use	Synonymous with the NSDF Project footprint	Includes the LSAs for the terrestrial and aquatic environments, for a total area of approximately 226 hectares	A circular area surrounding the LSA with an approximate radius of 7.4 km and extends roughly 8 km downstream in the Ottawa River
Socio-economic environment	Synonymous with the NSDF Project footprint	Includes the village of Chalk River, located 7 km west of the CRL site, and the Town of Deep River, located 9 km northwest of the CRL site	Includes the LSA and the communities of Pembroke, Petawawa, the City of Ottawa, and the Pontiac Regional County Municipality in Outaouais, Quebec

Figure 2: Site, local and regional study areas – Atmospheric environment

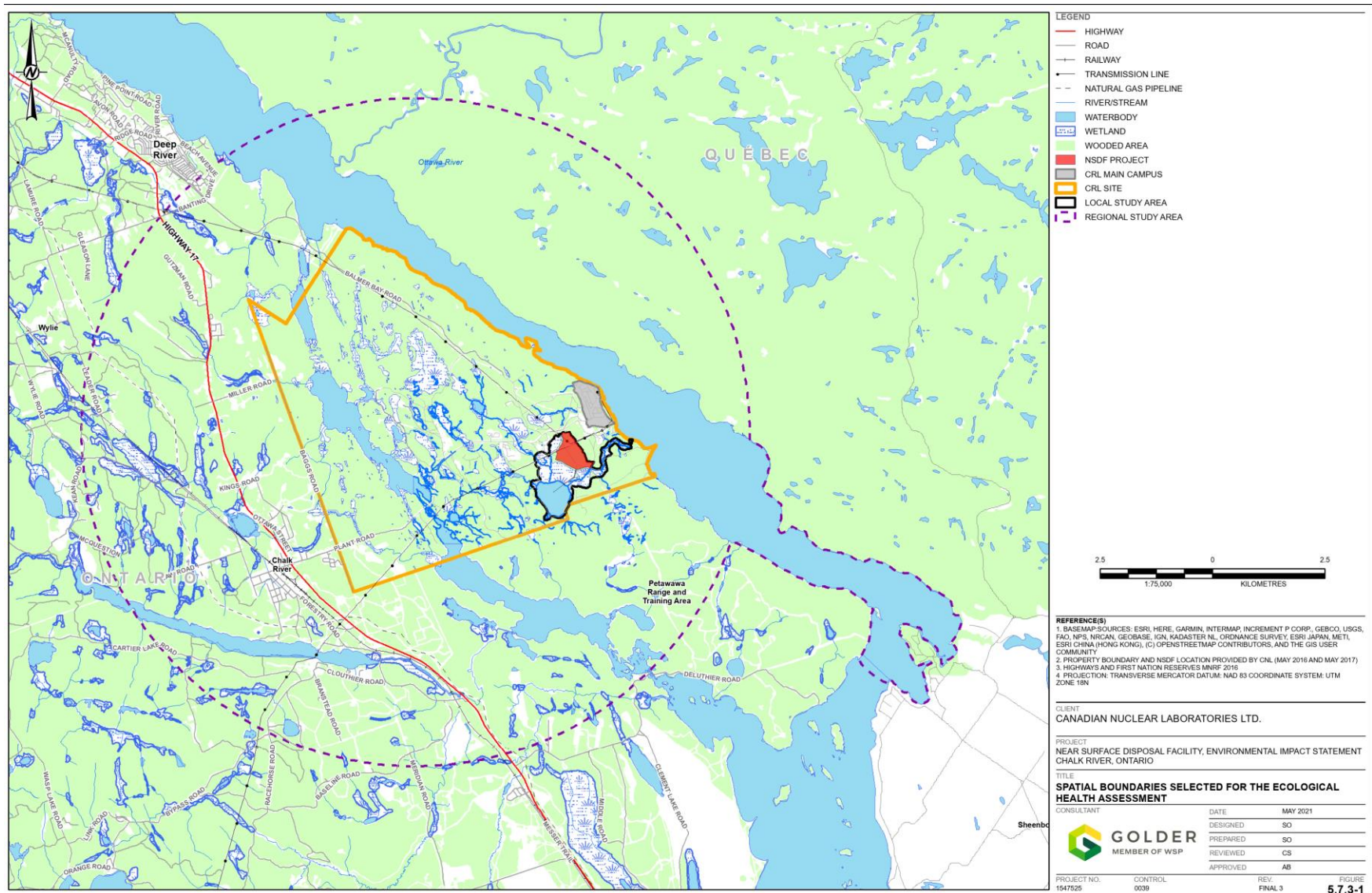
Source: Canadian Nuclear Laboratories, 2021

Figure 3: Site, local and regional study areas – Geological, hydrogeological, surface water and aquatic environments

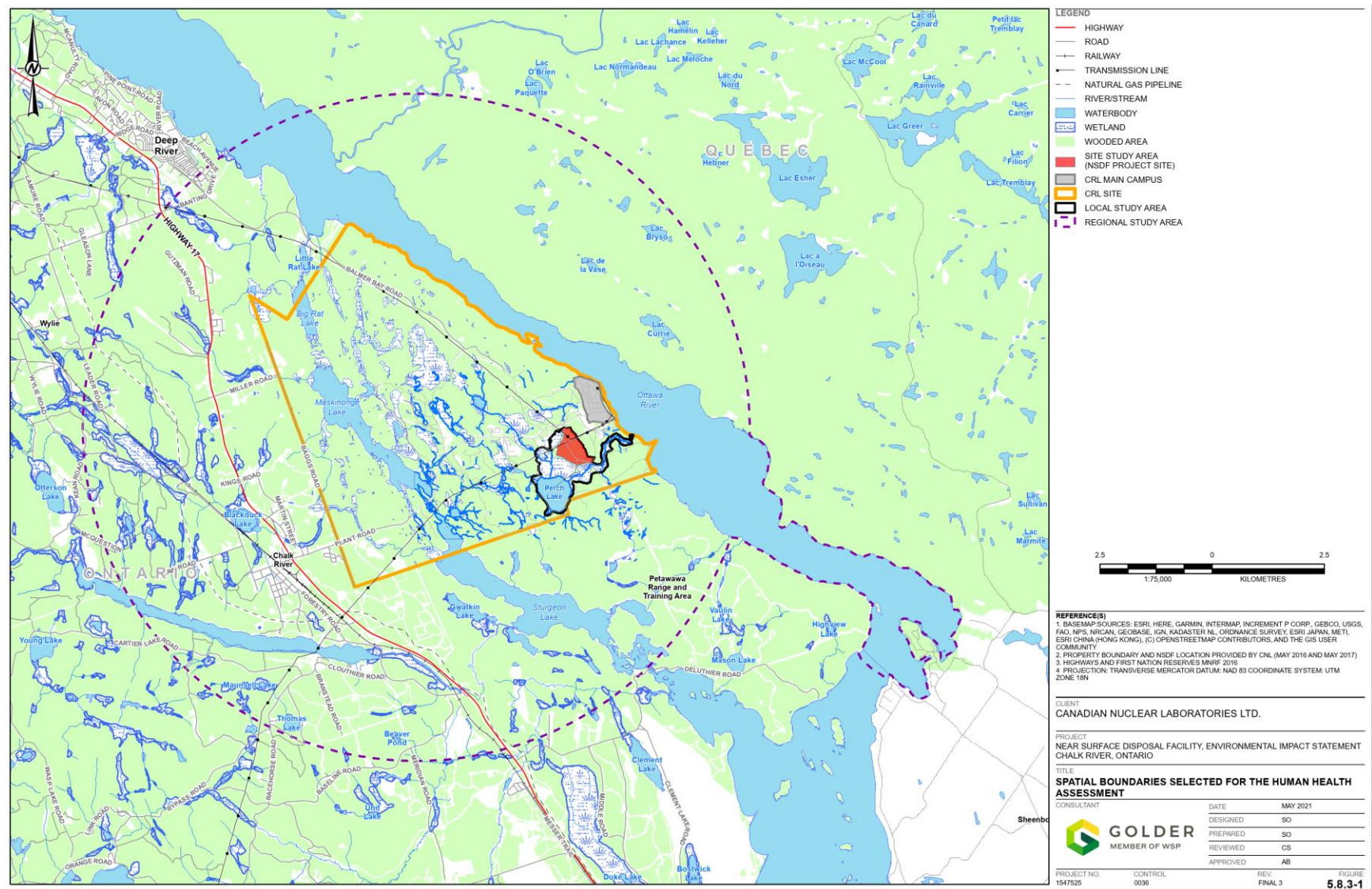
Source: Canadian Nuclear Laboratories, 2021

Figure 4: Site, local and regional study areas – Terrestrial environment

Source: Canadian Nuclear Laboratories, 2021

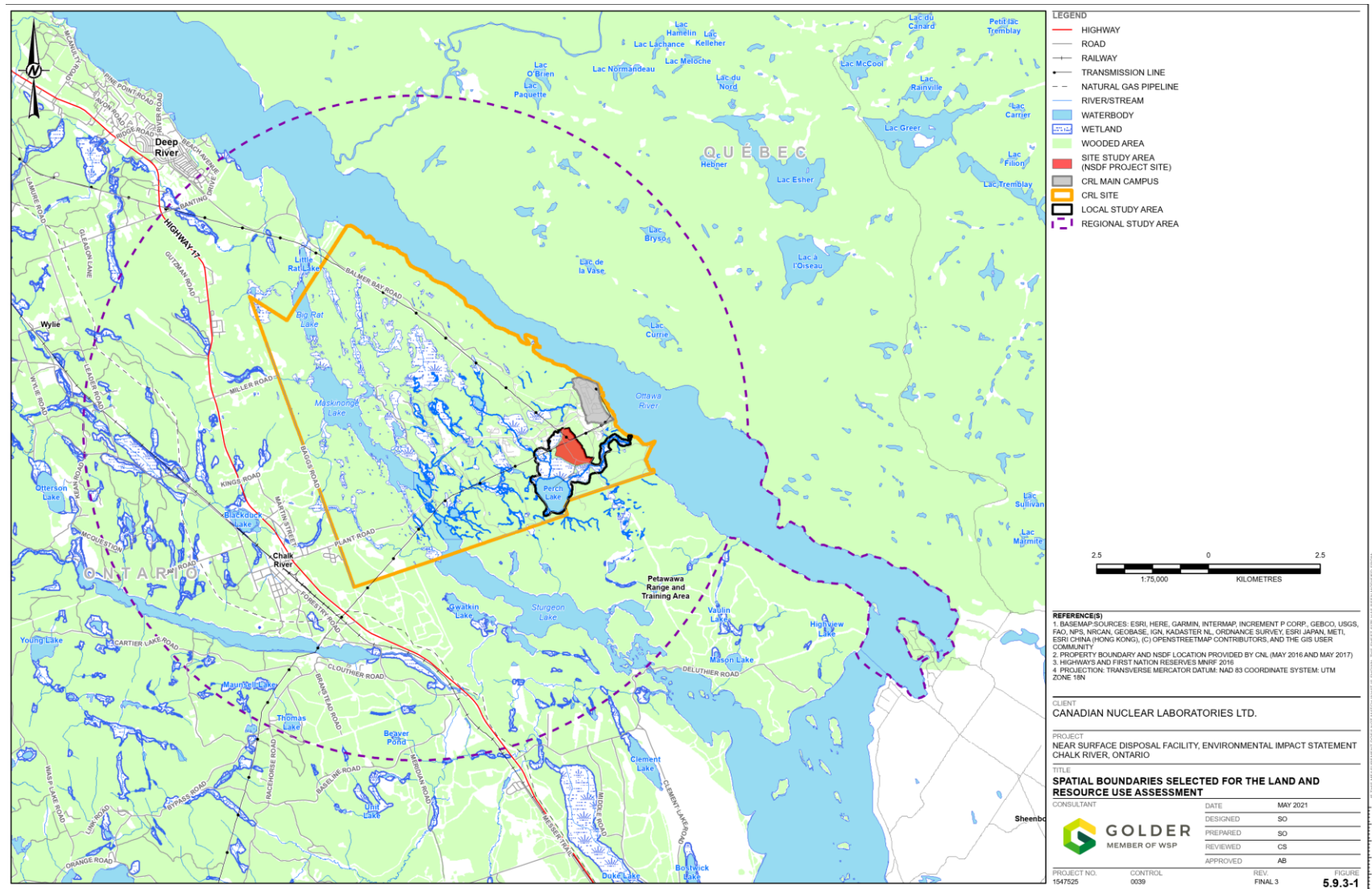
Figure 5: Site, Local and regional study areas – Ambient radioactivity and ecological health

Source: Canadian Nuclear Laboratories, 2021

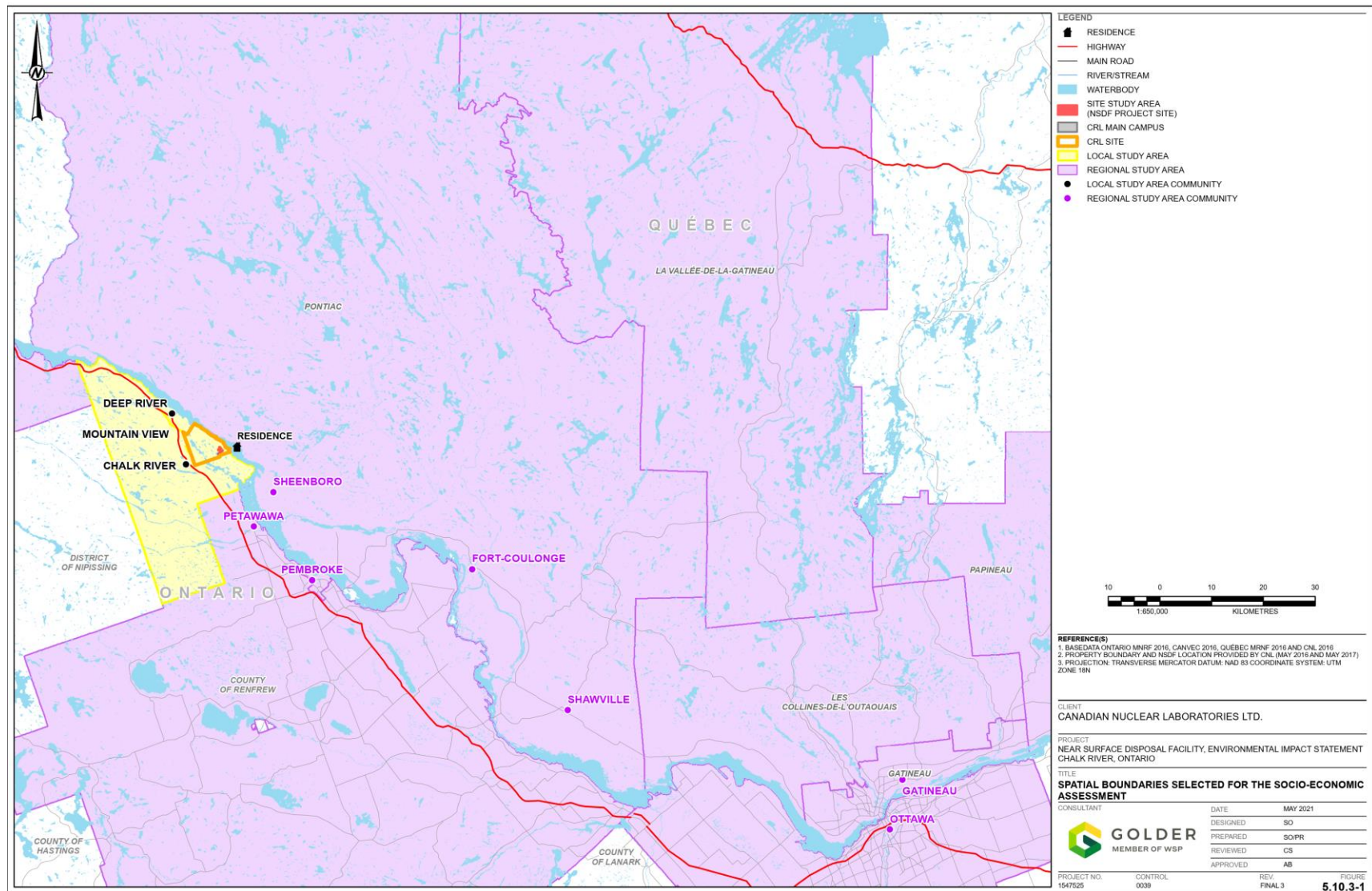
Figure 6: Site, local and regional study areas – Human health

Source: Canadian Nuclear Laboratories, 2021

Figure 7: Site, local and regional study areas – Land and resource use



Source: Canadian Nuclear Laboratories, 2021

Figure 8: Site, local and regional study areas – Socio-economic environment

Source: Canadian Nuclear Laboratories, 2021

2.4 CNSC analysis methodology

CNSC staff reviewed various sources of information to complete the analysis of potential adverse effects of the proposed NSDF Project, including:

- the draft EIS submitted by CNL in March 2017 and the revised draft EIS submitted in November 2019
- additional information from CNL during the course of the EA
- CNL responses to information requests from the CNSC and the FPRT during their review of the EIS
- CNL responses to comments received from the public and Indigenous Nations and communities
- advice from expert federal departments and provincial ministries
- Indigenous knowledge and land use studies from Algonquins of Pikwakanagan First Nation (AOPFN), the Algonquins of Ontario (AOO), and the Métis Nation of Ontario (MNO)

The comments received from the public and Indigenous Nations and communities as part of the public comment period on the draft EIS submitted by CNL in 2017 were addressed as part of the EA process. Comments directed to CNL were addressed and resulted in changes to CNL's final EIS. Comments directed to CNSC staff were taken into consideration in their analysis. Tables presenting the disposition of comments addressed to the CNSC and to CNL, respectively, are posted on the [Canadian Impact Assessment Registry \(CIAR\) Internet site](#).

Through the technical review of the EIS, information requests from the federal and provincial review team and their responses from CNL resulted in additional mitigation measures and follow-up monitoring program measures being incorporated by CNL into the revised and final EIS document.

CNSC staff requested that CNL submit a consolidated EA commitments list for the NSDF Project. CNL submitted and CNSC staff reviewed [CNL's Near Surface Disposal Facility Project Consolidated Commitments Report](#) (the commitments report), a document that captures all mitigation measures, follow-up monitoring program measures and other commitments made by CNL to the public and Indigenous Nations and communities throughout the EA process to date. CNSC staff examined this information to ensure that all key issues and concerns that have been brought forward to date by Indigenous Nations and communities and the public have been addressed. Should the Commission approve the Project, the commitments report will be updated to capture any new commitments recommended by the Commission.

CNSC staff assessed the likelihood of the NSDF Project to cause significant adverse environmental effect, following the application of mitigation measures, in accordance with the CNSC Generic Guidelines, CNSC REGDOC-2.9.1, *Appendix A*, and the Canadian Environmental Assessment Agency's (now the Impact Assessment Agency of Canada) [Operational Policy Statement: Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under CEAA 2012](#).

The approach used by CNSC staff was to assess each predicted, residual adverse effect in three steps:

- step 1: determining whether the residual environmental effects are adverse
- step 2: determining whether the residual adverse environmental effects are significant
- step 3: determining whether the significant adverse environmental effects are likely

In step 2, the residual adverse effects were characterized using the following assessment criteria:

- magnitude: severity of the adverse effects
- geographic extent: spatial reach of the adverse effect
- duration: length of time of the adverse effect
- frequency: rate of recurrence of the adverse effect
- reversibility: degree to which the environmental conditions can recover after the adverse effect occurs
- timing: consideration for the time of year that a project activity is undertaken

CNSC staff also considered context for all residual adverse effects across all the criteria listed above. Context refers generally to the current state of the environment or of the VC and the sensitivity and resilience to the change caused by the Project.

The definitions and limits used to assign the level of effect for each rating criterion are presented in appendix A. CNSC staff used the tables in appendix A to help determine the significance of the effects which combines the degree (low, moderate or high) of the residual effect of each criterion. With the help of the tables, CNSC staff were able to make an overall assessment of the significance of the residual effect. The degree of residual effect is determined by taking into consideration the mitigation measures proposed by CNL and all measures considered necessary by CNSC staff.

CNSC staff considers effects to be “not significant” where the residual effects after mitigation measures have been implemented are low, moderate or high in magnitude; localized in geographic extent; short-term in duration; and are fully or partly reversible.

CNSC staff considered effects to be “significant” where the residual effect after mitigation measures have been implemented would be high or moderate in magnitude; long- or medium-term in duration; and irreversible.

2.5 Purpose of the environmental assessment report

The purpose of the EA report is to summarize the assessment conducted by CNSC staff, including the information and analysis considered by CNSC staff in reaching its findings on whether the proposed NSDF Project is likely to cause significant adverse environment effects, after taking into account the implementation of proposed mitigation measures. The report also includes recommended conditions, based on key mitigation measures and follow-up measures for the Commission to consider in their decision.

The Commission will consider this report and comments received by Indigenous Nations and communities and the public when issuing an EA decision for the NSDF Project under CEAA 2012.

This EA report is designed to reflect the scope of the EA decision by the Commission and address requirements of CEAA 2012 (see section 2.1). The EA report first introduces the project,

its regulatory context and the existing conditions of the proposed site. Next, it presents changes predicted to be caused by the project to environmental compartments (air, water, terrestrial, and geological). Then the EA report presents the predicted effects of those changes to VCs identified by the CNSC based upon CEAA 2012 requirements (see section 2.2), as well as other effects considered under the scope of the EA (see section 2.1). Finally, the EA report presents a summary of Indigenous consultation and public engagement, and CNSC staff findings and recommendations.

In short, the report content is structured as follows:

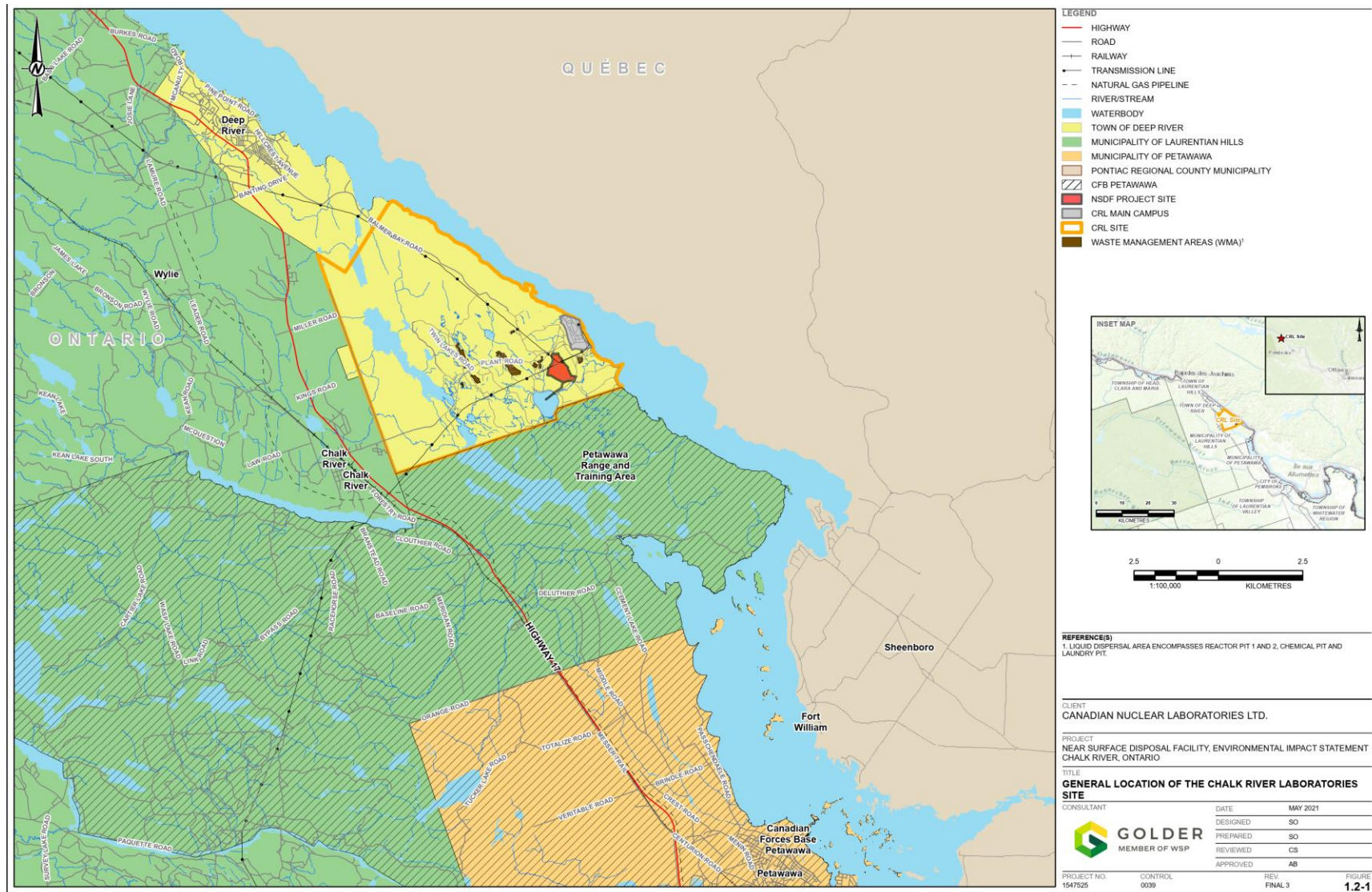
- introductory chapters, providing an overview of the project, regulatory requirements and existing site conditions (chapters 1-5)
- predicted changes to the environment that could be caused by the Project (chapter 6)
- predicted effects on VCs from changes to the environment (chapters 7-8)
- views expressed by Indigenous Nations and communities and the public with some sections being co-developed by interested Indigenous Nations and communities (chapters 4-9)
- Indigenous consultation and engagement and key issues and concerns as well as Indigenous or Treaty rights that could be potentially affected by the Project (chapter 9)
- Public engagement and key issues raised during EA-specific engagement activities (chapter 10)
- Follow-up monitoring program (chapter 11)
- CNSC staff findings and recommendations (chapter 12)

3.0 Project overview

CNL is proposing the construction, operation and decommissioning of the NSDF Project for the disposal of solid, low-level radioactive waste at the CRL site in Renfrew County, Ontario. The NSDF would hold up to 1,000,000 cubic m³ of low-level waste in 10 waste disposal cells. The proposed project would also include a WWTP, supporting facilities and site infrastructure. The operations phase is anticipated to last approximately 50 years, followed by a closure phase of approximately 30 years. Section 4 of this EA report summarizes the alternative means considered by CNL for the proposed NSDF Project. Additional Project details can be found in section 1.1.2 of the CMD and the following sections provide a brief overview of the Project.

3.1 Project location

The NSDF Project is proposed to be located within the CRL site in Renfrew County, Ontario, adjacent to the Ottawa River, within the traditional unceded territory of the Algonquin Anishinabeg peoples, as well as the traditional and/or Treaty territories of the Williams Treaty First Nations, and the Métis Nation of Ontario. The CRL site has a total area of approximately 4,000 ha and is located approximately 185 km northwest of the city of Ottawa, within the boundaries of the Corporation of the Town of Deep River. The CRL site is bordered by the federal Department of National Defense Garrison Petawawa to the southeast, and the Village of Chalk River to the southwest. The Ottawa River forms the northeastern boundary of the CRL site. The CRL site contains several licenced nuclear facilities, waste management areas (WMA), and other nuclear and non-nuclear infrastructure, facilities, and laboratories.

Figure 9: Project location

Source: Canadian Nuclear Laboratories, 2021

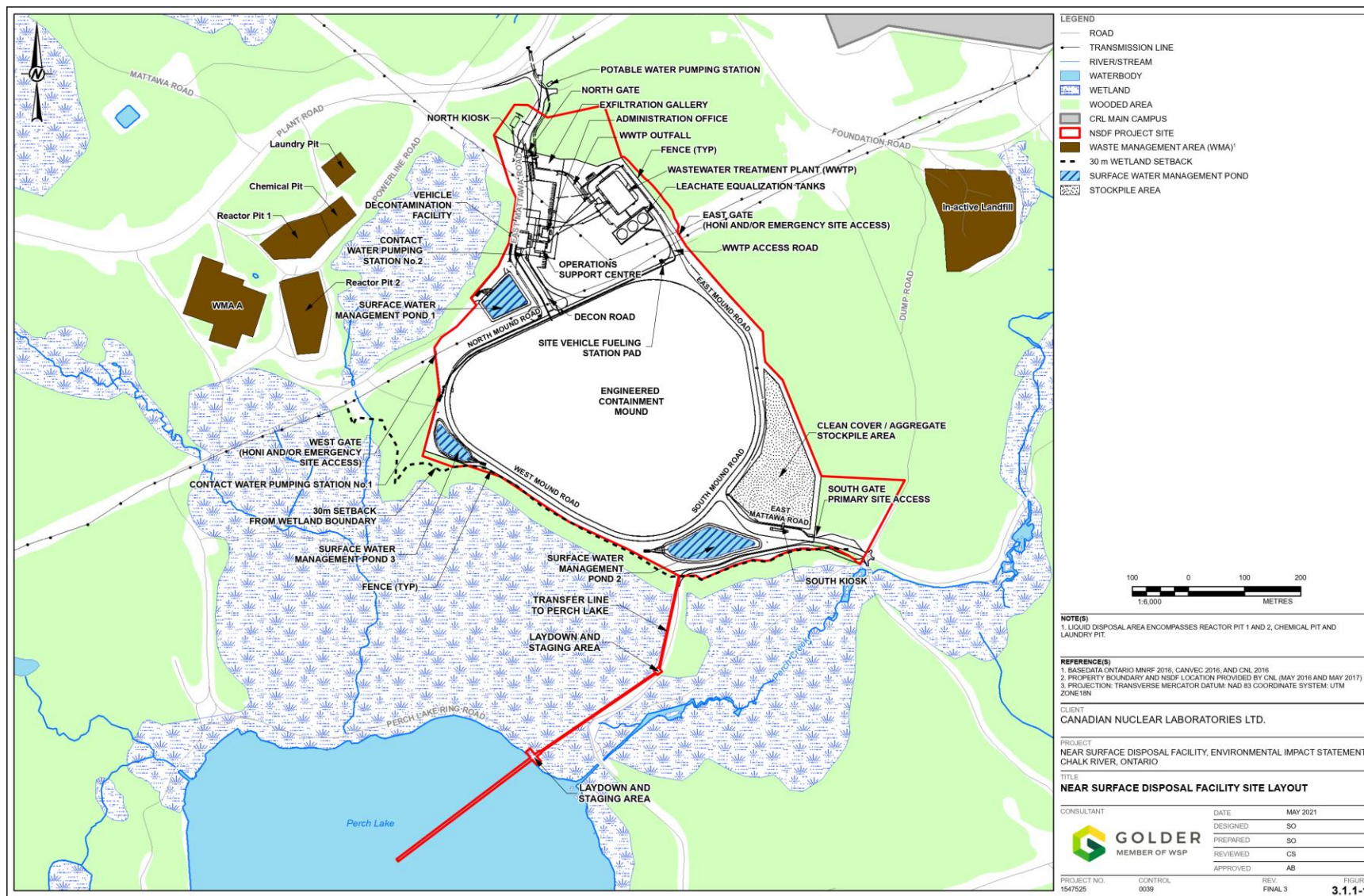
3.2 Project components

The main NSDF Project components and descriptions are listed in table 3.1. Figure 10 illustrates the proposed geographic locations of the proposed NSDF Project components.

Table 3.1: Descriptions of the main NSDF Project components

Project component	Description
Engineered containment mound (ECM)	The ECM would consist of 10 disposal cells (maximum 15,000 m ² of waste per cell) and contain and isolate the wastes from the surrounding environment. Passive safety features would be implemented to provide isolation of the waste, including a base liner, a final cover, and a perimeter berm. An active leachate collection and water treatment system will be in place to treat all contact water from the site.
Waste Water treatment Plant (WWTP)	The WWTP would include facilities and processes implemented to treat wastewater produced by the ECM. The WWTP would be a stand-alone facility with a design life of approximately 50 years. Wastewater requiring treatment would arrive to the WWTP from 3 general sources: leachate, contact water, and wastewater from ongoing operations. The total annual volume of wastewater expected to require treatment is approximately 11,000 m ³ . Final effluent would be stored in tanks on site and sampled prior to discharge into Perch Creek and Perch Lake Watershed through an exfiltration gallery or by a transfer line discharge.
Support facilities	Supporting facilities for the NSDF Project would include both modular and permanent structures designed for year-round operation. The main support facilities would include north and south weighing station kiosks, an administration building, an operations support centre, a vehicle decontamination facility, a site vehicle refueling station, and a potable water pump station.
Site infrastructure	The site infrastructure systems would be designed to accommodate year-round operations during the NSDF Project construction and operations phases and long-term monitoring and maintenance during the closure and post-closure phases. The site infrastructure would include access roads, site security (perimeter fencing and boundary setbacks), sanitary sewage disposal system, surface water management, and utilities such as natural gas, power, telecommunication, data, and domestic water pump and distribution.
Management of generated waste	All wastes that arise from the construction, operations, and closure phases of the NSDF Project will be managed according to CNL's Waste Management Program. Facilities and activities within the NSDF Project site will be planned, developed, and operated in a manner that reduces both the volume and the level of hazard of all wastes generated during the life cycle of the facilities.

Figure 10: Project components and site layout



Source: Canadian Nuclear Laboratories, 2021

3.3 Project activities

Table 3.2 lists the key project activities that would occur during each phase of the NSDF Project. The table also shows the approximate expected duration of each project phase.

Table 3.2: NSDF Project activities and duration by phase

Project phase (planned duration)	Project activities
Construction (3 years)	<ul style="list-style-type: none"> • Clearing and grubbing of vegetation on site and excavating, removing, and stockpiling of topsoil and overburden • Establishing exclusion and buffer zones around wetlands and other sensitive areas where activities are not permitted to occur • Blasting and excavating for the ECM • Removal and/or stockpiling of waste rock • Excavating drainage ditches and surface water management ponds • Grading the NSDF Project site, including access roads, stockpiles areas, and other building locations • ECM liner system construction, including construction of the outer boundary berm • Developing surface water management infrastructure • Managing surface water and wastes during construction • Developing on-site road and access • Constructing the WWTP, support facilities, and site infrastructure
Operations (50 years)	<ul style="list-style-type: none"> • Phased development of disposal cells • Verification and acceptance of wastes to ensure they meet standards required to be placed within the ECM • Progressive closure of disposal cells and installation of temporary and final cover systems • Operation of the WWTP and discharge of treated effluent • Surface water management and erosion control • Domestic waste management • Petroleum storage and hazardous materials handling • Maintenance of infrastructure, facilities, and site services
Closure (30 years)	<ul style="list-style-type: none"> • Installation of the final cover of the ECM • Decommissioning of infrastructure and support facilities • Remediation and grading of the NSDF Project site

Project phase (planned duration)	Project activities
	<ul style="list-style-type: none">• Continued operation of the WWTP and discharge of treated effluent• Ongoing performance monitoring and inspection activities
Post-Closure (IC of 300 years and post IC)	<ul style="list-style-type: none">• Ongoing long-term monitoring to verify facility performance during institutional control period• Surveillance and inspection activities to verify integrity of the facility

4.0 Purpose of the project and alternative means

4.1 Purpose of the project

The purpose of the proposed NSDF Project is to provide the permanent disposal of current and future low-level radioactive waste at the CRL site, as well as a small percentage of waste volume from off-site locations. CNL has indicated that the proposed NSDF would allow for the remediation of historically contaminated lands as well as the decommissioning of outdated infrastructure to facilitate the ongoing CRL site revitalization.

As part of the initial project planning (outside of the CEAA 2012 process), CNL undertook an analysis of alternatives to the project as a first step to determine the appropriate facility type (near surface vs. deep underground) required for this project. The analysis served to validate that the preferred alternative is a reasonable approach to meeting the need and purpose of the project.

CNL assessed four different options/facility types (ongoing waste storage, NSDF, Geologic Waste Management Facility (GWMF) and very low-level waste disposal facility), based on technical, economic, and environmental considerations for each alternative. Both the ongoing waste storage and the very low-level waste disposal facility were found to be unfeasible early in the process. Therefore, two alternative facility types for waste disposal were fully assessed by CNL:

1. NSDF
2. GWMF (a deep underground repository)

Both alternatives met CNL's overall project need and were determined to be environmentally feasible. While alternative 2 (the GWMF) would provide increased barriers for potential releases to the environment, the nature of low-level wastes does not warrant the need for these barriers. GWMFs are typically proposed for higher-level wastes and incur substantially higher life cycle costs. Therefore, alternative 1 (the NSDF) was identified by CNL as the favorable alternative. The NSDF was proposed as the facility type in the project description for the purposes of the CEAA 2012 process, and was carried through to the full environmental assessment. Given that this analysis of alternative facility types is not a required factor to be considered under CEAA 2012, CNSC staff did not review CNL's assessment of alternative facility types. CNSC staff's assessment of CNL's assessment of alternative means of carrying out the preferred facility type is provided below.

4.2 Alternative means to carry out the project

Once a facility type is chosen, "alternative means" are the various technically and economically feasible ways under consideration by the proponent that would allow a designated project to be carried out. The alternative means should be considered by the proponent as early as possible in the planning of a designated project. EA documentation must clearly explain and justify the methodologies used to identify, assess and select alternative means. The CNSC's Generic Guidelines and REGDOC-2.9.1 outline requirements and approach to conducting an alternative means assessment for a CNSC-led designated project under CEAA 2012.

This section presents CNL's assessment of alternative means to carry out the proposed NSDF Project. In addition, this section includes a summary of public and Indigenous comments received regarding the NSDF Project alternative means assessment and CNSC staff analysis and findings. CNSC staff analysis and findings are based on the final EIS which is a culmination of

all the revisions and additions that have been made as a result of the analysis, IRs and comments submitted during the EA process.

Facility design of near surface options

Three alternatives for the facility design of near-surface options were considered:

1. ECM
2. Above-ground concrete vault (AGCV)
3. Shallow caverns

Alternative 3 (the shallow caverns) was eliminated from further consideration due to the CRL site characteristics (high water table) and the large volume of waste inventory which would require multiple caverns. The ECM and AGCV alternatives are both technically and environmentally feasible and could be constructed to meet the purpose of the proposed NSDF Project. Moreover, both alternatives have similar monitoring requirements and could be constructed to accommodate up to 1,000,000 m³ of solid, low-level radioactive waste. However, alternative 2 (the AGCV) is expected to be more vulnerable to seismic events and has estimated life cycle costs 5 times those of the ECM alternative. Therefore, CNL identified alternative 1 (the ECM) as the preferred option for the facility design of the NSDF Project.

Facility location

Two alternatives were considered for the NSDF Project facility location:

1. On site at CRL
2. Off site at:
 - Whiteshell Laboratories (WL) or
 - Nuclear Power Demonstration (NPD) site

Both alternatives considered for the facility location were anticipated to have suitable geological features and area for the safe construction and operation of the NSDF Project. However, transporting the waste to the WL or NPD locations would likely raise public concerns related to the transportation of large volumes of low-level radioactive waste, considering wastes to be placed in the proposed NSDF Project will originate primarily from existing waste and future operational, decommissioning and environmental remediation activities occurring on the CRL site. Both WL and NPD are scheduled to be closed within the upcoming decade, and therefore, will not be equipped with the appropriate services and infrastructure to securely operate the proposed NSDF. As such, CNL determined that having the facility located on site at CRL (alternative 1) was the most suitable alternative for facility location.

Site selection

A total of 15 potential sites within CRL were identified for initial screening for the proposed NSDF Project site selection. The following mandatory criteria were considered during the screening process:

- minimum area of 30 hectares
- site must be at least 200 metres wide
- access to Class IV electricity for power generation

- access to waste for sanitary and process requirements
- access to gas and other heating source

Exclusion criteria were then applied to potential sites to remove all locations constrained by the proposed NSDF Project requirements or pre-defined factors. Exclusion criteria included physical, cultural, and biological features. The following exclusion criteria were considered during the screening process:

- sites within the Ottawa River floodplain
- areas with a slope in excess of 25% (areas with a slope less than 10% were desirable)
- areas within 50 metres of Plant Road
- areas with outcrops and organics less than 20% of the proposed sitting area
- areas with liquefaction potential and active fault lines
- known likely habitats of national or provincial significant wildlife species in accordance with the Federal SARA or COSEWIC
- areas that are seasonally or permanently inundated with water
- areas within 30 metres from watercourses or wetlands
- sites located adjacent to provincially registered archaeological sites
- areas within 100 metres from existing CRL site boundaries
- sites of existing or previously sited facilities

Two candidate locations were identified for further evaluation after the application of the above mandatory and exclusion criteria:

1. the East Mattawa Road (EMR) site
2. the Alternate site (11A)

Alternative 1 (the EMR site) was preferred for both economic and environmental reasons. The EMR site is in closer proximity to the existing waste operational areas and thus represents a tighter consolidation of land uses. Extensive environmental studies have been completed in Perch Creek and the Perch Lake Watershed, allowing for additional baseline data regarding how the facility could interact with the surrounding natural environment at the EMR site. The life cycle costs for the EMR site are also expected to be lower, as the site is already located near existing services and access routes. Thus, alternative 1 was identified by CNL as the preferred site location for the NSDF Project.

Leachate treatment system

Three alternatives for leachate management systems were considered for meeting the design requirements for the proposed NSDF Project:

1. Use of an existing wastewater treatment facility.
2. Construction of a new waste water treatment plant (WWTP).
3. No discharge through the use of a leachate evaporation pond.

Alternative 2 (the construction of a new WWTP) was considered the only feasible option as a leachate treatment system. Alternative 1 was considered unsuitable as the available wastewater treatment facilities are expected to reach the end of their life before the end of the operating life of the NSDF Project, making them unfeasible as leachate treatment systems. Alternative 3 would be a suitable alternative for hot, dry climates but would be ineffective in the mid-continental climate of central Canada, which has no distinct dry season.

Effluent discharge options

Following treatment in the WWTP, the treated effluent will need to be discharged to the natural receiving environment. The estimated annual volume of treated effluent to be discharged is approximately 11,000 m³. The following alternatives for effluent discharge were considered:

1. discharge to ground
2. discharge to surface water (i.e., Perch Creek, Perch Lake or the Ottawa River)
3. co-discharge to the NSDF stormwater system and to ground
4. co-discharge to ground and to surface water
5. no liquid discharge (i.e., thermal evaporator)

CNL hosted a focus group on effluent discharge alternatives in May 2019. Invitations were extended to members of the public, local municipalities, Indigenous Nations and communities, and non-government organizations. The focus group consisted of members of the public, local municipalities, and non-government organizations. CNL stated the intent of the focus group was to stimulate discussions regarding potential improvements to the NSDF Project effluent discharge and to incorporate the conclusions of the discussions into the final EIS. General results of the discussions included updated evaluation criteria for effluent discharge and the rejection of the alternative option to discharge into the Ottawa River.

Alternative 4 (co-discharge to ground and to surface water) was determined to be the most technically and economically feasible alternative. The combination of discharge to ground with direct discharge to surface water would provide an additional discharge option when there is insufficient infiltration capacity at the exfiltration gallery. Discharge to ground would also provide the added benefit of enabling control of recharging water to the wetlands. Discharge into Perch Lake was the only option deemed to be acceptable by the public, based on discussions held during the focus group, and was thus determined by CNL to be the preferred alternative for effluent discharge of the NSDF Project.

Discharge type

Multiple engineering alternatives were considered for the discharge system of the proposed NSDF Project:

1. discharge by surface onto Perch Lake
2. piped outfall to Perch Lake (submerged outlet in Perch Lake)
3. piped outfall to Perch Lake (above water discharge)
4. submerged diffuser in Perch Lake (alignment along lakebed)
5. submerged diffuser in Perch Lake (diffuser suspended in water column)

Alternatives 2 and 4 were considered technically and economically feasible for the discharge of treated effluent into Perch Lake. While both options are expected to cause disturbances of the lakebed sediment during the construction and operation phases, alternative 4 is expected to limit these effects and allow for effective mitigation measures. Thus, alternative 4 (submerged diffuser in Perch Lake with alignment along lakebed) was considered by CNL to be the most favourable option for discharge type.

Views expressed

In relation to the alternatives means assessment for the proposed NSDF Project, comments received from the public and Indigenous Nations and communities, including the Algonquin Anishinabeg Nation Tribal Council, the AOPFN, the MNO and the Mohawks of the Bay of Quinte, identified concerns regarding the alternatives considered in the alternatives assessment. For example, some commenters suggested that other than the 2 locations on the CRL site, a site further from the Ottawa River should have been considered for the alternative means assessment.

CNL considered all of the information provided by the public and Indigenous Nations and communities in selecting the preferred alternatives for the NSDF Project components. CNL also held several technical meetings with concerned Indigenous Nations and communities, as well as a public webinar in June 2020, dedicated to explaining the details of the alternative means assessment for this project.

CNSC staff analysis and findings

CNSC staff, as well as ECCC and MELCC staff, in their technical review of CNL's draft EIS, asked CNL to provide further detail on the different waste management strategies considered and to provide justification for CNL's preferred option, an ECM, as the most suitable storage option to contain the waste and prevent environmental effects including impacts to water quality. CNSC staff also requested that CNL include in their alternative means assessment, a description of any alternative means that were considered, but determined not to be technically and economically feasible, including rationale. CNL revised the EIS and added in additional information justifying their proposed NSDF Project in comparison to other alternatives assessed, including facility type and design. CNL also revised the EIS to include additional detail on all alternatives assessed, including those that were determined not to be technically or economically feasible. CNSC staff also requested that CNL provide further detail on whether or not other discharge points had been considered for the treated leachate, which resulted in CNL revising the EIS to include a new section, "Effluent Discharge Options", in which CNL's preferred option is justified.

CNL's alternative means assessment considered the cost-effectiveness, technical applicability, reliability, environmental effects, and feedback from the public and Indigenous Nations and communities on the selected alternatives means of carrying out the proposed NSDF Project. CNL clearly outlined its approach, identified clear technical and economic feasibility criteria, and sufficiently documented the rationale for their preferred alternative means (to provide context for public and Indigenous Nations and communities and ultimately, to allow the Commission to understand the choice). CNSC staff have determined that CNL has provided sufficient information in the EIS and related documentation in accordance with the CNSC Generic Guidelines and REGDOC-2.9.1.

With regards to CNL's preferred option for the Project site selection, CNSC staff have reviewed CNL's assessment and have found that although the proposed Project site is located approximately 1.1 km from the Ottawa River, the EMR site is an acceptable and safe location for

the proposed NSDF. As confirmed by CNSC staff's review, the ECM is to be located on a bedrock ridge sloping away from the Ottawa River, and is designed to resist strong earthquakes, high precipitation and other disruptive events. All contaminated water will be captured and treated during the pre-closure period; therefore, it is unlikely that any contaminated water from the waste will reach the Ottawa River. In the post-closure, the cover-berm-base liner system will limit seepage into the subsurface to very small rates. If minimal amounts of seepage escape from the ECM, the seepage would follow a long pathway, through the Perch Lake Swamp to the South, then through Perch creek, before finally reaching the Ottawa River. CNSC staff have verified and are satisfied that at the exit to the Ottawa River, contaminants would be attenuated to negligible levels and would not have detectable impact on water quality.

Based on its review of this analysis, CNSC staff is satisfied that the proponent has adequately assessed alternative means of carrying out the Project in accordance with the CNSC Generic Guidelines and REGDOC-2.9.1 and for the purposes of assessing the environmental effects of the proposed NSDF Project under CEAA 2012.

5.0 Geographic setting

5.1 Biophysical environment

The NSDF Project is proposed to be located entirely within the CRL site in Renfrew County, Ontario, within the Ottawa River watershed. The site is located within the Central Gneiss belt of the Grenville Structural Province of the Canadian Shield. The Ottawa River is the dominant water body within the area, located directly to the northeast of the CRL site. The CRL site contains several small drainage basins that drain directly or indirectly into the Ottawa River through smaller on-site streams and lakes, with Chalk River and Petawawa River being the 2 major tributaries to the Ottawa River. Approximately 12% of the CRL site drains directly into the Ottawa River. The proposed NSDF Project site is approximately 1.1 km away from the closest point of the Ottawa River.

The Perch Creek and Perch Lake watershed is located southwest of the NSDF Project site. Perch Lake is located entirely within the CRL site. The Perch Creek and Perch Lake watershed has been previously impacted by plumes emanating from the WMA A and the Liquid Dispersal Areas. As such, extensive environmental studies of contaminant hydrogeology have been completed in the last 60 years and continue to be ongoing as part of CNL's existing Environmental Management Plan and thus a robust understanding of the Perch Creek and Perch Lake Watershed exists.

A set of rapids at Cotnam Island, located approximately 40 km downstream of the CRL site, control the water level in the Ottawa River along the site boundary, along with adjustments to the discharge rate at the Des-Joachims hydroelectric dam. The Ottawa River section adjacent to the CRL site is between 200 to 400 metres wide with a steeply sloped shoreline that extends to a depth of 55 metres. Aquatic vegetation is abundant along the shoreline and fine substrates covers the majority of the river bottom adjacent to the CRL site.

The average water table depth at the proposed NSDF Project site was observed to be 4.81 metres below ground surface under average conditions. Depth to the water table is generally greatest near the top of the bedrock ridge and decreases toward the low-lying wetland areas within the region. It should be noted that the installation of the proposed ECM would limit local recharge to

the water table, resulting in a lowering of the water table elevation beneath the proposed NSDF Project facilities.

The geographic area of the CRL site is characterized by a diverse mix of upland and wetland habitats, with lakes and rivers comprising over 10% of the surface area within the region. The vegetation in the region includes coniferous and deciduous forests, as well as a wide variety of plant species. Characteristic tree species for this ecoregion include the eastern white pine (*Pinus strobus*), red pine (*Pinus resinosa*), eastern hemlock (*Tsuga canadensis*), black spruce (*Picea mariana*), yellow birch (*Betula alleghaniensis*), and sugar maple (*Acer saccharum*). Approximately 2.6 hectares of the western region near the CRL site is occupied by a Petawawa Research Forest Plantation, established in 1956 to determine frost and White Pine weevil resistance in Norway spruce. Personnel with the Petawawa Research Forest Plantation have confirmed they no longer have interest in continuing research in the area.

Air quality was assessed at the nearest air quality monitoring station in Petawawa from 2009 through 2013, which was the latest available data at the time of the baseline assessment conducted by CNL in 2015. The monitored atmospheric concentrations of pollutants were below the respective provincial and federal criteria for each indicator compound. The air quality monitoring station in Petawawa is generally downwind of the proposed NSDF Project location and is considered to be the most representative station for the project, due to proximity and similarity in geographic setting (rural location and distance from the Ottawa River).

5.2 Human environment

The NSDF Project is proposed to be located within the boundaries of the Corporation of the Town of Deep River, approximately 185 km northwest of the city of Ottawa. The Village of Chalk River (7 km west of the site) and the Town of Deep River (9 km northwest of the site) are the closest population centres to the proposed NSDF Project location. Surrounding those communities are the Township of Rolph, Buchanan, Wylie and McKay, which with Chalk River, form the Municipality of Laurentian Hills. The Town of Deep River has a population of approximately 4,100 residents while the Municipality of Laurentian Hills has a population of approximately 2,800. The Town of Petawawa and the Garrison Petawawa, total approximately 17,200 residents and are located 20 km and 17 km southeast of the proposed NSDF Project site, respectively. The City of Pembroke, located 34 km southeast, is the other main population center of the region with approximately 15,940 residents.

The Pontiac Regional County Municipality, located in the Province of Quebec across the Ottawa River from the proposed NSDF Project site, is normally uninhabited throughout the year except during the summer months due to seasonal cottage dwellers. The closest community on the Quebec side of the Ottawa River is the Municipality of Sheenboro, located approximately 16 km downstream of the proposed NSDF Project site.

The proposed NSDF Project site is located within the Algonquin Settlement Area that is subject to ongoing modern Treaty negotiations in the Ottawa Valley being led by the AOO with the Governments of Canada and Ontario. A non-binding Agreement-In-Principle was signed with the Governments of Canada and Ontario regarding the land claim in 2016. The NSDF Project is geographically located close to several Algonquin communities. The AOPFN and the Algonquins of Greater Golden Lake First Nation (AGGLFN) are located nearest to the project site. The residential community of Pikwakanagan is located on the southeast shore of Golden Lake, approximately 50 km southeast of the site, however, AOPFN asserts Aboriginal rights and

title to lands within the broader Ottawa River and Mattawa River watersheds in Ontario, which represents their traditional territory. AOPFN is an independent First Nation that is participating in the ongoing land claim negotiations led by the AOO. The community of Greater Golden Lake is located west of Petawawa, Ontario. Algonquin members from various other Algonquin communities historically and currently continue to use the area for the exercise of rights. The proposed NSDF Project site also falls within the boundaries of the Williams Treaties and within the MNO traditional harvesting territory.

Public access is restricted on the CRL site and therefore the only operations and activities taking place at the site are those undertaken by CNL. No hunting or fishing is permitted on the site and it is not currently used for traditional purposes by Indigenous peoples. The primary land uses within the region include forestry, recreation and tourism, trapping, mining, and agriculture. The Ottawa River is used recreationally for swimming, sport fishing and boating; however, there is little commercial fishing. There are several sand beaches along both sides of the Ottawa River that are popular recreational sites and 2 provincial parks, Algonquin and Driftwood, are located along the Ottawa River to the west of the CRL site. The parks provide opportunities for canoeing, hiking, fishing, and hunting, as well as various winter activities such as cross-country skiing, snowmobiling, and ice fishing.

6.0 Predicted changes to the environment

Predicted changes to the environment caused by NSDF Project activities are presented in terms of effects to the atmospheric environment, water resources, terrestrial environment, and geological and hydrogeological environment. These sub-divisions of the environment are referred to as environmental compartments. While changes to the environment can be considered as effects under section 5(1)(b) of CEAA 2012, they are also more generally understood as changes or effects to non-living components that can then lead to effects on identified VCs, as described in Chapter 7. VCs refer to features that may be affected by a project and that have been identified to be of concern by CNL, government agencies, Indigenous Nations and communities or the public. Examples of VCs include fish and fish habitat, migratory birds, terrestrial wildlife, species at risk, and human health.

This section provides a description of the existing environment for each environmental compartment. The baseline information included in the description was used to identify and determine potential changes due to the NSDF Project. Note: The term “baseline” should not be confused with “background” or “reference” conditions but understood as the state of the environment as it is now.

CNSC staff analysis and findings are based on the final EIS which is a culmination of all the revisions and additions that have been made as a result of the analysis, IRs and comments submitted during the EA process.

6.1 Atmospheric environment

The proposed NSDF Project could potentially cause changes to the atmospheric environment through:

- Change to air quality due to an increase in emissions, including dust and greenhouse gasses (GHGs), associated with construction and operations activities.

CNSC staff’s analysis of CNL’s assessment on the changes to the atmospheric environment considered the views expressed by federal departments, provincial ministries, Indigenous

Nations and communities, and the public. This informed CNSC staff's analysis of effects to fish and fish habitat, Indigenous uses, and human health in sections 7.1, 7.3, and 7.4 respectively of this report, including mitigation and follow-up measures. There are no sensitive receptors within the vicinity of the proposed NSDF Project that would experience adverse effects due to noise and vibration caused by NSDF Project activities. Sensitive receptors include senior citizen residences, childcare facilities, dwellings, and education facilities, consistent with Ontario Reg. 419/05: Air Pollution. An analysis of potential indirect effects from noise and vibrations on fish and fish habitat and migratory birds is provided in section 7.1 and 7.2.

Description of the existing environment

There are two industrial facilities outside of the LSA (<25 km from LSA boundary) that report indicator compounds and pollutant releases to the National Pollutant Release Inventory (NPRI). These emissions contribute to the local air quality but are minor contributors of non-radiological indicator compounds. The existing concentrations of total particulate matter (including PM₁₀ and PM_{2.5}), nitrogen dioxide, sulphur dioxide, carbon monoxide, and metals are below applicable federal standards, resulting in current air quality in the RSA that is typical of a rural setting.

6.1.1 Air quality

Air quality is a key environmental compartment of the NSDF Project as air can be a pathway for the transport of contaminants to aquatic and terrestrial environments, which may in turn impact the health of Indigenous peoples as well as their current use of lands and resources for traditional purposes, the public, vegetation, wildlife, aquatic biota and other living organisms.

Proponent's assessment of potential changes to the environment, mitigation, and monitoring

Potential changes to the atmospheric environment are from GHGs emissions and other indicator compounds including: suspended particulate matter (SPM), particles nominally smaller than 10 microns in diameter (PM₁₀) and particles nominally smaller than 2.5 microns in diameter (PM_{2.5}), carbon monoxide (CO), sulphur dioxide (SO₂), nitrogen oxides (NO_x), hydrogen sulfide (H₂S), vinyl chloride (C₂H₂Cl), lead (Pb), Mercury (Hg), and acrolein (C₃H₄O), and dust from vehicles, WWTP operations and/or waste decomposition during the project construction, operation, and closure activities. The lowest value among provincial guidelines, federal standards, and national air quality objectives were used as criteria to assess for potential effects to humans and biota in the RSA.

The methods used to estimate emissions from the NSDF Project in the air quality assessment include models that predict ground-level concentrations of non-radiological compounds. These models, known as the AEROMOD dispersion models, are used to predict concentrations and deposition rates associated with NSDF Project emissions, and are the models adopted in Ontario as the regulatory models recommended for permitting and regulatory applications.

Air emissions (indicator compounds listed above, GHGs and dust) released during the construction and operations phases would be higher than those released during the closure and post-closure phases of the proposed NSDF Project due to the nature of activities occurring during the construction and operations phases, which include the operation of vehicles and equipment. Changes to air quality caused by the Project would immediately cease following decommissioning of the WWTP and associated water management systems at the end of the closure phase.

Monitoring of air quality at the CRL site is currently conducted under CNL's effluent verification monitoring program, which is compliant with the Canadian Standard Association (CSA) Group standard *N288.5-11 Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills*. To ensure CNL's Effluent Verification Monitoring Program is sufficient to cover NSDF Project activities, including the protection of fish and fish habitat, monitoring of dust will be integrated into the program, as well as continuous monitoring of airborne radiological particulates from applicable NSDF operational facilities on the CRL campus. As discussed in section 7.1.1 below, dust deposition from non-radiological air emissions such as CO, SO_x, NO_x, PM_{2.5} and SPM can potentially cause changes to surface water quality and result in effects to fish and fish habitat.

CNL's effluent verification monitoring program will verify effects predictions for ecological health and effectiveness of mitigation, and will be ongoing during the operation, closure and institutional control periods as needed, based on annual reviews of monitoring data. In addition, air quality monitoring activities for the NSDF Project will be implemented, in order to verify effects predictions, confirm effectiveness of mitigation, and demonstrate compliance with regulatory requirements.

CNL has proposed several mitigation measures to reduce the changes to air quality due to the NSDF Project, which are described in CNL's procedure for management and monitoring of emissions and the CRL effluent verification monitoring program. These measures will be implemented throughout all project phases and are also listed in CNL's commitments report. These measures include:

- implementation of CNL's dust management plan (DMP); the DMP for the NSDF Project will include:
 - restriction or suspension of activities if unacceptable amounts of dust are generated due to winds or other site conditions
 - use of water spraying or misting techniques (e.g., water trucks) as the primary dust control method
 - use of fixatives (e.g., chemical suppressant) for dust control, and for use as daily/interim cover
 - suspension of excavating, loading, hauling and disposal operations when wind speeds exceed the specified criterion
 - requirement of vehicles that have come into contact with contamination to pass through the vehicle decontamination facility
- maintenance of on-site vehicles and equipment engines, which meet Tier 2 emission standards
- application of aggregate to unpaved roads
- road misting and fixating application
- limitation of on-site vehicle idling
- no heating of processed wastewater within the WWTP
- active ventilation within the WWTP building

- HEPA filtration to all active ventilation exhaust prior to release from the WWTP
- installation of interim and final covers to reduce release of emissions from the ECM

Proposed follow-up monitoring program measures, also listed in CNL's commitments report will include:

- site inspections during periods of high dust susceptibility
- particulate monitoring using high volume sampler

Further analysis of GHG emissions as a VC is provided in section 7.5 of this report.

Views expressed

The AOO and the AOPFN expressed concerns about potential site-specific impacts related to blasting and increased vehicle traffic. AOPFN is concerned about incremental increases in air emissions, dust and noise levels that may occur outside the NSDF Project fence line from these activities, and the associated potential adverse impacts on wildlife and AOPFN's traditional use of the area, including diminishing the sensory experiences of AOPFN land-users through changes in noise, smell and visual appearance. AOPFN indicated that noise is a potential impact pathway that should be considered. CNL clarified that the NSDF site is not visible from outside of the CRL property and that a variety of mitigation measures will be implemented to prevent any effects such as noise or dust impacting off-site use. CNL assessed the potential effects of noise specific to the NSDF Project as part of the socio-economic environment assessment as well as the impact of project-related traffic activities on terrestrial animals. CNL stated that no sensitive receptors reside near the NSDF Project that would likely experience nuisance effects on the atmospheric environment from construction and operation phases due to noise and vibration. HC staff reviewed the assessment of potential effects from noise and concur with CNL's assessment. CNL committed to better understanding Indigenous Nations and communities' concerns and to providing relevant NSDF Project construction work control documents for review and input when available and before finalizing, including the project Blasting Plan, Noise Control Plan and Air Quality Plan. CNL also committed to continuing to involve Indigenous Nations and communities in the development and implementation of the NSDF EAFMP.

The AOO expressed concerns about potential contaminants discharging from the NSDF Project and impacting air quality. The MNO raised similar concerns about the assessment of impacts to the atmospheric environment including baseline air quality data collection and emissions calculations for all phases of the project beyond the facility footprint. CNL indicated that they will continue to provide Indigenous Nations and communities with requested documents, including being committed to obtaining their review and input on the EAFMP, mitigation and avoidance plans.

Members of the public expressed concerns regarding dust and debris emitted during the construction phase of the NSDF Project, and potential impacts to the surrounding environment and waterbodies due to those emissions. In the EIS, CNL identified mitigation measures, including a DMP, which identifies dust control measures that will be put in place to minimize airborne dust at the NSDF site. Members of the public also expressed concerns about airborne emissions of both radioactive gases and particles during the site preparation and construction phases of the Project. CNL has indicated that there is the potential for radioactive gases and particle to be released from the wastes within the facility during placement of waste by heavy equipment into the ECM, however this would only occur after the site preparation and

construction phases (i.e., following the construction of the ECM). Therefore, effects on air quality during the site preparation and construction phases are limited to dust emissions and vehicle emissions from construction equipment, which have been assessed in the EIS and compared to federal and provincial ambient air quality criteria.

HC commented that future noise levels at receptor locations along Plant Road and Highway 17 could have been underestimated, as the predictions were based on assumptions derived from published literature rather than on project-specific information. HC requested that CNL provide updates to their traffic-construction noise assessment, including completion of a pre-construction traffic study. In response to HC's request, CNL updated and undertook additional noise modelling of the potential impacts of the Project's traffic noise on receptors along Plant Road and a review of receptor locations along Plant Road was undertaken and additional noise modelling was completed. As reflected in the commitments report, CNL committed to completing a pre-construction traffic count study along Highway 17 and Plant Road as part of the EAFMP.

The MELCC requested that CNL provide additional modeling of the atmospheric dispersion of radionuclides during the operational phase of the NSDF in order to assess whether air quality criteria in Quebec would be respected in areas of the province that may potentially be affected by the project. MELCC also requested that CNL update their criteria to include Quebec's air quality standards and criteria. In response to this comment, CNL updated their criteria to include Quebec standards and revised their approach with regards to environmental monitoring for radioactivity in Quebec to include the nearest off-site receptor to be located in Quebec, approximately 3 km from the CRL site.

CNSC Staff analysis and findings

CNSC staff have reviewed CNL's assessment as well as took into consideration the concerns raised by Indigenous Nations and communities regarding potential impacts from noise levels outside of the project fence line and determined that while the identified changes to air quality (from vehicle/equipment use, WWTP operation and waste decomposition) will be long lasting (i.e., effects continue post-closure) due to the nature of the project, they are expected to be negligible and not cause significant changes to the atmospheric environment, taking into account the implementation of mitigation and follow-up monitoring program measures (e.g., site inspections, DMP). Follow-up monitoring will also be used to confirm model predictions and ensure the environment remains protected.

6.2 Surface water resources

The proposed NSDF Project, through its lifecycle, has the potential to alter surface water resources in the LSA in several ways, including through:

- changes to surface water quality
- changes to downstream discharge patterns

Post-closure, the engineered barriers of the NSDF will degrade over time, resulting in increased infiltration of surface water to the emplaced waste. The increased infiltration will lead to increased volume of leachate released into the groundwater, which will then travel to the surface water environment in Perch Lake, before travelling through Perch Creek into the Ottawa River. Peak concentrations of key contaminants were assessed as part of the post-closure safety analysis and found that they are well below available guidelines.

With input from federal departments, provincial ministries and Indigenous Nations and communities, CNSC staff analyzed CNL's assessment on the changes to surface water resources. This supports CNSC staff's analysis of fish and fish habitat (section 7.1), Indigenous uses (section 7.3) and human health (section 7.4) of this report, including the mitigation and follow-up monitoring program measures.

Description of the existing environment

The proposed NSDF Project site lies within the Perch Lake watershed, which is located adjacent to the Ottawa River. Perch Lake is located south of the proposed NSDF site and has been selected to receive treated effluent from the NSDF during the operational phase via a diffuser placed in the center of the lake. The majority of Perch Lake is open water except for littoral zones along the shore, including a region of floating, emergent, and submerged vegetation, which account for approximately 30% of the lake surface area. The lake has a wetted area of approximately 46 hectares with an average depth of 2 metres and reaches a maximum depth of 4 metres. The substrate of Perch Lake primarily consists of organic sediments, while shoreline soils are a mixture of sands and soil. Perch Creek is the dominant surface water feature that drains Perch Lake into the Ottawa River, and ranges from 5 to 10 metres in width with depths generally less than 1 metre. Perch Lake is located within the CRL site and is not accessible to the public.

Due to the existence of nearby waste sites, the surrounding surface water features, including Perch Lake and Perch Creek, receive several different contaminants, including gross beta (mainly strontium-90 and progeny), tritium, chloride, and various metals. While the endpoint receiving environment of the Ottawa River has been unaffected due to dilution of contaminants, historical contamination of the Perch Lake watershed has led to local exceedances of available water quality benchmark values.

6.2.1 Changes in surface water quality

Proponent's assessment of potential changes to the environment, mitigation, and monitoring

There are 2 potential pathways of effects from the proposed NSDF Project on surface water quality:

- discharge of treated effluent from the WWTP to ground (via an exfiltration gallery) and to Perch Lake (via a transfer line) during operation
- leakage of leachate from the ECM during the post-closure phase from liner and final cover degradation

Discharge of treated effluent from the WWTP during the operation phase

During the operation of the facility, an exfiltration gallery is proposed at the discharge outlet for the treated effluent to promote the exfiltration (dispersal) of treated water into the local groundwater regime. Treated effluent will also be discharged directly to Perch Lake via a transfer line. The transfer line to Perch Lake will be designed to manage the full annual volume of treated effluent, if required, which will prevent the potential for overload flow at the exfiltration gallery. As discussed below, the discharge of treated effluent to Perch Lake was modelled using 2 different scenarios.

The potential effects of the discharge of treated effluent from the WWTP on surface water quality of the receiving and downstream environments were modelled using GoldSim. GoldSim

is a graphic simulation software package which was employed to estimate non-radiological and radiological contaminant concentrations in the surface water of the Perch Creek Basin. A total of 40 different non-radiological and radiological contaminants of potential concern (COPC) were considered for the GoldSim model through 2 scenarios:

- Scenario 1: 50% discharge to East Swamp Wetland via exfiltration gallery and 50% discharge to Perch Lake.
- Scenario 2: 100% discharge to Perch Lake.

Table 6.1 provides a summary of the maximum predicted wastewater concentration before treatment as well as the maximum range of modelled results for surface water quality from either of the 2 model scenarios in comparison to the existing baseline and the CNL's effluent discharge target.

Table 6.1: Water quality modeling results

Parameter	Units	Existing baseline concentration range ^(a)	Maximum predicted wastewater concentration (before treatment) ^(b)	Effluent discharge target ^(c)	Maximum range of modeling results for surface water quality (after treatment) ^(d)	Waterbody where effluent discharge limit is exceeded
<i>Non-Radiological Model Results</i>						
Aluminum	µg/L	129 – 631	150*	50	98 - 631	All
Ammonia	mg/L	0 - 0.02	0.002 - 0.007	0.02	0.001 - 0.007	N/A
Antimony	µg/L	0.027-0.050	0.000033	20	0.038 - 7.209	N/A
Barium	µg/L	17 - 18	0.71	4	12.4 - 18.8	All except Ottawa River
Boron	µg/L	6.5 - 37	120	200	6.7 - 80.2	N/A
Cadmium	µg/L	0.013 – 0.058	0.0029	0.09	0.026 – 0.065	N/A
Calcium	mg/L	7.0 – 7.6	100	116	5.9 - 46.4	N/A
Chloride	mg/L	15.7-54	17	120	15.7 - 107.7	N/A
Chromium	µg/L	0.768 - 1.38	0.25	1	0.56 - 1.38	East Swamp Weir
Cobalt	µg/L	0.24 – 0.45	2.7*	0.9	0.264 - 0.611	N/A
Copper	µg/L	3.48 - 8.94	0.8	2.0	3.48 - 6.17	All
Fluoride	mg/L	ND	0.12	0.12	0.001 - 0.043	N/A

Parameter	Units	Existing baseline concentration range ^(a)	Maximum predicted wastewater concentration (before treatment) ^(b)	Effluent discharge target ^(c)	Maximum range of modeling results for surface water quality (after treatment) ^(d)	Waterbody where effluent discharge limit is exceeded
Hardness	mg/L	28 - 61	354*	80-100	27 - 166	East Swamp Weir
Iron	mg/L	0.5 - 2.87	125*	0.3	0.5 - 2.87	All
Lead	µg/L	1.17 - 5.9	0.024	1.0	1.17 - 5.9	All
Magnesium	mg/L	2.328 - 2.53	68	82	2.262 - 31.048	N/A
Manganese	µg/L	52 - 130	5800*	120	45 - 97	N/A
Mercury	µg/L	0.004 - 0.009	0.0023	0.026	0.006 - 0.015	N/A
Molybdenum	µg/L	0.300	3.9	40	0.3 - 14.546	N/A
Nickel	µg/L	0.786 - 1.46	0.055	25	0.8 - 9.587	N/A
Nitrate	mg N/L	0.029 - 0.055	6.6*	2.93	0.055 - 2.403	N/A
Nitrite	mg N/L	ND	0.09*	0.06	0.002 - 0.108	East Swamp Weir
Phosphorus	mg/L	0.04 - 0.06	0.221*	0.01	0.04 - 0.12	All
Potassium	mg/L	0.912 - 10.12	26	53	0.959 - 19.661	N/A
Selenium	µg/L	0.3 - 0.9	0.048	1	0.614 - 1.283	Perch Lake Inlet
Silver	µg/L	1	0.0032	0.1	0.7 - 1.047	All except Ottawa River
Sodium	mg/L	8.4 - 24.6	100	680	8.4 - 249.4	N/A
Strontium	µg/L	39.5 - 45	100	1500	39.5 - 563.6	N/A
Sulphate	mg/L	1.25 - 2.79	634*	128	1.5 - 228.79	East Swamp Weir
Thallium	µg/L	0.020	0.0038	0.3	0.016 - 0.12	N/A
Tin	µg/L	0.002	0.58	73	0.002 - 26.198	N/A

Parameter	Units	Existing baseline concentration range ^(a)	Maximum predicted wastewater concentration (before treatment) ^(b)	Effluent discharge target ^(c)	Maximum range of modeling results for surface water quality (after treatment) ^(d)	Waterbody where effluent discharge limit is exceeded
Uranium	µg/L	0.039 - 0.08	0.61	5	0.044 - 1.832	N/A
Vanadium	µg/L	0.843 - 1.629	0.43	6	0.695 - 3.197	N/A
Zinc	µg/L	5.99 - 7.91	1.6	20	4.51 - 7.91	N/A
<i>Radiological Model Results</i>						
Carbon-14	Bq/L	0.037	3.1	200	1.49 - 71.8	N/A
Caesium-137	Bq/L	0.007 - 0.152	0.093	10	0.005 - 3.686	N/A
Cobalt-60	Bq/L	0.009 - 0.340	1300*	40	0.038 - 14.572	N/A
Gross Beta	Bq/L	9 - 293	8.97*	5	0.046 - 293	N/A
Tritium	Bq/L	355 - 3600	140,000	360,000	7.5 - 129,415	N/A

^(a) Existing baseline water quality data ranges for all assessment nodes between 2010 to 2018.

^(b) Maximum projected wastewater concentrations in wastewater are derived from the contaminant inventory

^(c) Effluent discharge targets are derived using HC's Guidelines for Canadian Drinking Water Quality (HC 2019) for radionuclides and the Canadian Council of Ministers of the Environment and Ontario Provincial Water Quality Objectives for non-radionuclides.

^(d) Maximum range of modelling results for surface water quality is the maximum concentration range derived from the two discharge scenarios

*Parameters whose maximum projected wastewater concentration exceeds their effluent discharge target.

Bolded concentrations indicate parameters whose surface water concentration exceed the effluent discharge target

MDL = method detection limit

For the majority of the non-radiological COPCs, the maximum predicted wastewater concentration (prior to treatment) was lower than the effluent discharge target, suggesting targeted treatment of these constituents would not be required prior to discharge. However, for a subset of the non-radiological constituents (e.g., those marked with asterisks in table 6.1), the maximum predicted wastewater concentration (prior to treatment) was higher than the treated effluent discharge target, indicating treatment of these constituents prior to discharge is required. Where the maximum range of modelled surface water concentration results exceed effluent discharge targets, any incremental change in concentration to the Perch Creek and Perch Lake watershed from the NSDF operation are not expected to be measurable in the Ottawa River and the downstream environment. All recorded exceedances of the effluent discharge limit in the

Ottawa River were reflective of the baseline concentration already being higher than the effluent discharge limit. Regardless, CNL has indicated the effluent will be treated and tested prior to release into the environment.

Overall, the discharge of treated effluent from the WWTP would result in a change to water quality in Perch Lake. However, this change would be negligible as the effluent would be treated to meet federal and provincial guidelines for protection of aquatic biota and Canadian Drinking Water Guidelines, for non-radionuclides and radionuclides, respectively (refer to table 6.1 above). Incremental changes to water quality during discharges under both discharge scenarios resulting from the operation of the NSDF Project are not expected to result in adverse effects throughout the Perch Creek and Perch Lake Watershed. COPCs from the effluent are not expected to be measurable beyond existing baseline conditions in the Ottawa River after the Perch Creek confluence. Aquatic life and drinking water sources are not likely to be affected by treated effluent from the WWTP.

Seepage of leachate from the ECM during the post-closure phase from liner and final cover degradation.

During the post-closure phase (i.e., after the end of the 300-year institutional control period in Year 2400), seepage of leachate from the ECM liner and final cover degradation as a result of normal evolution can cause changes to downstream surface water quality. The final cover system will be constructed to promote the shedding of surface water to mitigate infiltration into the mound and minimize leachate generation.

Once the cap has degraded and water infiltrates the facility, contaminants are flushed from the waste by infiltrated water. The water drains through the base liner of the ECM and enters the groundwater pathway to Perch Creek. If the infiltration rate through the cap exceeds the drainage rate through the base liner, then overtopping occurs, with water containing dissolved contaminants being released directly to the ground surface and cap perimeter soils.

As contaminants reach Perch Creek, there will be sorption in creek sediments and dilution in surface water and transport downstream to the Ottawa River. The river level can rise following periods of snowmelt and higher rainfall. Under these conditions, suspended sediments, containing absorbed contaminants, may be deposited on the shore. Peak environmental concentrations in water are expected to be low in the context of environmental effects. For example, as calculated in the Post-closure Safety Assessment, the peak concentration of tritium in surface water during the post-closure phase is estimated to be 0.000055 Bq/L, which is well below HC Guidelines for Canadian Drinking Water Quality of 7,000 Bq/L of tritium in drinking water.

For non-radionuclide contaminants during the post-closure phase, key COPCs are those expected to change as a result of the NSDF Project, namely aluminum, barium, copper, iron, lead, manganese, phosphorus, selenium, silver and zinc. During this phase, peak concentrations of copper, lead and uranium are expected to be below the corresponding environmental quality standard from Canadian Council of Ministers of the Environment (CCME) and Ontario Provincial Water Quality Objectives (PWQOs) for soil, sediment and water, except for the concentration of lead in groundwater adjacent to the ECM. The concentration of uranium in groundwater approaches the EQS, and slightly exceeds the environmental quality standards (EQS) for swamp soils. The peak concentration of uranium in groundwater immediately downgradient of the ECM is only slightly elevated above background and much lower in surface

waters, both values are well below the HC proposed operational guidance value and drinking water limit.

CNL has proposed several mitigation measures to reduce the changes to surface water quality due to the NSDF Project throughout all project phases. These measures, as listed in CNL's commitments report, include:

- sampling of treated effluent to confirm it meets treatment targets before release
- routine surface water quality monitoring through CNL's environmental monitoring program
- use of an exfiltration gallery to mitigate scouring of receiving waterbodies
- dispersion of outlet flows from surface water management ponds by level spreaders to provide an even flow to wetlands, with no flow discharge directly to wetlands
- conduct of inspections and maintenance activities annually and after major storm events and spring melt to ensure there are no erosional issues
- NSDF footprint designed to avoid wetlands and limit disturbance to natural environment
- implementation of erosion sediment control measures to mitigate the effects of sediment transport
- surface water from all external areas will be conveyed to surface water management ponds to address water quality and quantity criteria established for receiving waters
- final cover system will be designed to promote positive drainage, minimize infiltration and promote shedding of surface water away from the emplaced waste
- surface water management ponds designed to address erosion and sediment control concerns by providing water quality/quantity controls throughout the life of the facility
- environmental monitoring during the institutional control period to ensure the cover is functioning as intended
- effluent discharge targets for wastewater discharge that are protective of the environment and human health
- the waste acceptance criteria for the NSDF will limit the level of contamination, limiting the magnitude of surface water quality changes

Proposed follow-up monitoring program measures for effects on the surface water environment also listed in CNL's commitments report include:

- monitoring water levels and sediment buildup in surface water management ponds
- sampling water quality of each pond weir outlet water quality to determine if contact surface water or leachate contamination of the non-contact surface water is entering the surface water management pond and to confirm total suspended solid concentrations
- monitoring of wetland water elevations and surface water flows to verify changes from the presence of the ECM
- monitor quality of surface water surrounding the ECM to evaluate whether the quality of the water is affected by the ECM or surface water management ponds

Views expressed

The Algonquins Anishinabeg Nation Tribal Council (AANTC), the AOO, the AOPFN, Curve Lake First Nation (CLFN), Hiawatha First Nation (HFN), Kitigan Zibi Anishinabeg (KZA) First Nation, and the MNO raised concerns about the close proximity of the proposed NSDF Project to the Ottawa River, Perch Lake and Perch Creek, surrounding wetlands and Maskinonge Lake, and the potential for contaminants from the NSDF Project to enter these waterbodies. The AOO raised specific concerns about the high concentrations of tritium that would be deposited in the ECM, and the associated potential impacts on water quality. AOPFN also raised concerns related to effluent management and monitoring and enquired about the proposed effluent quality criteria/thresholds. The AOO expressed concerns about surface and wastewater management and the need for ongoing and adaptive aquatic monitoring with conservative contaminant thresholds for receiving water bodies. The MNO also had concerns about the lack of details on the Surface Water Management Plan (SWMP). CNL provided the MNO with requested documents, including their review and input on the SWMP and EAFMP.

CNL expanded the RSA for surface water, the aquatic environment, and ecological health to include 8 km downstream of the CRL site within the Ottawa River and concluded that residual effects on the Ottawa River water quality are determined to be negligible during operations and post-closure phases and may result in a net benefit due to remediation of legacy waste storage areas at the CRL site. CNL has provided information and evidence to Indigenous Nations and communities to clarify how the Project design will protect the Ottawa River.

CNL committed to implementing measures and follow-up actions to mitigate effects on surface water quality and downstream discharge, including designing the project to avoid wetlands, limiting disturbance to the natural environment, ensuring effluent discharge targets for waste water discharges are protective of the environment and human health, and routine monitoring and sampling to verify surface water quality (including for tritium). If new technology for removal of tritium is developed during the life of the Project, CNL has committed to evaluating the new technology and implementation if it is found to be practical for the project. CNL has also committed to continuing to involve Indigenous Nations and communities in the development and implementation of additional mitigation measures to include within the NSDF Project Environmental Protection Plan, which includes a SWMP. CNL also committed to involving Indigenous Nations and communities in the development of the NSDF EAFMP, including in identifying adaptive management triggers/thresholds in relation to VCs related to Indigenous Knowledge, rights and interests.

Members of the public expressed concerns regarding the potential for contamination of the Ottawa River and surrounding waterways due to the NSDF Project, which could negatively impact water quality. The Ottawa River is the primary source of drinking water for millions of Canadians and holds both social and economic value, through fishing, recreational activities, transport, and cultural expression. In addition to expanding the RSA for surface water and the aquatic environment, CNL has integrated an environmental monitoring program for the Project which includes groundwater and effluent monitoring. CNL has also proposed a conceptual monitoring plan, which includes each environmental discipline, including the aquatic environment, into the EAFMP of the Project. Residual effects which were predicted by CNL in the EIS will be monitored throughout all Project phases and appropriate mitigation measures will be implemented, as required.

ECCC and CNSC staff requested that CNL provide a complete list of contaminants that will be treated by the WWTP, including effluent discharge criteria and rationale for the proposed WWTP effluent discharge criteria and to re-evaluate if this criteria would be protective of freshwater aquatic life. ECCC also requested clarification to the type of receiving environment for the effluent discharge and that additional mitigation measures be carried out to prevent adverse effects from effluent being released. The MELCC requested that CNL justify proposed treatment methods and effluent discharge treatment targets. In response, CNL updated the exfiltration gallery design, updated the NSDF effluent discharge targets for all constituents, and committed to detailed monitoring through the EAFMP to ensure that CNL's effluent monitoring program for the WWTP will meet requirements for effluent toxicity testing (reflected in the commitments report).

MOECC (now MECP) requested that CNL include the assessment of thermal effects from discharge of treated effluent into Perch Lake as thermal impacts may occur through the discharge of relatively warmer water to cold water streams. In response to MOECC's concerns, CNL revised the EIS assessment to include the assessment of thermal effects and included additional information clarifying that there would be no direct discharges from the surface water management ponds to fish habitat.

6.2.2 Changes in downstream discharge patterns

Proponent's assessment of potential changes to the environment, mitigation, and monitoring

CNL has identified the following key pathways as resulting in potential changes to surface water discharge and flow:

- Physical changes to drainage patterns resulting from the discharge of treated effluent from the WWTP to ground (via an exfiltration gallery) and to Perch Lake (via a transfer line in the Perch Creek and Perch Lake Watershed), which may alter downstream discharge, water levels, channel and bank stability, and water levels in adjacent wetlands.
- Changes to drainage patterns and downstream discharge, water levels in adjacent wetlands, and channel and bank stability due to the activities involved with the installation of the ECM such as site preparation, clearing of land, blasting, development of surface water management structures, construction of the WWTP and other support facilities, road and access development.

Surface water management ponds are being proposed by CNL to reduce the potential for the NSDF Project to affect downstream discharge, water levels and channel/bank stability. The surface water management ponds would be designed to address erosion and sediment control concerns to Perch Creek and Perch Lake during construction by providing interim sediment control and by providing water quantity/quality control during the operations, closure and post-closure phases. Moreover, throughout all phases of the proposed NSDF Project, erosion and sediment control measures will be in place to mitigate the effects of soil erosion and sediment transport on downstream discharge patterns. These measures, as listed in CNL's commitments report, include:

- the use of erosion control blankets to control erosion on steep slopes, when needed
- check dams in ditches and swales

- 3 proposed surface water management ponds that will be constructed to serve as interim sediment control facilities during construction, and as surface water management facilities during operations and closure
- annual inspection and maintenance activities, and additional inspections after major weather events and spring melt, to ensure there is no excess erosion

Proposed follow-up monitoring program measures for effects on the surface water environment also listed in CNL's commitments report include:

- monitoring of wetland water elevations and surface water flows to verify changes from the presence of the ECM

Views expressed

The AOPFN expressed concerns about potential effects of the NSDF Project on altering surface water flows and water management in wetlands, and the corresponding effects on the people, plants and wildlife that depend on them. CNL indicated that mitigation and follow-up measures would be implemented to address effects on surface water quantity, including ensuring an even outlet flow from the surface water management ponds to wetlands, and that the surface water meets the water quality and quantity criteria established for wetland receiving waters. Operational and environmental monitoring would also be implemented to monitor wetland water elevations and surface water flows.

CNL has committed to collaborating with interested Indigenous Nations and communities on monitoring and follow-up measures for the surface water environment. This includes a commitment to work with Indigenous Nations and communities to develop and implement additional mitigation measures to include within the NSDF Project Environmental Protection Plan, which includes a SWMP. CNL also committed to involving Indigenous Nations and communities in the NSDF EAFMP, including in identifying adaptive management triggers/thresholds in relation to VCs related to Indigenous Knowledge, rights and interests.

Members of the public also expressed concerns regarding changes to water levels and bank stability within the surrounding waterbodies and wetlands due to Project activities and suggested the surface water monitoring plan be updated on a regular basis to account for excessive storm events and water level elevations. CNL has committed to evaluating the surface water monitoring plan based on period review of monitoring data, and the plan will be modified as necessary following adaptive management principles.

CNSC staff analysis and findings

CNSC staff have reviewed CNL's models and predictions for effects to the surface water environment and confirmed that CNL conducted a comprehensive analysis of these effects. Furthermore, CNSC staff reviewed CNL's identified mitigation and follow-up monitoring program measures for the identified effects and have found that they are adequate. As noted in section 4.3, CNSC staff have reviewed CNL's assessment and have found that although the proposed Project site is located approximately 1.1 km from the Ottawa River, the EMR site is an acceptable and safe location for the proposed NSDF. The proposed ECM is to be located on a bedrock ridge sloping away from the Ottawa River, and therefore, in the unlikely case that any contaminated seepage escapes from the ECM, the seepage would follow a long pathway, through the Perch Lake Swamp to the South, then through Perch Creek, before finally reaching the Ottawa River. CNSC staff have verified and are satisfied at the exit to the Ottawa River,

contaminants would be attenuated to negligible levels and would not have a detectable impact on water quality.

CNSC staff also conducted an effects significance determination for the identified effects, taking into account input from other federal departments, provincial ministries, Indigenous Nations and communities and the public, and determined that while the identified changes to surface water (from changes to surface water quality and changes to downstream discharge patterns) are long lasting due to the nature of the project, they are expected to be negligible due to the implementation of mitigation measures and not cause significant changes to the surface water environment.

6.3 Terrestrial environment

The proposed NSDF Project could potentially cause changes to the terrestrial environment through:

- loss of terrestrial habitat and vegetation communities due to vegetation clearing and grubbing
- changes to habitat quality and function from NSDF Project activities during construction and operations phases

With input from federal departments, provincial ministries, Indigenous Nations and communities and the public, CNSC staff have analyzed CNL's assessment on the changes to the terrestrial environment. This supports CNSC staff analysis of effects to migratory birds (section 7.2), Indigenous uses (section 7.3), and species at risk (section 8.1), including mitigation and follow-up monitoring program measures.

Description of the existing environment

The terrestrial environment surrounding the proposed NSDF Project site is predominantly comprised of mixed forests, which are characterized by a blend of northern and southern vegetation species, representative of the Great Lakes – St Lawrence Forest Region. Characteristic tree species of the ecoregion include conifers such as eastern white pine (*Pinus strobus*), red pine (*Pinus resinosa*), and eastern hemlock (*Tsuga canadensis*), and deciduous species such as yellow birch (*Betula alleghaniensis*) and sugar maple (*Acer saccharum*). Wildlife are diverse and abundant, and characteristic regional species include eastern wolf (*Canis lupus lycaon*), American black bear (*Ursus americanus*), moose (*Aces americanus*), and beaver (*Castor canadensis*).

The LSA consists primarily of an undisturbed mix of forested vegetation communities (38.8%) and wetlands (29%). Wetlands consist of South Swamp, East Swamp (which will receive treated effluent released from the WWTP via the exfiltration gallery) and the marsh wetlands surrounding Perch Lake and Perch Creek. Aquatic habitat, largely composed of Perch Lake and Perch Creek, covers 19.4% of the LSA. Anthropogenically-altered area in the form of roads, hydroelectric corridors and one inactive liquid dispersal area (LDA; Reactor Pit 1) comprise the remaining 12.8%.

Historically, human activity, including farming and logging, has disturbed vegetation communities within the RSA. Currently, the vegetation communities are at varying degrees of naturalization and succession. The RSA provides suitable habitat for wildlife of interest to

Indigenous Nations and communities (section 7.3) as well as migratory birds (section 7.2) and species at risk (section 8.1).

6.3.1 Loss of habitat

Proponent's assessment of potential changes to the environment, mitigation, and monitoring

Ecosystem availability, which CNL describes as changes to the amount (e.g., hectares) of vegetation communities, was analyzed using available Forest Resource Inventory (FRI) data to determine loss of habitat caused by NSDF Project activities. The FRI dataset for the RSA consists of spatially explicit polygons that provide information on forest tree species composition, as well as other non-forested categories of land cover. FRI datasets are typically derived from aerial photo interpretation, with field visitations to confirm derived habitat calls. The FRI dataset for the RSA is based on mapping work conducted in 1987 and corrected in 2009; the dates associated with polygon delineation were not available with the dataset.

Approximately 33 hectares of forested ecosystem would be cleared during the construction of NSDF Project components and a minor amount of wetland habitat (less than 1 ha) would be temporarily affected by the laydown and staging areas required for the installation of the Perch Lake transfer line. At the RSA scale, this results in a total permanent loss of 0.8% of forested ecosystem, primarily of second-growth, mature, and mixed forest presence. At the LSA scale, the permanent conversion of 33 hectares (ha) of forest to clear land cover translates to a loss of 53.9% of forested ecosystem.

Table 6.2 summarizes CNL's estimated loss of habitat associated with the proposed NSDF Project activities compared to available habitat in the LSAs and RSAs.

Table 6.2: Changes to availability of habitat in the local and regional study areas

Vegetation community	Local study area				Regional study area			
	Current area (ha)	Available area after project implementation (ha)	Change in area (ha)	Change in area (%)	Current area (ha)	Projected affected area due to project activities (ha)	Change in area (ha)	Change in area (%)
Mixed forest	70	42	-27	-39.1	1930	1903	-27	-1.4
Deciduous forest	6	4	-2	-33.3	643	641	-2	-0.3
Coniferous forest	5	1	-4	-80.0	199	195	-4	-2.0
Wetland	61	61	<1	<1.0	522	522	<1	<1.0
Flooded	0	0	0	0.0	1	1	0	0.0
Unclassified (cleared)	27	60	+33	+126.2	268	301	+33	+12.3
Total aquatic habitat	41	41	0	0.0	274	274	0	0.0

Despite habitat being removed, similar forested and wetland habitat would remain available within the LSAs and RSAs during all phases of the NSDF Project. The NSDF Project footprint has been positioned and designed by CNL to allow for wetland ecosystem availability to remain largely unchanged, with the exception of wetland area to be temporarily affected by the laydown and staging areas required for the installation of the Perch Lake transfer line. CNL has also proposed mitigation measures, to be implemented throughout all project phases, for loss of habitat due to NSDF Project activities. These measures as listed in CNL's commitments report include the following:

- the SSA has been designed to avoid wetlands and limit disturbance to the natural environment to the extent feasible including reducing the required area for the laydown and stockpile of materials during operation
- a 30 metre buffer will be established along identified wetlands near the SSA
- a 5 metre tree line buffer will be established along all property lines of the NSDF site to limit disturbances to vegetation and large tree roots at the tree line
- invasive species management measures will be implemented to reduce the potential for invasive species to colonize vegetation communities adjacent to the NSDF Project, including cleaning and inspection of vehicles prior to site entry

Proposed follow-up monitoring program measures for effects on the terrestrial environment also listed in CNL's commitments report include:

- monitoring and follow-up monitoring programs for all Species at Risk to be integrated into CNL's existing *Species at Risk* Program and used to confirm the predictions made in the terrestrial biodiversity assessment. Monitoring will be on-going during the construction and operations phases, and closure where appropriate.

Views expressed

The AOO and the MNO expressed concerns about ensuring the protection of large mammals, furbearers, and medicinal plants and ensuring that stringent measures are in place to mitigate environmental effects to the flora, fauna and land surrounding the NSDF Project, including ongoing monitoring of terrestrial animals for baseline data collection and ongoing monitoring post NSDF Project approval. The AOO are concerned that the terrestrial environment VC does not adequately capture potential impacts of the Project on wildlife groups of importance to them and their related habitat. The MNO is concerned about the lack of details provided on the increases in edge habitat and the potential effect of this increase in the LSA.

The AOPFN and the MNO also raised concerns regarding maintaining existing forests within their traditional territories and would like to be part of the advisory committee related to the Sustainable Forest Management Plan (SFMP) for CRL. The AOO and AOPFN also expressed concerns about the potential effects of the NSDF Project on terrestrial vegetation (including conifer species, mature mixed wood forest and important plant species) from direct removal and clearing during project construction and exposure to contaminants, and expressed the need for further information on mitigation and offset measures. The AOO raised concerns about the need for advance notice of vegetation clearing or disturbance to survey areas for plants of Algonquin importance.

CNL stated that the Project design will protect wildlife and plant species and ensure there is sufficient habitat for these species to continue to be available. CNL indicated that the NSDF Project is not predicted to have any terrestrial effects beyond the CRL site. CNL confirmed that a conservative approach was used to select and assess VCs and confirmed that VCs identified by Indigenous Nations and communities are represented by the species that are evaluated in the NSDF EIS and will be incorporated into the NSDF EAFMP.

CNL committed to offsetting the NSDF Project-related loss of forested area and habitat with a CRL-site wide SFMP, which will contribute to no net loss of habitat by the NSDF Project. CNL has committed to engaging Indigenous Nations and communities and stakeholders on the development of the SFMP, including considering support for commensurate offsets at off-site locations identified by Indigenous Nations and communities. CNL also committed to notifying and engaging Indigenous Nations and communities in advance of clearing vegetation from the site, including facilitating a pre-construction “inventory” data collection period for Indigenous guardians and knowledge holders to take inventory of the NSDF Project footprint for important wildlife and plant habitat. CNL has committed to using the results from the inventory to inform the NSDF EAFMP and is committed to engaging with Indigenous Nations and communities to include additional mitigation measures to protect important habitat areas in the NSDF Project Environmental Protection Plan.

Members of the public expressed concerns regarding permanent loss of habitat for certain wildlife species during the site preparation and construction phases, including loss of high quality habitat for bats and loss of critical habitat for the Blanding’s turtle. Additional concerns were expressed about the severity of effects to a variety of wildlife species within the food chain, including the number of species at risk and the time period over which the risks are expected to continue. CNL indicated that in addition to the implementation of the SFMP, an ecological risk assessment has been completed for the Project, that concludes that the radiological dose expected under the conditions of evolution of the site and disposal facility are expected to be negligible to both aquatic and terrestrial biota surrounding the facility.

ECCC requested that CNL provide additional information and evidence in the EIS and to further examine measures that can be taken to prevent the loss of critical habitat for species at risk that might be present at the Project site. CNL provided additional information, including acknowledgement that they will continue to work closely with Canadian Wildlife Services with regards to SARA permit requirements and that all mitigation and compensation measures will be implemented to ensure the protection of critical SARA-listed species and their critical habitat during all phases of the project.

6.3.2 Changes in quality and function of habitat

Proponent’s assessment of potential changes to the environment, mitigation, and monitoring

To analyze changes in quality and function of habitat caused by NSDF Project activities, CNL selected the following measurement indicators to assess potential changes to vegetation communities:

- Ecosystem distribution: Changes in the way each vegetation community is distributed on the landscape. Ecosystem availability and distribution are linked, but distribution focuses on the spatial configuration and connectivity of ecosystems, whereas availability focuses on the area of those ecosystems.

- Ecosystem condition: Changes in native species richness, abundance, and diversity. Ecosystem condition refers to the quality of habitat and is primarily affected by changes to structural stage and changes in the amount of moisture, amount of sunlight, competition with invasive species, dust deposition, and contamination (e.g., radiological).

NSDF Project activities associated with construction, operation and decommissioning could indirectly alter wildlife habitat quality and function as a result of vegetation clearing, habitat fragmentation, dust generation, and disturbance. CNL has proposed the implementation of mitigation measures to mitigate NSDF Project effects on habitat quality and function. These measures, as listed in CNL's commitments report, include the following:

- the most sensitive vegetation communities in the RSA, including wetlands, will be largely avoided by the NSDF Project
- appropriate invasive species control measures will be implemented to reduce the potential for invasive species to colonize vegetation communities adjacent to the NSDF Project
- the wetland habitat temporarily disturbed for the laydown and staging areas required for the installation of the Perch Lake transfer line will be restored to the natural wetland vegetation communities present prior to construction
- blasting activities will be temporarily suspended if wildlife are observed near the blasting area
- a DMP will be implemented by CNL, to ensure activities are suspended if unacceptable amounts of dust are generated due to winds or other site conditions
- activities with the highest levels of noise and habitat disturbance will be avoided during sensitive life phases, such as breeding and nesting for birds and maternity roosting for bats
- activities with high noise levels will be completed during daylight hours
- follow-up monitoring program measures as identified in section 6.3.1

Views expressed

The AOO and the AOPFN expressed concerns about potential effects of the project on the abundance and health of terrestrial wildlife species (including migratory bird species, raptors, beavers, moose, deer) and their habitat through the deposition of contaminated dust, bioaccumulation of contaminants in wildlife prey species, changes in water quality and the aquatic environment, direct removal of habitat, the introduction and/or spread of invasive species, sensory disturbances and wildlife-vehicle collisions. The AOO raised concerns about the need for a conservative approach to protect wildlife species, including implementing measures to compensate for habitat impacts and a wildlife-vehicle collision mitigation and monitoring plan. AOPFN raised concerns about the potential effects of the project on important moose and white-tailed deer habitat at and around the NSDF site and the associated need for engagement in mitigation and monitoring to ensure these habitats are protected. AOPFN is concerned about the need for further assessment of effects on various wildlife species and their habitat, and ensuring that the spatial boundaries of the NSDF Project footprint include all project infrastructure and activity that may impact wildlife and wildlife habitat, including haul routes and areas of increased traffic.

CNL provided information to Indigenous Nations and communities to clarify that the SSA for the terrestrial environment does include the NSDF Project footprint, which accounts for the direct physical disturbance and alternation of vegetation communities and wildlife habitat caused by construction and operations of the ECM and related facilities, buildings and infrastructure. CNL indicated that mitigation measures and a follow-up monitoring program would be implemented to mitigate effects to terrestrial vegetation and wildlife species, including wildlife-vehicle collision monitoring, designing the SSA to avoid wetlands and limit disturbance to the natural environment, establishing buffers along identified wetlands near the SSA, avoiding activities with the highest levels of noise and habitat disturbance during most sensitive life history phase, implementing a comprehensive SFMP, implementing an Invasive Species Management plan and installing wildlife exclusion fencing around the NSDF EMR footprint. CNL has committed to continuing information sharing and involving Indigenous Nations and communities in these mitigation, monitoring and follow-up measures for the terrestrial environment, including involving Indigenous Nations and communities in the NSDF EAFMP and working with Indigenous Nations and communities to include location specific mitigation measures to protect important habitat areas in the environmental protection plan.

ECCC requested that CNL ensure the protection of critical wetland habitat that could be used by potential species at risk located at the project site. CNL provided additional information and justification demonstrating how the project design has taken into account limiting the disturbance to the natural environment to the extent possible including the avoidance and protection of wetlands.

CNSC Staff analysis and findings

CNSC staff reviewed CNL's assessment related to the terrestrial environment. The purpose of this review was to provide an analysis of the information relevant to the terrestrial environment, comparing CNSC staff's technical assessment with the proponent's assessment and drawing findings on key mitigation measures, follow-up monitoring programs and the likelihood of significant adverse effects.

CNSC staff determined that residual effects to terrestrial biota are primarily associated with vegetation clearing and grubbing and the associated potential loss of habitat or alteration of existing vegetation and topographical features; sensory disturbance from NSDF Project activities during the construction and operations phases; and increased risk of injury/mortality on roads due to equipment and vehicle traffic.

The proponent indicated that mitigation measures and follow-up monitoring programs would be implemented to reduce effects to terrestrial vegetation and wildlife species, including wildlife-vehicle collision monitoring, designing the SSA to avoid wetlands and limit disturbance to the natural environment, establishing buffers along identified wetlands near the SSA, avoiding activities with the highest levels of noise and habitat disturbance during most sensitive life history phase, implementing a comprehensive Sustainable Forest Management Plan, and installing wildlife exclusion fencing around the NSDF EMR footprint. The proponent is also committed to collaborating with interested Indigenous Nations and communities on monitoring and follow-up measures for the terrestrial environment.

CNSC staff have found that, taking into account the implementation of mitigation and follow-up monitoring program measures, input from federal departments, provincial ministries, Indigenous Nations and communities and the public, the identified residual effects to terrestrial biota, while

potentially irreversible and/or long lasting due to the nature of the project and respective activities (e.g., permanent conversion of forested habitat to turf-grass habitat), are expected to be negligible and not cause significant changes to the terrestrial environment.

6.4 Geological and hydrogeological environment

The proposed NSDF Project could potentially cause changes to the geological and hydrogeological environment through:

- changes to groundwater flow
- changes to groundwater quality

With input from federal departments, provincial ministries, Indigenous Nations and communities and the public, CNSC staff have analyzed CNL's assessment on the changes to the geological and hydrogeological environment. This information supports the analysis of fish and fish habitat (section 7.1), Indigenous uses (section 7.3), and human health (section 7.4) of this report, including the proposed mitigation and follow-up monitoring program measures.

Description of the existing environment

The baseline geological and hydrogeological environment of the region has been characterized through a series of studies conducted by CNL and external consultants between 2014 and 2019, as well as through the routine groundwater monitoring program (GWMP) at the CRL site.

The CRL site is located within the Canadian Shield, in the Central Gneiss belt of the Grenville Province, on a rift valley named the Ottawa-Bonnechere Graben (OBG). The OBG is approximately 60 km wide and trends northwest, extending from Lake Nipissing to the Saint Lawrence River, with an eastern boundary occupied by the Ottawa River. Bedrock in the region has been shaped by past glacial events and northwest trending secondary faults, which has also influenced surface drainage.

Glacial till overlies most of the bedrock at the CRL site. Post-glacial sedimentation, deposited 11,000 years ago, resulted in fine-grain sediment deposition throughout the region. Surface geology within the low-lying areas of the Perch Basin are predominantly composed of recent organic soils, while sand and glacial tills are exposed at the surface near topographic highs, including those within the SSA.

6.4.1 Changes in groundwater flow

Within the Lower Perch Lake Basin, groundwater flow within the overburden is influenced by local topography and bedrock topography and is interpreted to be primarily horizontal. In the overburden deposits, groundwater flow occurs mainly within the basal sand and gravel, middle sand, and upper sand units, where present. The groundwater elevation data collected between October 2016 and June 2018 shows that the average depths of the groundwater table ranged from 0.06 metres below ground surface to 15.95 metres below ground surface, with an average of 4.81 meters below ground surface under average conditions. Generally, the water table elevation is expected to vary seasonally by 1 to 2 metres, with the high water table position occurring in April and May.

Proponent's assessment of potential changes to the environment, mitigation, and monitoring

In order to evaluate the potential impacts of the NSDF Project on groundwater flow, hydrogeological modelling was conducted to estimate the groundwater flow pathways and the

rates of groundwater flow from the NSDF site to downstream receptors, for both the operations phase and the post-closure phase. Two operations phase scenarios (i.e., average water table conditions and high water table conditions) and 3 post-closure phase scenarios (i.e., final cover intact, final cover compromised, and final cover and liner compromised) were considered.

The modelling results indicated that, for both the operations and post-closure phases, minor localized changes to the directions of groundwater flow would occur in the vicinity of the NSDF site as a result of captured and/or redirected water, while the overall groundwater flow paths would be the same as the current existing conditions. Construction of the ECM could lead to a lowering of the water table for all operations and post-closure scenarios, though this was generally limited to the local footprint of the ECM and the area directly northeast of the ECM. The maximum simulated reduction in groundwater elevation would occur over the central and eastern portions of the ECM, to a maximum reduction of approximately 7 metres in average conditions and 9 metres in high water table conditions.

CNL has proposed several mitigation measures and design features to reduce the effects of the NSDF Project on groundwater levels and flow during all project phases. These measures, as listed in CNL's commitments report, include:

- NSDF designed to limit disturbance to the natural environment
- discharge of treated effluent will be directed primarily to the exfiltration gallery area, to reduce water loss from the hydrogeological system
- discharge of treated effluent to Perch Lake via a pipeline, to reduce high water table conditions in the area of the exfiltration gallery

Proposed follow-up monitoring program measures for effects on groundwater flow, also listed in CNL's commitments report, include:

- Groundwater monitoring will be integrated into the overall CNL Groundwater Monitoring Program to verify that the EA predictions on groundwater during the operation phase are accurate, and to verify the effectiveness of mitigation. Groundwater monitoring will continue through operation, closure and post-closure phases.

Views expressed

The AOO and the AOPFN expressed concerns about potential effects of the NSDF Project on groundwater and surface water flows, and the corresponding effects on wildlife and fish habitat. CNL has committed to implementing mitigation measures to address potential alterations to groundwater levels and flow due to the construction of the NSDF Project and have indicated that for both the operations and post-closure phases, the overall groundwater flow paths are expected to remain the same as current conditions. CNL has committed to continuing information sharing and involving Indigenous Nations and communities in mitigation, monitoring and follow-up measures, including the NSDF EAFMP and the NSDF Environmental Protection Plan.

Members of the public expressed concerns regarding potential effects of the Project on surface water levels and water table elevations in and near the adjacent wetlands. CNL has committed to monitoring water elevations in wetlands to confirm that there are no significant changes to wetland habitat. CNL also conducted additional groundwater flow modelling to evaluate the potential impacts of the Project on water elevation in adjacent wetlands, which predicted a one or

two meter rise in water table elevation at discharge locations but no appreciable changes to water table elevations in the adjacent wetlands.

6.4.2 Changes in groundwater quality

Proponent's assessment of potential changes to the environment, mitigation, and monitoring

The GWMP at the CRL site includes annual and semi-annual water level measurements, sampling and analysis from 180 monitoring wells and boreholes at 32 locations on the CRL site. The proposed NSDF Project site has not previously been used for storage of waste and other materials, and as a result, there is no long-term groundwater quality data for the footprint directly beneath the proposed location of the ECM. However, monitoring wells in and adjacent to the NSDF SSA were included in the GWMP.

Bedrock groundwater quality throughout the CRL site demonstrates consistent variations with groundwater depth. Shallow groundwater, to depths of 100 metres, is dominated by sodium and bicarbonate, with pH values between 7.0 and 8.0. Deeper groundwater, between depths of 100 metres and 900 metres, is consistently alkaline with a pH value of approximately 9.0.

The overall water quality at the two monitoring wells east of the NSDF Project site (i.e., FR-3 and GD-42) is classified as diluted calcium/sodium bicarbonate, with sulphate and chloride as other dominant anions. Groundwater samples from these two monitoring wells show the consistent presence of tritium, but gross alpha and beta activity have consistently remained low (either below detection limit or less than 1 counting standard deviation above detection limit since 2007). Long-term groundwater quality to the west of the proposed ECM footprint has been characterized through both the GWMP and a series of detailed evaluations of subsurface contaminant distributions for facilities such as the chemical pit, WMA A and reactor pit 2. Downgradient of the chemical pit (a legacy fluid dispersal area), slightly elevated concentrations of mercury, lead and uranium have been observed in groundwater. No elevated concentrations of mercury or other heavy metals have been detected downgradient of WMA A or reactor pit 2. Based on results of routine groundwater monitoring conducted since 1997, as well as detailed plume monitoring, it can be concluded that these facilities do not make a considerable contribution to inorganic parameter concentrations in the groundwater, and contaminants in the groundwater are not likely to impact ecological receptors as there is negligible direct exposure and rapid dilution in the receiving water (East Swamp).

During the operations phase of the NSDF Project, changes in groundwater quality could be caused by discharge of treated wastewater to the ground and East Swamp via the exfiltration gallery. However, these effects are expected to be negligible, as effluent will be monitored to verify that discharge targets are being met.

Leakage of leachate from the ECM during the post-closure phase of the proposed NSDF Project could result in changes to groundwater contaminant concentrations. During the post-closure phase of the NSDF Project, the final cover, leachate collection system, and water treatment systems will no longer be maintained. During this phase, rain may infiltrate through the final cover into the waste and then enter the groundwater flow through a breach in the base liner.

CNL has proposed several mitigation measures to reduce the effects of the NSDF Project on groundwater quality throughout all project phases. These measures, as listed in CNL's commitments report, include:

- effluent discharge targets for wastewater discharge that are sourced from federal and provincial guidelines and are protective of the environment and human health
- treated effluent will be sampled to confirm that it meets the effluent discharge targets before release to the environment
- exfiltration gallery will promote the exfiltration of treated water into the local groundwater regime, where further retention of radioactivity by the geosphere is anticipated
- the waste acceptance criteria developed for the NSDF Project will limit the level of contamination and types of waste to be disposed in the ECM and therefore limit the magnitude of potential changes to surface water and groundwater quality
- limitation of the level of contamination and types of waste to be disposed in the ECM, which in turn will limit the magnitude of potential changes to surface water and groundwater quality
- all runoff will be directed to collection ditches for treatment prior to discharge
- implementation of procedures to identify spill occurrences and initiate emergency responses
- construction of final cover system will promote shedding of surface water (or the runoff of water from the surface of the mound) to mitigate infiltration into the mound

Proposed follow-up monitoring program measures for effects on groundwater quality, also listed in CNL's commitments report, include:

- groundwater elevation measurements to determine groundwater flow directions and gradient
- sampling to confirm groundwater quality to detect potential impact of leachate from the ECM
- groundwater monitoring to occur through all phases of the project and to be adjusted (parameters, location, frequency) as required based on annual review of monitoring data

A GWMP specific to the NSDF Project will be developed by CNL to monitor groundwater hydraulics and quality in both vertical and horizontal orientations along the critical flow pathway, with an emphasis on locations downgradient from the ECM. The GWMP will be compliant with Canadian Standards Association (CSA) N288.7-15 *Groundwater Protection Programs at Class 1 nuclear facilities and uranium mines and mills*, and integrated into the overall CNL groundwater monitoring program. Groundwater monitoring will continue through operation, closure, and post-closure phases.

Views expressed

The AOPFN inquired about the proposed effluent quality criteria/thresholds. AOPFN and the AOO raised concerns about CNL's plans for inspecting waste and waste packaging and the associated potential risk of contaminants and effluent disposal leaching from the NSDF Project

and impacting surface water and groundwater quality, particularly for Perch Lake and the Kichi-Sibi/ Kichissippi ³(Ottawa River).

The AOO expressed concerns about contaminants leaching and discharging from the Project and impacting soil quality. CNL indicated that soil analysis results concluded that the SSA does not contain radionuclide concentrations above local background levels. The analytical results for metals in surface soils at the SSA are below the provincial background values and are comparable to the CRL site-wide baseline values for soils.

CNL has stated that impacts on groundwater quality from discharge of treated WWTP effluents will be negligible. CNL also committed to implementing environmental design features and mitigation measures to reduce residual effects on groundwater quantity and quality, including a GWMP to monitor groundwater hydraulics and quality throughout operations, closure, and post-closure. CNL committed to collaborating with interested Indigenous Nations and communities on monitoring and follow-up measures for the hydrogeological environment.

CNL also committed to ongoing communication and engagement with Indigenous Nations and communities regarding off-site waste deposits into the NSDF and CNL's waste verification process. CNL indicated that they will not exceed the proportion of offsite waste streams as described in the NSDF Final EIS, and that they are committed to early engagement with Indigenous Nations and communities should CNL consider a new waste stream in the future.

Members of the public expressed concerns regarding the potential effects to groundwater quality from the potential releases of non-radiological constituents from the ECM. CNL updated the EIS to include an analysis of potential effects to groundwater quality and ecological receptors and updated the groundwater modelling for the Project. CNL also confirmed that the revised groundwater modelling program indicates that there are no significant releases of metals anticipated from the Project into the Perch Lake watershed.

CNSC staff analysis and findings

CNSC staff reviewed CNL's assessment related to geology and hydrogeology and determined that CNL has provided sufficient geological information to complete the description of the baseline conditions for the geological environment (particularly the bedrock), which was used to justify aspects of the hydrogeological conceptual model and the development of scenarios considered in the safety assessment. The data necessary for model building, the hydrogeological conceptual model, and the groundwater flow and contaminant transport numerical models have been found to be adequate by CNSC staff. Uncertainty in groundwater flow prediction are evaluated using sensitivity analysis and CNSC staff considers this to be acceptable.

Proposed environmental design features and mitigation measures to be implemented by CNL to reduce residual effects on groundwater quantity and quality are considered to be adequate by CNSC staff.

A GWMP specific to the NSDF Project will be developed to verify EA predictions on groundwater from the ECM and WWTP operation, and to verify the effectiveness of mitigation. Considering the uncertainty involved in the hydrogeological quantitative and qualitative analysis,

³ Also referred to in the Algonquin language as "Kichi-Sibi", "Kichissippi", and "Kitchissippi".

the GWMP is necessary, and considered to be adequate by CNSC staff. Additional groundwater flow simulations (and scenarios within the safety assessment) were developed by CNL to evaluate the influence of a hypothetical conductive bedrock fracture zone and address CNSC staff's concerns about potential effects related to undetected geological features.

In summary, CNSC staff have reviewed the characterization of the site geological and hydrogeological conditions, the synthesis of the data to develop the site conceptual model, the groundwater flow and contaminant transport numerical models, uncertainty analysis with respect to groundwater flow and contaminant transport predictions, and environmental design features. Taking into account also the implementation of mitigation and follow-up monitoring program measures, input from federal departments, provincial ministries, Indigenous Nations and communities and the public, CNSC staff have determined that changes to the geological and hydrogeological environment are expected to be negligible. Staff's analysis of the geological characteristics also informed the licensing review, contributing to CNSC's expectation for CNL to verify bedrock fracture characteristics after excavation (during the construction phase) as part of a Geoscience Verification Plan (refer to section 6.5.1.1 of the CMD).

7.0 Predicted effects on valued components

Predicted effects on VCs listed in table 1.2 are described in the sections below, with the exception of wetlands and terrestrial biota. Wetlands are addressed in section 6.3 above.

For terrestrial biota, the species-level assessment focused on those species identified in Schedule 1 of the federal SARA and are included in section 8.1 below.

Indigenous Nations and communities identified a number of terrestrial biota species of interest during consultation and CNSC staff considered them during their analysis, where applicable, including: moose, beaver, white-tailed deer, black bear, lynx, otter, mink, bullfrog, marten, rabbit/hare, muskrat, fox, elk, salamanders, tricolored bumblebees, raspberry bushes, blueberry bushes, chokeberry, oak, cranberries, ground hemlock, pinecones, service berries, duckweed, cat tail, eastern white pine, spruce scots pine, and mushrooms.

7.1 Fish and fish habitat

The proposed NSDF Project could cause residual adverse effects on fish and fish habitat through:

- fish habitat loss and alteration
- changes to fish health

Description of the existing environment

The wetlands, lakes, streams, and rivers of the Perch Lake Watershed provide habitat for a diversity of fish and aquatic species, including species used by Indigenous Nations and communities for traditional purposes. Previous water quality monitoring of Perch Lake recorded high nutrient levels that indicate eutrophic conditions suitable for the dominant aquatic vegetation of floating-leaved plant cover consisting of water lily (*Nymphaea odorata*) and watershield (*Carex lasiocarpa*). Similar to other lakes in the region, Perch Lake undergoes open water conditions from April to October and ice-covered conditions from November to March.

An inventory of fish in 9 waterbodies within the CRL site (Ottawa River, Perch Lake, Lower Bass Lake, Upper Bass Lake, Maskinonge Lake, Duke Stream Marsh, Perch Creek, Main Stream, and East Swamp Stream) was initially performed in the summer of 1980, with the most

recent follow-up inventory investigation performed in 2018. The baseline inventory data provides a historical baseline description that can be used to characterize the potential distribution of species in the study area. The initial inventory performed in 1980 identified 41 fish species within the CRL site.

Current fish distributions within the study site reflect the introduction of the Northern Pike to Perch Lake in the mid- to- late 1980s, which caused changes to the population dynamics of local species. The previously abundant population of Yellow Perch (*Perca flavescens*) was reduced in number along with many foraging species, such as the Creek Chub (*Semotilus atromaculatus*) and Bluntnose Minnow (*Pimethilus notatus*). However, Perch Lake continues to support a large-bodied fish community that is similar in composition to the community recorded in Perch Lake in 1980.

According to previous fish sampling reports in the Ottawa River, 4 fish species of conservation concern were identified as occurring or having the potential to occur in the river reach adjacent to the CRL site (e.g., Allumette Lake), namely the Lake Sturgeon (*Acipenser fulvescens*), the American Eel (*Anguilla rostrata*), the Northern Brook Lamprey (*Ichthyomyzon fossor*), and the River Redhorse (*Moxostoma carinatum*). The principal threats to these species of concern include habitat degradation, dams and other barriers, and habitat fragmentation.

7.1.1 Fish habitat loss and alteration

Proponent's assessment of environmental effects, mitigation, and monitoring

The potential residual effects on fish populations due to habitat loss and alteration are anticipated by CNL to be caused by the following pathways:

- Physical changes to fish habitat and temporary riparian area disturbances from the installation of the Perch Lake diffuser and transfer line construction. As part of the installation of the discharge transfer line, the open water section of the transfer line will include a foundation installed with steel pile supports for both the transfer line and diffuser. The use of heavy equipment, excavation and dredging activities to allow for the placement of the discharge transfer line will cause temporary disturbance to shoreline areas.
- Changes to fish habitat from an area of turbulence created by discharge of treated effluent through the Perch Lake diffuser. A portion of the treated effluent will be discharged through a transfer line with a diffuser located in a deep location of Perch Lake. The average discharge rate from the diffuser is anticipated to be 11.25 m³/hr causing potential turbulence that could affect fish habitat quality.
- Changes to water quality and fish habitat from non-radiological air emissions and dust emissions, and subsequent deposition (as discussed in section 6.1.1 and 6.2.1 above).

CNL has proposed several mitigation measures and environmental design features in order to reduce the effects of the NSDF Project on fish habitat during all project phases. These measures, as listed in CNL's commitments report, include:

- Mitigation for physical changes to fish habitat/temporary riparian area disturbance:
 - the temporary installation of turbidity curtains around the area of construction, to limit the extent of any suspended sediments

- construction activities will avoid any sensitive periods for resident fish species, such as spawning and egg/larval development
 - equipment will be maintained free of leaks, invasive species and noxious weeds
- Mitigation for changes to fish habitat due to turbulence created by treated effluent discharge:
 - perch lake diffuser to provide additional dilution of treated effluent at the point of release
 - exfiltration gallery to promote exfiltration of treated water into the local groundwater regime where further retention of radioactivity by the geosphere is anticipated
- Mitigation for changes to water quality and fish habitat from non-radiological air and dust emissions:
 - runoff will be managed to avoid adverse environmental effects in downstream waterbodies
 - monitoring of non-radiological air and dust emissions generated during the construction and operations phases of the proposed NSDF Project to ensure they remain below applicable air quality guidelines and standards
 - implementation of primary dust control measures including water spraying and misting techniques, and fixatives (e.g., chemical suppressants) may be used for dust control and ECM cover
 - implementation of erosion and sediment control and spill management plans
 - waste acceptance criteria will limit level of contamination and types of waste to be disposed in the ECM
 - final ECM cover system to promote positive drainage, reduce erosion and mitigate infiltration of surface water into the mound
 - blasting plan and activities that follow industry standard best management practices, applicable federal guidelines, and Fisheries and Oceans Canada guidelines for use of explosives

CNL's proposed follow-up monitoring program measures, also listed in the commitments report, include:

- surface water environmental monitoring to include turbidity and total suspended solids monitoring as measurement indicators of fish habitat and fish community assessment endpoints
- WWTP treated effluent will be sampled to confirm it meets effluent discharge targets before release to the environment

While effects to fish habitat are anticipated to occur throughout construction and operations, CNL expect the effects to be negligible after the implementation of mitigation measures, and environmental design features.

Views expressed

The AOO and the AOPFN expressed concerns about the close proximity of the Project to the Kichi-Sibi/ Kichissippi (Ottawa River) its tributaries, including Perch Lake. The AOO raised concerns about the potential impacts to aquatic species at risk, including lake sturgeon and American eels, as well as other fish species not designated as species at risk. Both AOPFN and the AOO expressed concerns about the need for ongoing and adaptive aquatic ecosystem monitoring, including a detailed water quality monitoring program for construction and operations. The AANTC and the MNO raised concerns about the lack of details provided on aquatic biota in the EIS and supporting documentation. The AOO and the MNO also identified concerns about how information and studies on aquatic biodiversity are being shared with their respective communities. The MNO also had concerns related to the aquatic environment including chemical suppressant interaction with surface water runoff as well as the use of fixatives and resulting specific effects, in particular to fish and fish habitat.

CNL indicated that mitigation measures and environmental design features would be implemented to mitigate effects on the aquatic environment, including fish and fish habitat. CNL stated that the residual effects from the Project on aquatic biodiversity are not predicted to be significant. CNL committed to involve interested Indigenous Nations and communities in mitigation, monitoring and follow-up measures for the aquatic environment, including the NSDF Project Environmental Protection Plan and the NSDF EAFMP, which would include routine surface water quality monitoring that is protective of aquatic biodiversity. CNL also committed to collaborating with Indigenous Nations and communities to ensure that Indigenous Knowledge and land use information informs the NSDF EAFMP, and to tie monitoring results to appropriate adaptive management mechanisms developed in collaboration with Indigenous Nations and communities if greater than expected impacts occur.

ECCC requested that CNL include additional mitigation measures to prevent adverse effects from effluent being released to Perch Lake. CNL committed to additional mitigation measures and monitoring both upstream and downstream of the surface water management ponds to ensure sediment loading is minimized (as reflected in the commitments report). The surface water management ponds will be monitored for total suspended solids to ensure compliance with Environmental Protection Program requirements for total suspended solids in effluent discharge.

ECCC raised concerns regarding potential acid rock drainage and metal leaching potential of the proposed blast rock. CNL responded that the potential for metal leaching and acid rock drainage is anticipated to be low given the relatively low occurrence of the sulphide minerals and the relative stability of the constituent minerals of the rock. Any potential adverse effects on water quality are expected to be negligible. Thus, the excavated rock would be used as construction material for the berm around the perimeter of the ECM and covered with a base liner and cover system that will limit infiltration. CNL also committed to developing a blasting plan that will follow *DFO Guidelines for the Use of explosives in or Near Canadian Fisheries Waters* as well as provincial standards and best management practices at all stages of the project.

ECCC and CNSC staff raised concerns regarding treated effluent discharge from the WWTP including discharge location, quality of treated effluent and design of the WWTP. CNL provided additional details, revised the effluent discharge strategy, and carried out additional fish surveys to ensure that fish and fish habitat would not be impacted by the proposed WWTP treated effluent discharge.

CNSC staff analysis and findings

As discussed in sections 6.2 and 6.4, effluent discharge targets for waste water discharge will be protective of the environment and human health to ensure the protection of fish and fish habitat. All treated effluent will be sampled to ensure it meets treatment targets prior to release to the environment to confirm predictions and to ensure the environment remains protected.

CNSC staff determined that there are no primary linkages or impacts from the NSDF Project to the Perch Lake Watershed or Ottawa River aquatic environments, and that only negligible changes to those environmental compartments are anticipated as a result of the implementation of proposed mitigation measures (e.g., Perch Lake diffuser, exfiltration gallery, erosion and sediment control). CNSC staff found that CNL's identification, proposed mitigation measures, and follow-up monitoring program measures are comprehensive and determined that they are adequate to address potential effects to fish, fish habitat, fish community and species of conservation concern in the aquatic environment. While physical changes to fish habitat are expected from the installation of the diffuser and transfer line construction, these changes are expected to occur at intermittent intervals during the construction and operation phases and are expected to be counterbalanced by the proposed mitigation measures and are expected to be fully reversible once project activities cease.

With input from federal departments, provincial ministries, Indigenous Nations and communities and the public, CNSC staff have found that the NSDF Project is not likely to cause significant adverse environmental effects on fish habitat, (for further details please refer to table B-1 in appendix B), and will continue to monitor CNL's Indigenous engagement activities, with regards to monitoring and follow-up monitoring program measures.

7.1.2 Fish health

Proponent's assessment of environmental effects, mitigation, and monitoring

All effluent discharge from the WWTP will be tested to meet applicable federal and provincial standards before release into the aquatic environment, suggesting no significant fish mortality will result from NSDF Project activities. However, CNL anticipates that the NSDF Project could result in potential residual adverse effects on fish populations through changes to fish health, resulting from the following pathways:

- discharge of treated effluent from the WWTP to groundwater and Perch Lake may cause changes to downstream surface water quality, which can affect fish habitat quality, survival, and reproduction
- leakage of leachate from the ECM during the post-closure phase from liner and final cover degradation may cause changes to downstream surface water quality, affecting fish habitat quality, survival, and reproduction

A portion of treated effluent from the WWTP will be released into an exfiltration gallery to promote the exfiltration of treated water into the local groundwater. From there, small quantities of residual contaminants would migrate from the East Swamp Wetland into the East Swamp Stream, potentially affecting water quality and aquatic biota. The remaining treated effluent will be released into Perch Lake using the submerged diffuser. Aquatic biota and terrestrial species will be exposed to the small quantities of contaminated surface water and sediment throughout the water bodies in and near the CRL site, which could adversely affect the survival and reproduction of fish species in the region. However, dilution will occur when the contaminants

reach the bodies of water and paired with strict effluent standards (outlined in section 6.2.1), CNL expects that there will be no adverse effects to fish health and reproduction. CNL also expects that leakage of leachate from the ECM from liner and final cover degradation will also result in negligible residual effects to fish health due to dilution.

Refer to section 7.1.1 for CNL's proposed mitigation measures and follow-up monitoring program measures to mitigate potential effects to fish, fish habitat, fish community or species of conservation concern in the aquatic environment.

Views expressed

The MNO expressed concerns that there were no more speckled trout due to a previous spill from historic and ongoing nuclear operations at CRL, and that the potential for an increase in the amount of water being taken from the Ottawa River for construction water could potentially affect the impingement rates for Sturgeon. CNL indicated that mitigation measures and environmental design features would be implemented to mitigate effects on the aquatic environment and stated that the residual effects from the NSDF Project on aquatic biodiversity are not predicted to be significant. CNL also indicated being committed to ongoing engagement with the MNO, including discussions with MNO citizens on aquatic biodiversity.

The AOO and the AOPFN are concerned about the continued release of effluent and potential contaminants entering the surface and subsurface waters of the Ottawa River and nearby waterbodies, and the corresponding effects to the surrounding environment and ecosystem (e.g., long-term impacts on fish health in Perch Lake, ongoing bioaccumulation of contaminants in fish species, flora, fauna, fish, fish spawning habitat, aquatic life and species that prey on fish). The AOO raised concerns about the need for a long-term fish tissue contaminant monitoring program for the operations phase of the project. AOPFN is also concerned about the need for further details on the proposed effluent quality criteria/thresholds and more clarity on the indicator species selected for ecological health of aquatic vegetation communities.

CNL has stated that meeting effluent discharge targets within the Perch Lake Watershed is considered to be protective of fish in the Ottawa River and that no residual effects to hydrology or water quality are anticipated for the Ottawa River. Effluent water quality monitoring would be integrated into the Effluent Verification Monitoring Program.

CNL indicated that surface water quality monitoring would be conducted in the Ottawa River and Perch Lake watershed through the NSDF EAFMP and CRL Environmental Monitoring Program to ensure radionuclide concentrations are protective of aquatic biodiversity, including fish. Additional assessments of Perch Lake and the Perch Lake fish community are conducted every 5 years as part of the CRL Site Environmental Risk Assessment. CNL stated that the need for fish and sediment monitoring would be reviewed using an adaptive management response, should surface water monitoring show that concentrations exceed EIS predictions. CNL committed to providing additional information and meaningfully involving interested Indigenous Nations and communities in mitigation, monitoring and follow-up measures for the aquatic environment, including environmental monitoring programs, such as the NSDF EAFMP.

Members of the public expressed concerns regarding potential contaminant exposure of aquatic biota downstream due to Project activities, including exposure to tritium. CNL stated that provisions had been implemented for the mitigation of tritium release from the ECM waste inventory, and the NSDF Waste Acceptance Criteria has been developed to ensure the WWTP is capable of treating the contaminants in the leachate to meet effluent discharge targets that are

protective of the aquatic biota. CNL also committed that any waste with high concentrations of tritium will be individually packaged to prevent leachate generation within the ECM and has indicated that the exfiltration gallery as a primary discharge location provides additional retention time for radioactive decay of tritium prior to reaching biotic receptors.

CNSC staff analysis and findings

As discussed in sections 6.2 and 6.4, effluent discharge targets for wastewater discharge will be protective of the environment and human health to ensure the protection of fish, fish habitat, fish community and fish health. All treated effluent will be sampled to ensure it meets treatment targets prior to release to the environment and to confirm predictions and to ensure the environment remains protected.

CNSC staff determined that there are no primary linkages or impacts from the NSDF Project to the Perch Lake Watershed or Ottawa River aquatic environments, and that only negligible changes to those environmental compartments, including water quality, are anticipated as a result of proposed mitigation measures. CNSC staff found that CNL's identification, proposed mitigation, and follow-up monitoring program measures are comprehensive, and determined that they are adequate to address potential effects to fish, fish habitat, fish community or species of conservation concern in the aquatic environment. While effluent discharge and leakage of leachate could cause effects to fish health continuously during the construction and operation phases, effects are not expected to affect fish populations and effects are expected to be fully reversible once project activities cease.

With input from federal departments, provincial ministries, Indigenous Nations and communities and the public, CNSC staff have found that the NSDF Project is not likely to cause significant adverse environmental effects on fish health (for further details please refer to table B-1 in appendix B), and will continue to monitor CNL's Indigenous engagement activities, with regards to monitoring and follow-up monitoring program measures.

7.2 Migratory birds

The proposed NSDF Project could cause residual adverse effects on migratory birds through:

- habitat loss and alteration
- sensory disturbance throughout the construction, operation, and closure phases

Description of the existing environment

There are many species of migratory birds present within the RSA, and habitat preferences are highly diverse. Many of the 117 migratory bird species known to have the potential to be present in the RSA are forest landbirds, but there are also several waterfowl and waterbirds. The most commonly observed species include the chestnut-sided warbler (*Setophaga pensylvanica*), veery (*Catharus fuscescens*), white-throated sparrow (*Zonotrichia albicollis*) and black-throated blue warbler (*Setophaga caerulescens*). Great blue herons (*Ardea herodias*) have been confirmed to be breeding in the RSA during surveys conducted in 2012, but no colonies have been observed to date in the LSA.

Vegetation community data was used to map suitable habitat for migratory birds within the LSAs and RSAs. Migratory birds have the potential to occupy all-natural habitat available within the RSA, and some migratory bird species are known to occupy anthropogenic structures such as buildings or bridges. Lakes and large wetlands are potential areas for waterfowl stopover and

staging, if wetlands are greater than 25 hectares in size. Shorelines of lakes, rivers, and wetlands within the RSA qualify as potential shorebird migratory stopover areas, but surveys during the migratory season have not been completed to confirm whether these areas are frequented by migratory shorebirds.

According to the *State of North America's Birds 2016* report, one third of all North American bird species, many of which are migratory birds, are in urgent need of conservation action due to declining populations and severe threats to their sustainability. Species at risk recorded within the LSA include the Canada warbler (*Cardellina canadensis*), Eastern whip-poor-will (*Antrostomus vociferus*), Eastern wood pewee (*Contopus virens*), Golden-winged warbler (*Vermivora chrysoptera*) and Wood thrush (*Hylocichla mustelina*).

7.2.1 Migratory bird habitat loss and alteration

Proponent's assessment of environmental effects, mitigation, and monitoring

Currently, there are approximately 3,568 hectares of suitable habitat for migratory birds within the RSA and 177 hectares within the LSA. As described in section 6.3 of this report, 34 hectares of mixed forested and wetland habitat is projected to be removed from the LSA during construction of the NSDF Project (table 6.2), all of which is considered suitable habitat for various migratory bird species. This is the equivalent loss of approximately 19 % of the LSA and 0.9 % of the RSA.

Adverse effects to migratory bird species, including migratory bird species at risk, from habitat loss and alteration within the LSA are estimated by CNL to be minimal with no population effects, as the loss of habitat in relation to the available suitable habitat within the RSA would be negligible. No unique habitat critical for the survival of migratory birds is located within the NSDF Project study area and the CRL main campus is not believed to represent a major barrier to migratory bird movement.

Previous research has shown habitat alteration can have both positive and negative effects on Canada warbler habitat availability. While Canada warblers tend to avoid disturbed habitat for up to 5 years post-disturbance, vegetation clearing can improve the habitat surrounding the disturbance perimeter by creating shrubbery along edge habitats, which is positively associated with Canada warbler abundance. Utility corridors and roads within the RSA may create suitable habitat for the Canada warbler as forest edges generally have denser shrub layers than interior forests. However, Canada warblers may also prefer nesting in interior-forest habitat. The presence of Canada warblers has been confirmed during CNL's baseline surveys in the LSAs and RSAs and they are assumed to be breeding in suitable habitat throughout the region.

The proposed NSDF Project is located in breeding habitat for the Eastern whip-poor-will, a species that breeds in semi-open or patchy forests and wide-open spaces. This species' nests require tree cover, shade and sparse ground cover and must be in close proximity to open areas for foraging. Large disturbance areas, including WMAs, may provide suitable foraging habitat for the Eastern whip-poor-will, especially when located near suitable nesting habitat. The proposed NSDF Project is also located in breeding habitat for the Eastern wood-pewee, which breed primarily in intermediate-aged to mature deciduous and mixed forests, typically near a clearing or forest edge. Eastern wood-pewees appear tolerant to habitat fragmentation, given their preference for edge habitat.

The NSDF Project is proposed to be located in breeding habitat for the Golden-winged warbler, a species that relies on early successional habitat (10 to 30 years after disturbance). The golden-winged warbler prefers breeding habitat at the edge of forest and open habitat with low to moderate canopy cover. CNL anticipates that vegetation clearing can improve habitat along the disturbance perimeter by creating early successional habitats positively associated with species abundance, but vegetation clearing can also result in suitable habitat loss. The proposed NSDF Project is also located in breeding habitat for wood thrush, a species that often breeds in moist, deciduous hardwood or mixed forest stands that have been previously disturbed. Wood thrushes in Ontario appear to prefer second-growth forest, suggesting wood thrushes in the RSA may have benefited from historical logging, though the initial disturbance would cause loss of suitable habitat.

CNL has proposed several mitigations to reduce the effects of the NSDF Project on migratory bird habitat loss and alteration during all project phases. These measures, as listed in CNL's commitments report, include:

- designing the SSA to avoid wetlands, and limit disturbance to the natural environment to the extent feasible
- identifying a 30 metre buffer along wetlands near the proposed NSDF Project site
- maintaining a 5 metre tree line buffer along all property lines on the NSDF Project site to limit disturbance and habitat loss and alteration
- collecting data on relative abundance and other key demographic parameters for breeding birds in the RSA during pre- and post-construction surveys
- integrating a risk assessment checklist to determine if an area qualifies as suitable habitat for migratory birds, which would then involve nest searches and clearing in the absence of nests during the breeding season
- not clearing trees until nests have been confirmed inactive or no longer occupied

Proposed follow-up monitoring program measures, also listed in CNL's commitments report, will include:

- collection and assessment of data every 5 years, on relative abundance and other key demographic parameters for breeding birds in the RSA

Collected data will be used to evaluate trends in populations of breeding birds that overlap with the RSA, including Canada warbler, eastern whip-poor-will, eastern wood-pewee, golden-winged warbler and wood thrush. If declining trends are observed for these species in the RSA, the need for additional mitigation will be evaluated.

Views expressed

The AOO and the MNO expressed concerns about ensuring stringent measures are in place to mitigate environmental effects to the flora, fauna and land surrounding the proposed NSDF Project, including ongoing monitoring of terrestrial biota for baseline data collection and ongoing monitoring post NSDF Project approval. The AOO are also concerned about the potential impacts of the Project on birds that are not protected by the *Migratory Birds Convention Act* (MBCA), including upland game birds, raptors, hawks, and owls. The MNO is also concerned about the lack of details provided on the increases in edge habitat and the

potential effect of this increase in the LSA, and about the efforts that are made to identify active nests for migratory birds, apply setbacks (whether overlapping or not) and schedule clearing accordingly. The AOPFN is concerned that the effects assessment for the migratory birds VC is primarily concerned with songbirds and does not adequately address other bird groups that would be most sensitive to Project effects. AOPFN also raised concerns about the potential effects of contaminants from the NSDF Project bioaccumulating and adversely impacting migratory bird species.

CNL provided additional information to Indigenous Nations and communities to clarify the approach that was used to select and assess VCs and confirmed that the suite of migratory birds with the potential to be affected by the NSDF Project are included in the terrestrial environment VCs. CNL concluded that the NSDF Project is protective of wildlife and plant species of importance and indicated that mitigation measures and follow-up monitoring programs would be implemented to mitigate effects to the terrestrial environment, including migratory bird species. Examples include designing the SSA to avoid wetlands and limit disturbance to the natural environment, establishing buffers along identified wetlands near the SSA, avoiding activities with the highest levels of noise and habitat disturbance during most sensitive life history phase, implementing a comprehensive SFMP and training staff to identify potential VCs of importance (including avian VCs) that would be reported to CNL's Environmental Protection Program to trigger additional mitigation measures. CNL has committed to collaborating with interested Indigenous Nations and communities on mitigation, monitoring and follow-up measures for the terrestrial environment, including providing support for Indigenous Knowledge monitoring in relation to the project and incorporating Indigenous Knowledge into the NSDF EAFMP. CNL will also engage with Indigenous Nations and communities to identify adaptive management triggers/thresholds in relation to VCs that are informed by Indigenous Knowledge, rights and interests that can be built into the NSDF EAFMP.

Members of the public expressed concern regarding sightings of migratory birds, including the Canada Warbler and Golden-Winged Warbler, at the proposed location for the EMR footprint. CNL indicated that Canada Warbler were only detected at the footprint of the proposed EMR four times over the course of two days (June 11 and June 13, 2016), suggesting the same male individual residing within the CRL site. CNL also indicated that only three sightings of Golden-Winged Warbler were reported at CRL (two in 1997 and one in 2013) and that all sightings occurred within wetlands, which will not be disturbed by the Project footprint.

ECCC raised concerns regarding the protection of bird eggs and nests during tree clearing activities. ECCC also raised concerns regarding CNL's proposed means to avoid destruction of suitable breeding habitat for the species at risk migratory birds that might be present at the site. CNL indicated that appropriate mitigation would be in place to ensure compliance with the MBCA and regulations for all migratory birds and that Environment Canada Beneficial Management Practices would be implemented throughout all phases of the project. CNL also provided clarification describing mitigation measures to be taken for the protection of suitable and critical habitat for any species at risk that might be present at CRL and the NSDF site.

CNSC staff analysis and findings

Key interactions between the proposed NSDF Project and migratory bird habitat loss and alteration are anticipated to occur from vegetation clearing and grubbing during construction. While these activities will result in the loss and alteration of existing vegetation and topographic features, the geographic extent of effects is predicted to be low and the large majority of

migratory bird habitat within the RSA will remain unaffected. Landscape fragmentation due to NSDF Project activities are not anticipated to be significant, as migratory birds can fly over and avoid the anthropogenically-altered areas, which will remain largely within the CRL site footprint.

CNSC staff have reviewed CNL's assessment of potential impacts on migratory bird habitat, including habitat loss and alteration. With input from federal departments, provincial ministries, Indigenous Nations and communities and the public, and taking into account the implementation of mitigation measures and follow-up monitoring program measures, CNSC staff have found that the NSDF Project is not likely to cause significant adverse environmental effects on migratory bird habitat (for further details please refer to table B-1 in appendix B).

7.2.2 Sensory disturbance

Proponent's assessment of environmental effects, mitigation, and monitoring

Anthropogenic disturbances including artificial light, smells, noise, and human activities are predicted to affect wildlife habitat availability, use, and connectivity, which can lead to changes in wildlife abundance and distribution. These disturbances would occur at intermittent intervals during the construction and operations phases. CNL anticipates that blasting activities and use of machinery at the NSDF Project site would be the main sources of noise during the construction and operations phases. Disturbances due to the operation of machinery may possibly occur during the decommissioning phase. Noise and presence of humans would discourage birds from using nearby habitat within the LSA. Artificial light pollution would be a deterrent for most migratory bird species, although it may act as an attractant for nocturnal species, including the Eastern Whip-poor-will.

CNL has proposed several mitigation measures to reduce the effects of the NSDF Project on migratory bird sensory disturbance. These measures, as listed in CNL's commitments report, include:

- activities which produce the highest levels of noise will not be conducted during the most sensitive life history phase of migratory birds (i.e., breeding and nesting)
- activities with high noise levels will be completed during daylight conditions
- a 5 metre tree line buffer will be maintained along all property lines on the NSDF Project site to limit sensory disturbance including artificial light pollution
- blasting activities will be temporarily suspended if migratory birds are observed in the blasting area
- follow-up monitoring program measures as identified in section 7.2.1

Views expressed

The AOPFN is concerned about the need for further assessment of effects on various wildlife species and their habitat and ensuring that the spatial boundaries of the NSDF Project footprint include all project infrastructure and activities that may impact wildlife and wildlife habitat, including haul routes and areas of increased traffic.

CNSC staff analysis and findings

CNL has proposed to put controls in place with respect to lighting and noise to reduce any sensory disturbance to migratory birds from Project activities. The project would also be carried

out in a manner that protects migratory birds as per federal regulatory requirements. Section 6.1 outlines standard mitigation measures that will be implemented to restrict effects of noise. CNSC staff determined these measures to be acceptable.

While sensory disturbances to migratory birds caused by NSDF Project activities are expected to be continuous during the construction and operations phases, they are anticipated to be reversible at the end of the operations phase. These effects are relatively small in a population context and are not predicted to adversely affect populations of migratory birds within the RSA.

CNSC staff have reviewed CNL's assessment of potential impacts on migratory bird sensory disturbance and taking into account input from federal departments, provincial ministries, Indigenous Nations and communities and the public, and the implementation of mitigation measures and follow-up monitoring program measures, have found the NSDF Project is not likely to cause significant residual adverse environmental effects on migratory birds due to sensory disturbance (for further details please refer to table B-1 in appendix B).

7.3 Indigenous uses: Current use of lands and resources for traditional purposes

This section describes the potential effects of changes to the environment caused by the NSDF Project on the current use of lands and resources for traditional purposes by Indigenous peoples including effects to fishing, hunting, gathering, trapping and the use of lands and resources for cultural purposes (referred to as Indigenous uses).

The proposed NSDF Project could cause residual adverse effects on Indigenous uses from changes to the environment through:

- access of and/or quality and quantity of hunting, fishing, trapping, and gathering activities in the RSA as a result of the project
- changes in access to cultural resources (including Pointe au Baptême)

Description of the existing environment

The NSDF Project is proposed on the current CRL site. The LSAs and RSAs for Indigenous uses are based on the combined extent of the related atmospheric environment component (air quality, acoustic environment), human health, terrestrial and fish VCs. The RSA is accessed and used by Indigenous Nations and communities for traditional and or/cultural activities, including the use of the Ottawa River. In addition, there are known Indigenous physical and cultural heritage sites in the LSAs and RSAs, such as Pointe au Baptême, which are culturally important to a number of Indigenous Nations and communities.

The NSDF Project occurs in an area that overlaps the unceded AOO settlement area comprised of 10 Algonquin communities: AOPFN) Antoine First Nation, Kijicho Manito Madaouskarini, Bonnechere Algonquin First Nation, AGGLFN, Mattawa/North Bay Algonquin First Nation, Ottawa, Shabot Obaadjiwan, Snimikobi Algonquin First Nation and Whitney and Area that is being negotiated as part of a comprehensive land claim agreement with the federal and provincial Governments. . The AOO identified that its Settlement Area includes 36,000km² of watersheds of the Kichi-Sibi/ Kichissippi (Ottawa River) (also referred to in the Algonquin language as “Kichissippi,” and “Kitchissippi”) and Mattawa River. The AOO identified the RSA as an area where Algonquin community members regularly harvest, fish, trap and gather. The AOO shared a list of species of importance, which CNSC staff have taken into consideration and incorporated

into the assessment and some of which were incorporated into the assessment by CNL. CNL committed to incorporating the species that were not included in the assessment into the NSDF EAFMP.

AOPFN's primary residential community of Pikwakanagan is located at Golden Lake approximately 50 km south from the NSDF Project. AOPFN asserts Aboriginal rights and title to lands within the broader Ottawa River and Mattawa River watersheds in Ontario, which represents their traditional territory. CNL's EIS and other information received from AOPFN indicated that community members' access and use the RSA for hunting, fishing, trapping and gathering activities and that there are critical preferred harvesting areas and important cultural sites located in the RSA.

The NSDF Project also occurs within the Mattawa/Lake Nipissing Traditional Harvesting Territory, which is represented by the North Bay Métis Council and the Sudbury Métis Council. The Kawartha/Ottawa River Métis community (Region 6) has ties and interest in the Project area as well. The MNO has indicated that the broader CRL site sits on the border of MNO Region 5 and Region 6. In the additional information provided by the MNO to CNL and the CNSC, uses such as hunting, trapping, fishing and plant harvesting were identified in the RSA. In addition, the MNO indicated that there are canoe routes and culturally important sites located in the RSA. CNL is aware of these routes and sites and no changes are anticipated to MNO's use of these routes or access to these sites as a result of the project.

The AANTC, the AOO, AOPFN and the MNO expressed that the Kichi-Sìbì/ Kichissippi (Ottawa River) is a culturally important waterbody. Additionally, all groups indicated that the Pointe au Baptême site located on the CRL site is significant to them. From Pointe au Baptême, Oiseau Rock, a sacred pictograph site can be viewed, which is across the Ottawa River from the CRL site. The AOO expressed concerns about physical access limitations to these culturally and spiritually important sites, as well as ensuring appropriate management and protection measures are in place to maintain the visual quality and experience of these areas for Algonquins. The AOO also raised concerns about permanent and irreversible loss of culturally and spiritually significant geological and landscape features, including rare and sensitive bedrock formations near the Kichi-Sìbì / Kichissippi (Ottawa River) (also referred to in the Algonquin language as "Kichissippi," and "Kitchissippi") as a result of blasting and soil movement expected during Project construction. The Pointe au Baptême site is located within the RSA and CNL has confirmed that they are aware of the importance of this site to Indigenous peoples and do not restrict access to it. In addition, the proposed project is not predicted to physically impact this site or access to it.

Effects to Indigenous uses are indirect effects of the NSDF Project resulting from changes to the environment. CNL's assessment of potential impacts of the project on biophysical VCs used by Indigenous peoples for traditional and/or cultural activities such as hunting, fishing, trapping and gathering, concluded that when mitigation measures are taken into account, there would be no significant residual effects expected. Considering this, CNL focused the assessment of potential effects to hunting, trapping, fishing, gathering and cultural sites associated on potential changes in access and in quality and quantity of resources used.

Proponent's assessment

Effects to Indigenous uses are indirect effects of the NSDF Project resulting from changes to the environment. CNL identified potential changes in access to, and/or quality and quantity of,

hunting, fishing, trapping and gathering activities from the NSDF Project. These changes were assessed for the SSA, LSAs and RSAs.

For the SSA and LSA, CNL did not predict any residual adverse effects from the project as there are no traditional and/or cultural activities currently practiced by Indigenous peoples within the CRL site (SSA and LSA).

In relation to quality and quantity of hunting, fishing, trapping and gathering activities in the RSA, CNL did not predict any residual effects to the biophysical environment (including to species of importance identified by Indigenous Nations and communities) after taking into consideration the implementation of proposed mitigation and follow-up monitoring program measures. These measures, as listed in CNL's commitments report, include:

- Terrestrial wildlife to be excluded from the SSA by a 6-foot-high chain link perimeter fence that will remain through post-closure.
- Environmental monitoring program – monitoring of dust, wetland integrity, surface water, biota, and radiological dust screening to verify and confirm predictions of no residual effects to the physical environment.
- Public Information Program and enhanced engagement with Indigenous Nations and communities, sharing results of monitoring and follow-up monitoring programs recommended for air quality, surface water quality, and ground water quality.

Therefore, with the identified mitigation measures and proposed follow-up and monitoring activities, CNL does not anticipate any residual effects on access of and/or quality and quantity of hunting, fishing, trapping, and gathering activities in the RSA as a result of the project.

In addition, CNL assessed the potential residual effect of changes in access to cultural resources (including Pointe au Baptême). As CNL has committed to maintaining access for Indigenous peoples to Pointe au Baptême there are no predicted residual effects as a result of the project.

Proposed follow-up monitoring program measures, also listed in CNL's commitments report, will include:

- Archaeological master plan and cultural resource management (CRM) program.
- Public information program and enhanced engagement with Indigenous Nations and communities, sharing results of the archaeological master plan and CRM program.

Views expressed

The AANTC, the AOO, AOPFN, and the MNO raised concerns with the project's ability to affect their land and resource use. All of these Indigenous Nations and communities expressed that they wish to be more involved in CNL's follow-up and monitoring programs to better understand potential effects and input into the management of the monitoring and follow-up activities in relation to the NSDF Project and CRL site. More specifically, AOPFN raised that CNL has underestimated effects on AOPFN's current use of lands and resources for traditional purposes. As reported in the AOPFN Algonquin Knowledge and Land Use Study (AKLUS) and RIA, AOPFN adopted a larger LSA and therefore traditional and cultural activities are practiced with this defined LSA.

CNL has committed to collaborating with interested Indigenous Nations and communities on mitigation, monitoring and follow-up measures for species and effects related to their land and

resource use, including providing support for Indigenous Knowledge monitoring in relation to the project. CNL has committed to directly involving Indigenous Nations and communities and incorporating Indigenous Knowledge in the development and implementation of the NSDF EAFMP, including in identifying adaptive management triggers/thresholds in relation to VCs that are informed by Indigenous Knowledge, rights and interests. CNL is also committed to working with Indigenous Nations and communities to address concerns related to safety and willingness to harvest within the proximity of the NSDF Project, including developing an Indigenous-driven Risk Communication Strategy for the NSDF Project. Further, CNL indicated that they would regularly check with interested Indigenous Nations and communities whether the mitigation measures being undertaken are effective at addressing their concerns.

The AOO, AOPFN, CLFN and the MNO raised concerns about archaeology and sites of cultural importance. The AOO and AOPFN requested involvement in culture and heritage matters at the NSDF site, including a role in stewardship and cultural recognition programs, and that CNL develop a contingency plan for artifact discovery and work stoppage.

CNL has conducted the required archaeology assessments in accordance with federal and provincial regulations. To date potential archaeological sites within the SSA were excavated and nothing of significance has been found. CNL has committed to suspend project activities immediately and engage a licensed consultant to carry out archaeological fieldwork if previously undocumented archaeological resources are discovered as per Sec. 48 (1) of the *Ontario Heritage Act*. CNL will notify interested Indigenous Nations and communities should artifacts be discovered and is committed to supplementing the NSDF Project's existing mitigations for the potential discovery of undocumented archaeological resources, based on input from Indigenous Nations and communities. CNL has committed to involving interested Indigenous Nations and communities in cultural stewardship and monitoring activities and will be implementing a CRM Program and discussing cultural protection planning opportunities with interested Indigenous Nations and communities. CNL also committed to facilitating a pre-construction "inventory" data collection period for Indigenous guardians and knowledge holders to conduct an inventory of the NSDF Project footprint for species and areas of importance, and to use the results from the inventory to inform the NSDF EAFMP.

CNSC staff analysis and findings

CNSC staff reviewed CNL's assessment of potential effects to access and the quality and quantity of hunting, fishing, trapping and gathering activities, during all phases of the NSDF Project and considered the Indigenous Nations and communities views.

In addition, the following measures proposed by CNL in the terrestrial, aquatic and surface water environment sections listed in this report also apply as mitigation and follow-up monitoring program measures for effects on Indigenous uses:

- Measures identified in section 6.2 Water Resources related to limiting effects to fish and fish habitat and limiting effects to water quality and quantity.
- Measures identified in section 6.3 Terrestrial Environment related to limiting disturbance to wetlands and natural environment, establishing a 30 m buffer near wetlands in the SSA, establishing a 5m tree-line buffer to limit disturbance to vegetation, avoid conducting activities with highest level of noise and habitat disturbance during key window, and preventing wildlife mortality due to vehicle collisions.

- Monitoring identified in sections 6.2 Water Resources and 6.3 Terrestrial Environment.

With these measures also applied to address effects on Indigenous uses, CNSC staff have found that there will be no significant adverse environmental effects to access and the quality and quantity of hunting, fishing, trapping and gathering activities, during all phases of the NSDF Project.

CNSC staff also conclude that there will be no residual adverse effects to changes in access to cultural resources for ceremonial purposes, including Pointe au Baptême given the proponent's commitment to continue to provide access to Indigenous Nations and communities. With respect to potential effects to other cultural resources including archaeology, and taking into account Indigenous Nations and communities' views, CNSC staff have found that the proponent's mitigation listed above and their commitment to follow the guidance under the *Ontario Heritage Act* pertaining to archaeology will mitigate any effects.

CNSC staff have reviewed the proponent's assessment of potential impacts on Indigenous uses from changes to the environment. Taking into account input from federal departments, provincial ministries, Indigenous Nations and communities and the public, implementation of mitigation measures and follow-up monitoring program measures, CNSC staff have found that the NSDF Project is not likely to cause significant adverse effects on access and quality and quantity of hunting, fishing, trapping and harvesting activities, or effects on access to cultural sites of importance to Indigenous peoples.

7.4 Human health (including Indigenous peoples Health)

The proposed NSDF Project could cause residual adverse effects on human health through:

- Exposure to air and water non-radiological contaminants by inhalation and ingestion.
- External and internal exposures to radiological contaminants.

Description of the existing environment

On average, the annual effective dose received from natural background for radiological exposures in Canada is 1.8 milliSievert (mSv), of which approximately 1 mSv is due to radon progeny inhalation. The dose off-site from the CRL site is ascertained annually by CNL from data collected as part of its environmental monitoring program. From 2014 to 2018, the most exposed members of the public received an annual average of 0.065 mSv from airborne releases, and 0.0005 mSv from water effluent pathways. In 2018, the most exposed members of the public received 0.032 mSv from releases of nuclear substances from the CRL site, in addition to the natural background dose.

Proponent's assessment

The proponent completed a human health risk assessment (HHRA) to assess potential impacts of the project on workers on site, members of the public (which include permanent and seasonal residents in the vicinity of the facility), and self-sufficient Indigenous Nations and communities. A self-sufficient Indigenous Nation or community is defined as a Nation or community of Indigenous peoples, including adults and children, who would use the area around the NSDF Project, including Perch Creek and the Ottawa River, to obtain all of their food through hunting and gathering in this area. It is assumed that this Nation or community will be exposed to airborne and waterborne radiological and non-radiological emissions.

Pre-closure period

The pre-closure period consists of the construction phase (during which no radiological exposures are expected, and it is therefore not discussed further), the operation phase, and a closure phase. The radiological risks associated with the operations and the closure phases were calculated by CNL on the basis that radiological exposures are expected to remain constant during each respective phase.

The following pathways were evaluated in CNL's analysis of residual effects to human health during the operation and closure phases:

- Pathway 1 - Dust created during handling of bulk materials and emissions of gases potentially released during storage and disposal of radioactive materials (as described in section 6.1).
- Pathway 2 - Emissions may be released from the WWTP to air during operations.
- Pathway 3 - Changes to the surface water quality from leakage of leachate from the EMC or from releases of treated effluent from the WWTP via an exfiltration gallery and into Perch Lake (as described in section 6.2).

In addition, direct external exposure to the waste and wastewater is included in the assessment of doses to NSDF workers. These pathways result in an incremental dose to persons on and off site during the pre-closure period.

Radiological contaminants - Potential effects to workers

Doses to NEWs were conservatively estimated for normal operations. Normal operations refer to all normal activities associated with waste placement, WWTP normal operations and maintenance activities. Operations activities are expected to last approximately 50 years.

For NEWs on site, the pathways discussed above apply to two categories of workers: those carrying out work activities at the WWTP and those carrying out work activities at the ECM. Dose to NEWs results from external exposure to radiation emitted from radioactive waste or wastewater and from inhalation of radioactive contaminants. The dose estimates were derived from the calculated dose rates and expected exposure durations specific to each work task. Internal dose from the inhalation of dust/gas was also considered in the dose estimates.

The highest effective dose to a WWTP worker is estimated at 5.2 mSv/yr. The highest effective dose for a worker working at the ECM is estimated at 10.4 mSv/yr. These dose estimates were calculated assuming the workers are only involved with activities at the WWTP or at the ECM. The dose estimate for the ECM worker assumes no cover over the waste and excludes the distance and any shielding provided by the equipment.

According to the conservative dose estimates performed by CNL, doses to workers during the operation phase will be below the regulatory dose limit of 50 mSv/y for a NEW. Radiological work assessments and planning will be used in combination with dose control points (DCPs) to limit dose to workers and to demonstrate the application of the as low as reasonably achievable (ALARA) principle. DCPs are set conservatively below the estimated worker dose and will be adjusted as experience is gained with the NSDF operations.

Radiological contaminants – Potential effects to members of the public

For persons off site, bounding doses specific to the operation and closure of the NSDF, resulting from the above mentioned 3 pathways, were ascertained. Airborne releases from the WWTP and ECM were assessed and for both sources of releases, the consequences off site were determined to be very low. The most significant releases are estimated to be from the WWTP. Cobalt-60 is expected to be the only radionuclide released in a significant quantity from the WWTP, in an amount equivalent to 0.04% of the Derived Release Limit (DRL) for the CRL site, below CNL's target of 1% of the DRL. This would result in an incremental increase in the annual dose to the most exposed members of the public of 0.0004 mSv (0.4 µSv), below CNL's dose constraint of 0.3 mSv/year (300 µSv/year) for members of the public. This represents 0.6% of the mean dose received annually from airborne releases from the CRL site from 2014 to 2018.

Non-radiological contaminants – Potential effects to both workers and members of the public

There were no residual effects identified for human health (workers and members of the public) from non-radiological contaminants during the operations and closure phases. All modelled non-radiological COPCs for air met their respective health-based guidelines. Surface water concentrations of non-radiological COPCs (except iron, lead and manganese) from the WWTP were below the health-based guidelines (as discussed in section 6.2 above). Predicted concentrations of iron, lead and manganese in surface water at some locations, however, slightly exceeded the guidelines due to existing ambient concentrations of these COPCs. Given the conservative assumptions related to the non-radiological COPC concentrations (including iron, lead and manganese) in the waste material, and conservative assumptions in the water quality modeling, the risks associated with these parameters during all phases were considered to be negligible. Furthermore, all wastes to be emplaced in the facility will be required to meet the Waste Acceptance Criteria, which will allow for further refinement of potential risks of non-radiological COPCs.

Mitigation measures, monitoring and follow-up

Mitigation measures proposed by CNL to help ensure doses to workers and the public remain below the identified criteria, as listed in CNL's commitments report, will include:

- Applying DCPs for NEWs and establishing a sensitive set of action levels for occupational exposures
- applying a dose constraint of 0.3 mSv/year for members of the public
- designing the NSDF such that potential releases of nuclear substance to the environment remain below the target of 1 % of the DRL for the Chalk River site

The principal means of mitigating radiological exposures to workers, as listed in CNL's commitments report, consist of:

- ensuring that all activities are covered by either CNL's work permits with completed radiological safety assessments or by approved work procedures
- implementing CNL's procedure for Management and Monitoring of Emissions, which includes operational control monitoring and verification monitoring
- gas venting in the final cover to prevent the buildup of gas emissions from waste in closed cells

- implementing a DMP
- not heating processed wastewater within the WWTP, as increasing the temperature increases potential release rates
- having active ventilation within the WWTP building and filtering active ventilation exhaust through HEPA filters prior to release

The strategy for wastewater treatment is based on optimizing public and environmental protection. This is to be achieved by using best available technologies that are economically achievable and capable of meeting regulatory requirements. Mitigation measures, as listed in CNL's commitments report, include:

- Discharge targets for non-radiological contaminants are from federal and provincial guidelines for protection of aquatic biota. For nuclear substances, the Canadian Drinking Water Guidelines (CDWG) have been adopted for the WWTP discharge targets.
- For tritium, a site-specific target has been developed. It is derived from the CDWG and accounts for dilution from the WWTP to Perch Creek, to ensure that at that location the CDWG for tritium is met.
- The Waste Acceptance Criteria developed for the NSDF Project are intended to limit the level of contamination by accepting only low level radioactive waste and limiting the types of waste to be disposed in the ECM. This will limit the magnitude of potential changes to surface water and groundwater quality. CNL plans to apply procedures to identify spills in the event that treated effluent is released to areas other than directly to the exfiltration gallery and initiate appropriate emergency responses.

CNL's proposed follow-up monitoring program measures in response to these mitigation measures consists of measurements of air, WWTP treated effluent and groundwater, as listed in CNL's commitments report, and include:

- Air quality will be monitored through WWTP air effluent monitoring as well as through the collection of dust samples in high volume air samplers during the construction and operations phases, with associated radioactivity measurements. As a result, pathway 1 (airborne release from storage and disposal activities) and pathway 2 (gaseous releases from the WWTP) will be monitored.
- Monitoring of WWTP treated effluent, storm water pond effluent and surrounding surface water quality.
- Groundwater monitoring will be conducted to confirm groundwater quality and detect potential releases from the ECM containment area. As a result of the monitoring strategies, pathway 3 (the release of treated effluent from the WWTP) will be monitored.

Post-closure period

The assessment of radiological and non-radiological safety was assessed taking into consideration the release of volatile substances to air, the release of leachate to soil by overtopping the berm, and the release of leachate to groundwater via the base liner. Refer to section 3.5 of the CMD for further information.

For Normal Evolution Scenario, an on-site resident receives the highest annual effective dose of 0.015 mSv from radiological contaminants, 4,100 years post-closure, with key

radionuclides/pathways being derived from external irradiation from niobium-94 and thorium-228 and ingestion of carbon-14 from crops and beef. The highest annual effective dose to the self-sufficient Indigenous Nation or community (as defined above) for normal evolution scenarios was assessed to be 0.077 mSv, occurring 520 years after closure.

Disruptive Event Scenarios include human intrusion due to borehole drilling and excavation to construct a house over the ECM and residing in the house with a basement during the post-institutional control period, as well as considering enhanced erosion of the cap, localized cover/liner failures and berm height reduction due to damage. The highest annual dose for the intrusion scenarios is 0.039 mSv, from radiological contaminants, for a resident residing in a house with a basement built on the ECM 100 years post-closure. The dose is mainly due to the ingestion of Carbon-14 resulting from the consumption of foodstuffs from a garden at that location. The enhanced erosion case results in an annual dose of 0.114 mSv, 7,650 years post-closure resulting from a resident farmer consuming locally grown foodstuffs (the dose is mainly due to Radium-228).

In both scenarios, the highest annual doses are below the dose criteria of 0.3 mSv per year.

In the post-closure phase of the project, for both the Normal Evolution Scenario and the Disruptive Events Scenarios, all non-radiological contaminants were assumed to be readily available for dissolution and leaching upon contact with water. Under these conditions, there would be negligible residual effects expected from non-radiological contaminants associated with the NSDF Project.

While there is uncertainty with respect to the inventory of non-radiological wastes that have been accumulated over the decades of operation of the CRL site, as well as the project inventory of non-radiological wastes that will be generated in the future, both wastes will have to meet NSDF Waste Acceptance Criteria.

Overall, CNL predicts negligible residual effects on human health from radiological and non-radiological contaminants associated with both pre-closure and post-closure phases of the NSDF Project.

Views expressed

The AOO, the AOPFN and the MNO expressed concerns about the potential effects from radiological and non-radiological exposure pathways, including contaminants entering surrounding waterways and the terrestrial environment, affecting the health of Indigenous peoples who harvest plants, wildlife, fish, medicines, and other traditional foods and natural materials from the area. The AOO are concerned that CNL's representation of radiological exposure pathways for Indigenous Nations and communities is insufficient as it does not include the appropriate plants or animal tissues consumed by Indigenous Nations and communities and fails to account for the various exposure pathways that a self-sufficient Indigenous Nation or community may be exposed to while simultaneously practicing harvesting activities and working at the CRL site.

The AOO and AOPFN raised concerns about the important connection between land and resource use and human health. AOPFN identified concerns regarding the lack of consideration of non-radiological determinants of health in the HHRA and indicated that other determinants and impacts on mental and physical health should be included in the health risk assessment (e.g., education status, economic status, diet and traditional food consumption, fear of contamination, loss of connection to territory). AOPFN and the AOO expressed concerns about the need for a

follow-up country foods survey and monitoring program that recognizes the interdependencies between ecological, socio-economic, community and cultural health, assesses potential contamination pathways and risks to the health of Indigenous peoples, and ensures the safety of foods harvested and consumed in the area surrounding NSDF.

CNL indicated that the Project design is such that potential releases of nuclear substances to the environment remain below the target of 1 % of the DRL for the CRL Site. Negligible residual effects are expected on human health from radioactivity associated with the Project during the operations and closure phases, and no residual effects were identified for human health from non-radiological contaminants during the operations and closure phases. CNL confirmed that the human health risk measurement indicators for the self-sufficient Indigenous Nation or community is conservative and is based on a diet of locally sourced traditional foods that captures potential changes to traditional food quality. CNL has committed to working with Indigenous Nations and communities to gather additional information on traditional food consumption near the Project to verify project assumptions. CNL is also committed to working with Indigenous Nations and communities to address concerns related to safety and willingness to consume traditional foods harvested within the proximity of the NSDF Project, including developing an Indigenous-driven Risk Communication Strategy for the NSDF Project.

CNL stated that measures would be implemented to mitigate radiological exposures to workers and the public, including implementing a DMP, implementing a procedure for Management and Monitoring of Emissions, and only accepting low level radioactive waste and types of waste to be disposed in the ECM in order to limit the magnitude of potential changes to surface water and groundwater quality. CNL also committed to implementing follow-up monitoring for air, WWTP treated effluence and groundwater to detect potential contaminant releases.

Members of the public expressed concerns regarding the potential long-term health effects of the Project on the surrounding population, including after the 300-year period of institutional control and monitoring has ceased. The public identified concerns relating to the uncertainty about potential human health impacts that is acknowledged in the EIS, and the lack of consideration given to a representative person located near the facility and consuming local food and water in the long-term dose assessment. Additional concerns were expressed regarding increased potential for adverse health effects due to the proximity of the proposed ECM location and the adjacent Ottawa River and water bodies. CNL indicated that the final EIS assesses the dose and risk to human health throughout the construction, operations and post-closure phases of the Project, and the assessment utilizes conservative assumptions during the calculation of dose to receptors, including on-site receptors having an occupancy factor of 100% during the post-closure period. CNL also stated their approach to the long-term safety assessment has been revised to include the dose to a resident/farmer who consumes local food and local drinking water, which was calculated to be less than 1% of the natural background dose and well below regulatory dose limits to members of the public.

CNSC staff analysis and findings

CNSC staff's assessment of exposures to radiological and hazardous substances were reviewed taking into consideration the effect of external factors on the waste and repository performance, the release of contaminants and their subsequent behaviour in the geosphere and biosphere, concomitant with the normal evolution of the repository, as well as with disruptive events. The technical basis for dose calculation was ascertained, and the modeling independently verified.

CNSC staff have verified, through independent modeling exercises, that, taking into account the implementation of the proposed mitigation measures, the proponent's assessment demonstrated that the predicted annual effective and equivalent doses to persons on-site and off-site during the normal operation of all phases of the proposed project, as well as during disruptive event scenarios, will not exceed the applicable dose limits of the *Radiation Protection Regulations* and will be controlled by the use of DCP, action levels or dose constraints established for this project.

CNSC staff have determined that CNL's assessment demonstrates that there are no residual impacts expected on human health from radiological or non-radiological COPCs for all phases of the proposed project.

While exposure to air and water radiological and non-radiological contaminants caused by NSDF Project activities are expected to occur within the LSA occasionally and intermittently for the long term, during all phases of the project, they are anticipated to be partially reversible as changes to water and fish concentrations would require a long time to return to baseline conditions. Receptors may see a change in health status, however all exposures are expected to be below the regulatory dose limits and will remain ALARA.

Overall, CNSC staff have verified CNL's assessment of the risks to human health (including Indigenous peoples' health) resulting from exposure to radiological and hazardous substances released from the NSDF during all phases of the project. Taking into account input from federal departments, provincial ministries, Indigenous Nations and communities and the public, and taking into account the implementation of mitigation measures and follow-up monitoring program measures, CNSC staff have found that the Project is not likely to cause significant adverse environmental effects on human health, including Indigenous peoples' health (for further details please refer to table B-1 in appendix B).

7.5 Transboundary environmental effects – Greenhouse gas emissions

GHG are atmospheric gases that absorb and re-emit infrared radiation resulting in the warming of the lower levels of the atmosphere. They are recognized as being one of the causes of climate change that can have various effects on ecosystems and human health. These gases disperse at the global scale and are, for the purpose of CEAA 2012, considered transboundary environmental effects.

The main GHG include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), ozone (O₃), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). GHG estimates are usually reported in units of tonnes of CO₂ equivalent (CO₂e) per year. As of 2017, projects that emit over 10,000 tonnes of CO₂e per year are required to report those emission levels to ECCC.

Description of the existing environment

Existing GHG emissions are not measured, however they are routinely estimated. For the purposes of the NSDF GHG assessment, federal and provincial reported GHG data, as well as CNL data, has been used to describe the background GHG emissions.

There are no large GHG emitters within 100 km of the NSDF Project, with the exception of the CRL main campus and the Department of National Defense, located in Petawawa. Table 7.1 below provides baseline GHG emissions for the CRL Main Campus, the Department of National Defense, as well as the Canada-wide and Ontario-wide annual GHG emissions for comparison.

Proponent's assessment of environmental effects

The measurement indicators for the NSDF Project considered in CNL's GHG assessment include changes in concentrations of CO₂, CH₄, and N₂. There are no NSDF Project activities that are expected to emit SF₆, PFCs or HFCs, therefore these compounds were not included in the GHG assessment. For the purposes of the GHG assessment, the construction phase, operation phase, and the first year after closure have been considered. The first year after closure is included to represent the year where emissions from the decomposition of the waste within the ECM are expected to be at their highest.

Table 7.1 also summarizes the annual overall GHG emissions in tonnes of CO₂e for the construction and operation phase of the NSDF Project.

Table: 7.1 Comparison of GHG emissions from the NSDF Project to the CRL main campus and to Ontario and Canadian emission totals

Source	GHG emissions (tonnes CO ₂ e)	
Canada-wide GHG Emissions (2017)	716,000,000	
Ontario-wide GHG Emissions (2017)	159,000,000	
CRL main campus 2018 GHGs	30,308	
Department of National Defence 2017 GHG emissions	31,655	
Source	Construction GHG Emissions (CO ₂ e tonnes/yr)	Operation GHG Emissions (CO ₂ e tonnes/yr)
NSDF Project		
GHG Emissions	28,768	9,233
Comparison to 2018 CRL main campus	94.9%	30.4%
Comparison to Canada-Wide Total	0.0040%	0.0013%
Comparison to Ontario Total	0.018%	0.0058%
NSDF Project + CRL main campus		
GHG Emissions ^(a)	59,376	39,841
Comparison to Canada-Wide Total	0.0083%	0.0056%
Comparison to Ontario Total	0.037%	0.025%

The following activities are expected to result in changes to GHG emissions and to residual effects to climate:

- use of vehicles and equipment that combust fuel during construction activities. These activities involve material handling and vehicles travelling on roads
- land clearing during the construction phase
- loss of carbon sinks as a result of the land clearing
- decomposition of waste emplaced in the facility

Proposed Mitigation Measures, Monitoring and Follow-up

Implementation of CNL's existing procedure for management and monitoring of emissions at CRL site, which includes operational control monitoring and verification monitoring will continue and apply for the NSDF Project as it outlines the key management practices to limit effects to air quality. The CRL Non-radiological Effluent Monitoring Plan comprises 56 monitoring points and will also apply to the NSDF Project. In addition, GHG emissions monitoring activities for the NSDF Project will be implemented.

CNSC staff analysis and findings

CNSC staff have assessed CNL's GHG assessment for the NSDF Project in accordance with the CNSC Generic Guidelines and found the assessment and methods of assessment to be adequate.

CNSC staff have verified CNL's assessment of the predicted effects to GHG emissions during all phases of the project. The predicted residual adverse effects to GHG emissions were estimated to increase because of the NSDF Project. As outlined in table 7.1, emissions of GHGs from the CRL site are estimated to increase approximately 94 % during the construction phase and approximately 30% during the operations phase. This change is estimated to be less than a 0.02% increase in total provincial GHG emissions and less than a 0.0005% increase in total national GHG emissions.

Taking into account input from federal departments, provincial ministries, Indigenous Nations and communities and the public, and the implementation of mitigation measures and follow-up monitoring program measures, CNSC staff have found that the Project is not likely to result in significant adverse environmental effects or contribute to provincial or national GHG emission levels. For further details please refer to table B-1 in appendix B.

8.0 Other effects considered

8.1 Effects of the project on Species at Risk

Subsection 79(2) of the SARA requires, an authority who is required by or under an Act of Parliament to ensure that an assessment of the environmental effects of a project is conducted, identify the adverse effects of the project on the listed wildlife species in Schedule 1 of the SARA and associated critical habitat. Species listed under SARA are protected from being disturbed, collected, harvested, captured, killed, or exported. Under SARA, over 400 species have been identified by the COSEWIC as being at risk in Canada and requiring special management considerations. Special management considerations include appropriate surveys and setbacks on lands where species have been recorded.

CNSC staff focused their assessment on species at risk on habitat loss due to NSDF Project activities. The NSDF Project's effects on migratory bird species at risk are discussed in section

7.2, and effects on fish species at risk are discussed in section 7.1, therefore CNSC staff focused this section on mammals (bats), reptiles (Blanding's turtle and Eastern milksnake), and insects (Monarch butterfly). The suitable habitat area per species is shown in table 8.1.

Table 8.1: Suitable habitat area by species in the local and regional study areas

Species		Suitable habitat area (ha)		Classification	
Common name	Scientific name	Local study area	Regional study area	Species at risk ⁴	Migratory bird ⁵
Birds					
Canada Warbler	<i>Cardellina canadensis</i>	128	1701	X ^T	X
Eastern Whip-poor-will	<i>Antrostomus vociferous</i>	13	769	X ^T	X
Eastern Wood-pewee	<i>Contopus virens</i>	54	1603	X ^{SC}	X
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	102	2621	X ^T	X
Wood Thrush	<i>Hylocichla mustelina</i>	86	1076	X ^T	X
Mammals					
Little Brown Myotis (bat)	<i>Myotis lucifugus</i>	86	1149	X ^E	
Northern Myotis (bat)	<i>Myotis septentrionalis</i>	86	1149	X ^E	
Tri-colored Bat	<i>Perimyotis subflavus</i>	86	1149	X ^E	
Other					
Blanding's Turtle	<i>Emydoidea blandingii</i>	179	2788	X ^E	
Eastern Milksnake	<i>Lampropeltis triangulum</i>	NA	NA	X ^{SC}	
Monarch Butterfly	<i>Danaus plexippus</i>	80	805	X ^{SC}	

Listed as Threatened (T), Endangered (E), and Special Concern (SC)

⁴ Species listed under schedule 1 of the *Species at Risk Act*

⁵ Migratory birds protected under the *Migratory Birds Convention Act*

8.1.1 Mortality, habitat loss and effects on Species at Risk

Potential effects of NSDF Project activities to 6 species at risk identified within the RSA were assessed in this section, including 3 bat species, 2 reptile species, and 1 insect species.

Bats

Description of existing environment

The old forests within the RSA are home to many wildlife species, including the 3 SARA-listed bat species identified as endangered, namely the little brown myotis (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*) and tri-colored bat (*Perimyotis subflavus*). All Canadian bat species have 4 primary habitat requirements: hibernacula (or shelter for the winter), swarming sites, roosts, and foraging areas. Within the RSA, the potential for hibernacula in exposed bedrock that typically forms caves was assessed at an overview-level and concluded to be low, due to lack of key minerals typically found in the geological environment where such caves are present. However, CNL biologists have not conducted surveys to date that would confirm the presence or absence of hibernacula features within the RSA. Foraging habitat requirements are varied between the 3 species and not likely limiting in the environment of the RSA.

Based on research conducted by CNL on maternity roosting behaviour in natural habitats, older forests are generally preferred by bats, including the 3 species considered in this section (little brown myotis, northern myotis, and tri-colored bat). As a conservative estimation of potential maternity roost habitat within the RSA, CNL analyzed vegetation community data to determine the availability of forests or swamp wetland types in the RSA that contain mature forest stands and matured tree swamps. A total of 1,149 hectares of suitable maternity roost habitat is estimated to occur in the RSA.

CNL biologists have also conducted acoustic monitoring surveys to determine the composition of the bat community at specific areas within the CRL site since 2014. The surveys have determined the presence of all 3 SARA-listed species (little brown myotis, northern myotis, and tri-colored bat) using habitats within the LSA.

All 3 bat species considered in this analysis have faced dramatic population declines over the last decade caused by white nose syndrome (WNS), which is a fungal disease experienced by bats when they are hibernating. WNS causes physical damage (erosion of the skin, damage to sweat glands and muscles) to bats and arouses them from their state of torpor (i.e., sleep), causing them to expend energy that is typically reserved until their emergence in the spring. Since detection of WNS in 2010, the recorded populations of the little brown myotis and northern myotis have been reduced by approximately 94% in Nova Scotia, New Brunswick, Ontario and Quebec.

Due to the adverse effects of WNS on the 3 bat species considered in this analysis and their susceptibility to any additional sources of change, other threats have been recognized as habitat loss and degradation, disturbance or harm, and pollution and climate change. Moreover, the little brown myotis is especially vulnerable to extermination efforts, due to their tendency to roost in anthropogenic structures such as attics.

Proponent's assessment of environmental effects, mitigation, and monitoring

NSDF Project activities will result in the permanent loss of approximately 28 hectares of potential maternity roost habitat, potential long-term avoidance of adjacent maternity roosting habitat in the LSA from sensory disturbance, and permanent change in movement corridors between maternity roosting habitat patches.

CNL has proposed several mitigation measures to reduce the effects of NSDF Project activities on the little brown myotis, northern myotis, and tri-colored bat. These measures, as listed in CNL's commitments report, include:

- the SSA has been designed to avoid wetlands and limit disturbances to the natural environment to the extent feasible
- a 30 metre buffer will be established along identified wetlands near the SSA and where the buffer cannot be maintained, appropriate mitigation will be established to reduce any risk of erosion
- a 5 metre tree-ling buffer will be established along all property lines on the NSDF site to limit disturbance to vegetation and wildlife habitat
- activities which produce the highest levels of noise will not be conducted during the most sensitive life history phase of bats (i.e., maternity roosting)
- bat boxes will be installed in suitable locations in the RSA in an attempt to offset the incremental contribution of the NSDF Project to cumulative effects on SARA-listed bat species
- weekly monitoring to determine if bat boxes are being used. Boxes not being used may be moved to alternate locations
- a comprehensive SFMP will be implemented to ensure the long-term retention of trees serving as maternity roosts for bat species

Proposed follow-up and monitoring measures, as listed in CNL's commitments report, include:

- installation of bat boxes in suitable locations in the RSA to offset the incremental contribution of the NSDF Project to cumulative effects on SARA-listed bats. Bat boxes to remain in place throughout the construction and operation phases. Visual monitoring to be conducted at least weekly to determine if at boxes are being used. Boxes not being used may be moved to an alternate location every year during the pre-construction phase and will continue through construction and for 3 years after start of operations
- CNL, in collaboration with Trent University, trapped and tracked bats back to the roost site (natural tree or bat box), including Guano (feces) collection. This work was carried out for 2 years and has provided a better understanding of habitat occupancy by the bat species at risk, including bat boxes, and habitat preference

Blanding's turtle

Description of existing environment

Blanding's turtles (*Emydoidea blandingii*) are semi-aquatic reptiles that inhabit a variety of aquatic and wetland habitats, including marshes, ponds, slow-flowing rivers and creeks, pools, lakes, and sloughs. Blanding's turtles prefer aquatic habitats with soft, muddy bottoms and abundant aquatic vegetation, and they use these habitats for hibernating, mating, foraging, and movement. They are listed as endangered under Schedule 1 of the SARA and as threatened under the *Ontario Endangered species Act, 2007*. Mortality along roadways and railways has been identified as the most important threat to the turtle population.

Blanding's turtles hibernate from approximately October to April and will bury themselves in soft substrates underwater. They are known for returning to the same hibernation area every season. Blanding's turtles also occasionally travel seasonally through upland terrestrial habitat to meet important biological requirements, such as nesting. In Ontario, Blanding's turtles typically nest from late May through the second week of July, with peak nesting activity occurring in June. They require loose sandy substrates or organic soils to create nests and prefer open areas, resulting in nests that are typically found on beaches, shorelines, meadows, gardens, fields, and road shoulders.

Blanding's turtles inhabit the RSA and have been the focus of field studies on the CRL site since 2009. Habitat mapping for the Blanding's turtle in the RSA was conducted by mapping all CNL observation records for the species, identifying all permanent and seasonal wetlands within a 2 km buffer around the observation records, and applying a 240 metre buffer to all those aquatic and wetland features to incorporate suitable terrestrial habitat into the critical habitat mapping.

Perch Lake has the potential to be used as an overwintering habitat for Blanding's turtles, and the sandy areas around the lake have the potential to be used as nesting areas. Moreover, although the SSA is dominated by forest cover, the roads and hydroelectric corridors provide openings within which suitable turtle nesting habitat may be found. However, no nesting habitat has been confirmed in the SSA to date.

Proponent's assessment of environmental effects, mitigation, and monitoring

CNL has committed to developing nesting habitat on the CRL site by building nesting mounds at eight culverts on site, five of which have already been built at priority culverts. Artificial nesting mounds will be built on both sides of the culverts and will be monitored weekly for use by turtles during the nesting period and after periods of rain, to capture potential increases in nesting behaviour associated with rainfall.

CNL has proposed and implemented several measures to reduce the effects of NSDF Project activities on the Blanding's turtle. These measures are listed in CNL's commitments report and include:

- the SSA has been designed to avoid wetlands and limit disturbance to the natural environment to the extent feasible
- a 30 m buffer will be established along identified wetlands near the SSA where the buffer can not be maintained, appropriate mitigation will be established to address any risk of erosion
- a 5 m tree-line buffer will be established from all property lines on the NSDF site to limit disturbance of vegetation and large tree roots at the treeline
- the installation of turtle crossing signs along Plant Road, including 2 electronic signs that are in use during the turtle nesting season
- detailed species at risk training to employees at the CRL site
- enforcement of CRL site speed limits on all access roads
- critical Blanding's turtle habitat will be assessed annually to ensure no significant loss
- artificial nest mounds will be constructed on both sides of new and replaced culverts

- native vegetation will be planted around new and replaced culverts
- appropriate permanent fencing will be installed for 200 m on either side of newly replaced culverts to guide turtles through the tunnel
- reptile exclusion fencing will be installed and maintained along the perimeter of the SSA prior to initiating activities during the construction phase and prior to acting Blanding's turtle season
- road grading and levelling activities will not be completed during the turtle nesting season (May 15 to June 30)
- road mortality surveys will be completed for reptiles in the species' active seasons of April 15 to September 30

Proposed follow-up measures and monitoring, as listed in CNL's commitments report, include:

- Wildlife-vehicle collision monitoring to be conducted in the SSA during construction and operations phases and closure. Vehicle-caused Blanding's turtle mortality will be reported and data will be compiled in a database that can be used to inform adaptive management for the site.
- As part of the SARA permitting process for the removal of critical habitat, critical habitat will be assessed annually to ensure no significant loss at CRL and to determine compensation measures initiated at CRL or elsewhere. Monitoring will be integrated into CNL's existing Species at Risk Program.
- Exclusion fencing to be inspected annually for integrity during construction and operations phases and closure.
- Culverts will be inspected for barriers to turtle movement weekly during the active season for Blanding's turtle (April 15 to October 15).
- Nesting mounds will be inspected weekly during the nesting season (May 15 to June 30) for suitability and mounds will be maintained by removing vegetation as needed.
- Nest cages will be inspected for integrity weekly during the nesting and hatching emergence season (May 15 to October 15).
- Cameras will be installed at culverts and will record photographs on a time-lapse basis during the active season (April 15 to October 15) every year for the next 5 years. Photographs will be reviewed and data compiled.

With the implementation of mitigation measures, CNL has predicted that the Project activities in the RSA are predicted to have a net neutral or positive effect on the local Blanding's turtle population.

Eastern milksnake

Description of existing environment

Eastern milksnakes (*Lampropeltis triangulum*) use a wide range of habitats including prairies, pastures, wetlands, and various types of forest habitats. They can also regularly be found in rural areas, where they frequent older buildings. Eastern milksnakes are listed as a species of special

concern under the SARA. The presence of individuals in the RSA has been confirmed due to the availability of natural habitat and proximity to the Ottawa River and various wetlands.

The eastern milkshakes lay eggs in late June and early July in rotting logs or under suitable cover, and they hibernate in mammal burrows, hollow logs, soil banks, and old building foundations. They are known to display fidelity to their hibernation sites, which can vary from well-drained sites or in areas close to water. The eastern milksnake has adapted to rural areas in southern Ontario, which suggests it is resilient to low levels of anthropogenic disturbance. However, extensive changes in land cover and land use, such as urbanization and agriculture, are reducing habitat availability for the species.

Milkshakes are considered habitat generalists and microhabitat preferences cannot be determined from vegetation community mapping; thus, a qualitative assessment of habitat availability was conducted in the RSA for this species. CNL has recorded 11 occurrence records for this species within the RSA, most of which were found within buildings at the CRL site. No sightings of eastern milkshakes were recorded at the proposed NSDF Project site, and no road mortalities have been documented within the CRL site. However, the CRL main campus, where the majority of observation records occur, borders the LSA to the north, suggesting eastern milkshakes may use habitat near or within the proposed NSDF Project site.

Proponent's assessment of environmental effects, mitigation, and monitoring

NSDF Project activities may adversely affect the eastern milksnake through loss of suitable habitat, potential avoidance due to sensory disturbance in the LSA, and an increased risk of injury and mortality on roads. CNL has proposed mitigation measures to reduce effects of NSDF Project activities on the eastern milksnake. These measures are listed in CNL's Commitment List and include:

- exclusion fencing will be installed and maintained around the NSDF footprint
- drivers will be given standard safety and environmental awareness training
- signs warning drivers of high-use wildlife areas will be installed and speed limits may be reduced in these areas
- eastern milksnake collisions and sightings will be reported and monitored, which will provide feedback for adaptive management

Proposed follow-up measures and monitoring, as listed in CNL's commitments report, include:

- annual inspection of exclusion fencing for integrity during the construction and operations phases and closure
- road mortality surveys to be conducted weekly during pre-construction and operation phases within the NSDF Project site. During construction phase, mortality survey to be conducted daily during the species active period (April 15 to September 30)

Monarch butterfly

Description of existing environment

Monarch butterflies (*Danaus plexippus*) require habitat with milkweed to ensure there are caterpillars and wildflowers, which supply a nectar source for adult monarch butterflies. Caterpillars feed solely on milkweed and as such, monarch butterflies can be found in environments where milkweed grows naturally, such as meadows, wetlands, prairies, and

roadsides, and in urban areas where milkweed is planted. The monarch butterfly is listed as a species of special concern under the SARA and is considered endangered by COSEWIC.

CNL used vegetation community data to map suitable summer breeding habitat for monarch butterflies within the LSAs and RSAs based on the likelihood of each vegetation community type to support milkweed plants. The following vegetation community types were identified as suitable monarch butterfly habitat:

- pre-sapling forest of any type
- wetland
- flooded area
- 30 metre buffer around aquatic habitats, including lakes and rivers
- cleared land beneath transmission lines
- 5 metre buffer around roads

No monarch butterflies have been observed within the LSA, but a total of 80 hectares of suitable habitat for the species is estimated to be present in the LSA.

Proponent's assessment of environmental effects, mitigation, and monitoring

CNL has proposed mitigation measures to reduce effects of NSDF Project activities on the monarch butterfly. These measures are listed in CNL's Commitment List and include:

- a 30 metre buffer around wetlands within the LSA
- vegetation clearing scheduled between May and October will require a search of the habitat prior to construction for the presence of milkweed. Removal of milkweed will be managed in accordance with CNL's environmental protection program

Views expressed

The AOO expressed concerns about potential impacts and the need for a conservative approach to identify and protect species at risk and their habitat near the Project. The AOPFN expressed concerns about the effects of the Project on habitat loss for species at risk present in the LSA through the direct removal of mixed wood forest. AOPFN and the KZA First Nation expressed concerns with the effects of the project on the Blanding's Turtle population, health and habitat. AOPFN is concerned about the potential for Blanding's Turtles to be impacted by increased traffic through Blanding's Turtle habitat, invasive reed species and changes to water management in wetlands, and expressed uncertainty about the effectiveness of the proposed mitigation measures to ensure no-net loss-of critical Blanding's Turtle habitat.

CNL stated that mitigation and follow-up measures would be implemented to mitigate effects on species at risk habitat loss, including installing a treeline buffer from all property lines on the NSDF site, installing artificial nesting habitat for SARA listed bats, implementing a Species at Risk monitoring program and implementing a Blanding's Turtle Road Mortality Mitigation Plan, which includes offsets to the loss of critical habitat that will be more effective for the CRL site conditions (i.e., increasing habitat connectivity and providing adequate nest mounds). CNL is also committed to offsetting the NSDF Project-related loss of forested area and habitat with a CRL-site wide SFMP, which will contribute to no net loss of habitat by the NSDF Project. CNL has committed to engaging Indigenous Nations and communities and stakeholders on the

development of the SFMP, including considering support for commensurate offsets at off-site locations identified by Indigenous Nations and communities. CNL is also committed to engaging with Indigenous Nations and communities to develop additional mitigation measures to include within the NSDF Project Environmental Protection Plan. CNL will also engage interested Indigenous Nations and communities in the NSDF EAFMP, which includes monitoring the implementation of mitigation measures specific to the protection of species at risk.

Members of the public expressed concerns regarding destruction of critical or high-quality habitat for both the Blanding's turtle and bats within the CRL site, and the lack of detailed mitigation measures provided in the EIS for endangered species. CNL indicated that further studies have been conducted on the potential impacts to bats and Blanding's turtle from the construction and operation of the Project and additional mitigation measures identified. CNL indicated that with the implementation of these additional mitigation measures, which include a Blanding's Turtle Road Mortality Mitigation Plan and tracking individuals from select bat species to locate, monitor, and protect roosts, residual effects on bats and Blanding's turtle were assessed to be not significant.

ECCC expressed concerns regarding potential effects to maternity roosting habitat for bats. CNL indicated that additional baseline studies were being carried out which provides details on baseline survey methods and results for bats and bat habitat will be followed to ensure protection of roosting habitat and beyond. CNL also indicated that this information will be used in the development of a SFMP at the CRL site.

ECCC expressed concerns regarding effects to the protection of Blanding's turtle nesting habitat as well as CNL's monitoring and follow-up plan for Blanding's turtle and requested that CNL include more detail including frequency of surveys to be conducted, and habitat creation plan considerations. CNL committed to reducing turtle road mortality through implementation of a Blanding's Turtle Road Mortality Mitigation Plan which will include monitoring and adaptive management to ensure a net neutral or positive effect on the Blanding's Turtle population at the site. CNL also committed to developing nesting habitat on the CRL site by building artificial nesting mounds at 8 culverts on site, and weekly monitoring to capture use and nesting behaviors.

ECCC expressed concerns regarding potential effects of the proposed NSDF Project on habitat used by the eastern milksnake for hibernation, including habitat destruction through vegetation clearing and grubbing. CNL revised the EIS to include all potential impacts of the proposed NSDF Project to species of special concern, including the eastern milksnake, and conducted a residual effects assessment. CNL committed to leaving the wetlands surrounding the SSA undisturbed, as they may provide habitat and migration corridors for the eastern milksnake, and committed to implementing a *Blanding's Turtle Road Mortality Mitigation Plan*, which will benefit the eastern milksnake as individuals have been observed near roads on the CRL main campus. In addition, reptile exclusion fencing will be installed according to provincial guidelines to prevent snakes, including the eastern milksnake, from entering the site prior to site clearing and during operation.

ECCC expressed concerns regarding potential effects of the proposed NSDF Project on patches of milkweed plants, which are essential for monarch butterflies. CNL revised the EIS to include all potential impacts of the proposed NSDF Project to species of special concern, including the monarch butterfly, and conducted a residual effects assessment. CNL committed to searching open habitat for the presence of milkweed in advance of construction for the proposed NSDF

Project. Areas of the footprint that are found to contain milkweed would be cleared outside of late May to October, to avoid potential effects to monarch butterflies.

CNSC staff analysis and findings

CNSC staff have determined that the measures CNL would implement to mitigate the potential effects of NSDF Project activities on SARA-listed bat species are consistent with proposed recovery strategies for the identified federal species at risk. As discussed in section 7.2 in relation to migratory birds, and also applied to SARA-listed bat species, the avoidance of nesting periods and maternity roosting during vegetation clearing would reduce adverse effects on species at risk.

CNSC staff have assessed the potential impacts to the Blanding's turtles, eastern milksnake, and monarch butterfly (and their respective critical habitats where applicable), including habitat loss and alteration. The majority of residual effects are expected to be low to moderate, due to mitigation measures proposed by CNL, while additional monitoring and adaptive management will help protect and conserve the SARA species that may be affected by habitat loss and/or fragmentation due to the NSDF Project.

Taking into account input from federal departments, provincial ministries, Indigenous Nations and communities and the public, and the implementation of mitigation measures and follow-up monitoring program measures, CNSC staff have found that the NSDF Project is not likely to cause significant adverse environmental effects on the species at risk identified within the RSA.

8.2 Effects of accidents and malfunctions

Proponent's assessment of environmental effects and mitigation

There is the potential for accidents and malfunctions to occur throughout all stages of the NSDF Project, which could lead to adverse impacts on health, safety, and the surrounding environment. Potential accidents and malfunctions during pre-closure (i.e., site preparation, construction, operations, and closure) of the proposed NSDF Project and the associated health, safety, and environmental effects were identified, characterized, and evaluated by CNL through a systematic approach. This approach included hazard identification and analysis associated with design, construction, and operation of the NSDF Project, screening of hazards, and assessment of key accidents and malfunctions. During the post-closure phase, disruptive event scenarios and what-if cases were identified and their potential effects on health, safety, and the environment were assessed in the post-closure safety assessment to test the robustness of the proposed NSDF Project. Refer to section 4.4 (safety analysis) and section 3.5 (post-closure safety assessment) of the CMD for further information.

The assessment of potential accidents and malfunctions considered both radiological and non-radiological events. The radiological accidents and malfunctions considered are events that involve radioactive substances and could result in the release of radioactivity and non-radioactive substances. The dose consequences to the on-site workers and the public were assessed by comparison with the dose acceptance criteria for accidents and malfunctions, which are defined based on the frequency of the event and the regulatory limits. During the hazard identification and analysis, the radiological hazards and events are grouped into 3 categories, based on their frequency. The categories include:

1. Anticipated operational occurrences (AOOs): An upset operation event deviating from normal operation with a frequency of occurrence greater than or equal to 10^{-2} per year.

2. Design basis accidents (DBAs): Accident conditions against which the project is designed and may result in the release of radioactive materials, which include events with a frequency of occurrence equal to or greater than 10^{-5} per year, but less than 10^{-2} per year.
3. Beyond design basis accidents (BDBAs): Accidents falling outside the design envelope of the project with a frequency of occurrence of less than 10^{-5} per year.
 - Design extension conditions (DECs): A subset of BDBAs that are considered in the design process of the facility in accordance with best-estimate methodology to keep release of radioactive material within acceptable limits. DECs could include severe accident conditions.

The non-radiological accidents and malfunctions that are typical of major conventional construction projects involve only non-radiological substances and therefore have no potential for the release of radioactivity. These accidents are assessed qualitatively, and are controlled by human performance. Therefore, it is important that provisions including training, procedures, and oversight of contractors are implemented during the pre-closure phase to achieve as-low-as-reasonably possible accident and malfunction rates. For the NSDF Project, the construction conventional hazards are controlled and managed by the CNL's existing Occupational Safety and Health (OSH) Program. The conventional non-radiological hazards during operation and closure were evaluated only to the extent of determining their ability to initiate or contribute to accidents with radiological consequences; otherwise such hazards are adequately covered by CNL's OSH Program.

The key potential radiological and non-radiological accidents and malfunctions are identified based on the risk ranking and consequence severity, and their effects on human and non-human biota. The key potential radiological accidents and malfunctions assessed by CNL include exposures due to:

- radioactive sources associated with industrial radiography
- a dropped load during waste placement at the ECM and during waste water treatment at the WWTP
- internal fire at the ECM and at the WWTP
- spills and leaks of wastewater and contaminated IX resin at the WWTP

The key potential conventional accidents and malfunctions during site preparation and construction which have been assessed include leaks and spills, vehicle collisions, over blasting, malfunction of detonators used for rock blasting, particulate matter and dust generation, and an internal fire. The key potential conventional accidents and malfunctions during operations include impacts from collisions, falls, chemical spills and leaks, hazardous reactions, and a dropped load.

CNL has identified potentially major credible radiological and non-radiological accidents and malfunctions associated with the NSDF Project, and has assessed the mitigated effects of key radiological and non-radiological accidents and malfunctions. Tables 8.2 and 8.3 below outline the key potential radiological and non-radiological accidents and malfunctions and CNL's proposed mitigation measures.

Table 8.2: Key potential radiological accidents and malfunctions and proposed mitigation measures

Type of accident or malfunction	Description	Mitigation measures
Radioactive source associated with industrial radiography	Identified as a key potential accident during construction, where radiography equipment containing a radioactive source combined with human error can result in radioactive exposure. There are no linkage pathways to the public or non-human biota, as the effect is localised.	Mitigation measures proposed by CNL include proper training, administrative controls, shielding, barriers, and personal alarming dosimeters to detect radioactivity.
Dropped load	Identified as a key potential accident during operations, a dropped load could result in damage to waste packages and worker exposure to radioactivity. There is no linkage pathway to the public or non-human biota as the effects are localized with a short duration.	Mitigation measures proposed by CNL include personal protective equipment and clothing, preventative maintenance of equipment and vehicles, barriers, and personal alarming dosimeters.
Internal fire	Internal fires at the ECM could be initiated by wildland fire, lightning, vehicle fire, or equipment electrical failures. Internal fires at the WWTP could be initiated due to flammable gas release, spontaneous combustion, vehicle fire, or electrical fire. There is a secondary pathway for impact on air quality, which can affect human and non-human biota. The frequency of these events is expected to be rare and health effects are considered by CNL to be negligible or minor to the public, workers, and the environment.	Proposed mitigation measures include adequate equipment maintenance, portable fire extinguishers, WWTP fire detection systems, CRL fire department, and a water pump station at the NSDF Project site.
Contamination at WWTP	Contamination at the WWTP could be caused by contaminated equipment or contamination during sampling of the process tank at the WWTP. There is no linkage pathway to the public or non-human biota, as the effects would be localised and contained.	Proposed mitigation measures include personal protective equipment and clothing, chemical showers and eye wash stations, and spill kits.

Type of accident or malfunction	Description	Mitigation measures
Spills and leaks of wastewater at WWTP	Spills and leaks of wastewater could be caused by mechanical failures of the WWTP tanks, piping, or valves. There is no linkage pathway to the public or non-human biota as effects are localized and would be contained.	The proposed mitigation measures include secondary containment, leak detection, active drain systems, and personal protective equipment and clothing.
Spills and leaks of contamination IX resin at WWTP	Spills and leaks of contamination IX resin at the WWTP may occur during the replacement or transfer of spent resins. There is no linkage pathway to the public or non-human biota	Proposed mitigation measures include secondary containment, leak detection, active drains systems, spill kits, and personal protective equipment and clothing.

Table 8.3: Key potential non-radiological accidents and malfunctions and proposed mitigation measures

Type of accident or malfunction	Description	Mitigation measures
Leaks and spills	Leaks and spills consider fuel spills from heavy equipment or failure of hydraulic oil hose during construction. CNL claims the result of such a leak or spill will result in a localized effect that is easily remediated. The potential health effect to workers is negligible and there is no linkage pathway to the public. Potential effects on surface water quality and terrestrial environment due to leaks and spills are assessed to be negligible after implementation of identified mitigation measures.	Proposed mitigation measures include secondary containment for heavy equipment fueling, spill kits, vehicle maintenance, and refueling away from surface water features
Overblasting	Overblasting during excavation could result in excess noise and vibration and damage from rock flying beyond defined boundaries. The potential health effects are moderate for workers and negligible for the public and the environment. Noise and vibration effects from uncontrolled explosions would be short in duration.	Proposed mitigation measures include blasting plans, barriers, defined safety limits, and a 30 metre buffer along all identified wetlands near the ECM.

Type of accident or malfunction	Description	Mitigation measures
Internal fire	A fire may occur as a result of an accident associated with the NSDF Project construction, including equipment malfunction or human error. There is no linkage pathway to the public or non-human biota. The potential release to the environment is negligible due to short duration.	Proposed mitigation measures include fire extinguishers in vehicles and engine compartment fire suppression systems on heavy equipment.
Malfunction of detonators	CNL has also assessed potential malfunctions of detonators, in response to information requests submitted by CNSC staff. Detonator malfunction could occur due to manufacture defect, a pinch or tear in the shock tube, and damage of the shock tube or leg wire during loading operations. Potential health effects to workers and environmental effects are considered negligible after implementing mitigation measures.	Proposed mitigation measures include a blasting plan, blasting safety plans, blasting system notification, visual inspections, barriers for access restrictions, blasting mats, testing of the electronic detonators and circuits, and immediate blasting using the redundant secondary detonator in the event of a primary detonator malfunction.
Particulate matter and dust generation	Particulate matter and dust is expected to be generated during the site preparation and construction activities. The potential effects to worker health and the environment are negligible as the effects are localized.	Proposed mitigation measures include DMP and water spraying or misting.
Vehicle collision	Vehicle collision during construction and operation may result in potential worker injury or mortality, and a leak of fuel from damaged vehicles. The potential fuel leak may cause measurable effects to the environment. There is no linkage pathway to the public.	Proposed mitigation measures include speed restrictions, use of seatbelts, and vehicle design.
Fall	Potentially hazardous falls include scenarios where workers fall into contact water or non-contact water ponds at the ECM, resulting in worker injury. The potential health effects of this accident to on-site workers are minor and there is no linkage pathway to the public or non-human biota.	Proposed mitigation measures include raised berms of the contact water containment, spotters, barriers, and personal protective equipment and clothing.
Chemical spills and leaks	Chemical leaks and spills consider scenarios where chemical drums are dropped due to human error in the WWTP chemical	Proposed mitigation measures include personal protective equipment and clothing, secondary containment, spill kit,

Type of accident or malfunction	Description	Mitigation measures
	storage area, resulting in loss of containment, spill, and the worker being splashed. The potential effects of this accident to on-site workers is minor and there is no linkage pathway to the public or non-human biota.	chemical showers, eye wash stations, spotters, and high-level alarms on chemical feed tanks to signal overflow.
Hazardous reaction	Incorrect chemical mixing, wrong chemical addition or sequence, and wrong chemical addition at the WWTP could result in adverse chemical reactions. This accident could result in worker injury, however the potential health effects to on-site workers are negligible. There are no linkage pathways to the public or non-human biota.	Proposed mitigation measures include chemical addition system interlocks, secondary containment, personal protective clothing and equipment, two separate rooms for acidic and caustic chemicals, and hydrogen sulphide monitors.
Dropped load	Dropped loads could be caused by human error or mechanical failure. This accident could result in worker injury and the potential health effects to on-site workers are moderate. There is no linkage pathway to the public or non-human biota.	Proposed mitigation measures include spotters, equipment maintenance and inspections, barriers, and lines of fire awareness.

Views expressed

The AOO, the AOPFN and the MNO, raised concerns about potential accidents, leaks and spills from the NSDF site releasing radiological and non-radiological contaminants and impacting the integrity of the surrounding environment and waterbodies. CNL stated that there is no linkage pathway to people or non-human biota as effects are localized (on-site) and would be contained. CNSC staff concur that the residual effects to the public and the environment resulting from the accidents and malfunctions at the ECM and the WWTP are negligible.

The MNO signaled a lack of clarity with respect to radiological dose estimates in the assessment of accidents and malfunctions. The CNSC verified and confirmed that CNL's dose acceptance criteria, the methodology for the assessment of radiological consequences, and the calculated dose rate to both on-site and off-site workers are adequate.

The AOO and AOPFN expressed concern about ensuring that trigger values for radiation doses in receiving environments are highly conservative and that frequent monitoring is in place to continually and conclusively demonstrate that contamination is not occurring. CNL indicated it is committed to collaborating with interested Indigenous Nations and communities on monitoring programs and follow-up measures, including in identifying adaptive management triggers/thresholds to inform the NSDF EAFMP. CNL also stated that secondary containment, leak detection and active drain system measures would be implemented to mitigate potential spills and leaks. The AOO also raised concerns about CNL's level of accident and emergency preparedness. CNL also indicated that the emergency preparedness program would be implemented if an accident or malfunction situation occurs.

The AOO and the MNO also raised concern about ensuring that land users in the region are notified as quickly and effectively as possible with transparent information in the event of an accident and malfunction. CNL indicated it is committed to collaborating with interested Indigenous Nations and communities on monitoring programs and follow-up measures for accidents and malfunctions.

Members of the public expressed concerns regarding the potential for accidents and malfunctions at the Project site releasing radiological and non-radiological contaminants into the surrounding environment and waterbodies, including from transportation accidents. CNL confirmed that for on-site potential accident or malfunctions, there is no linkage pathway to the public or non-human biota and any releases would be contained. CNL also indicated that they have been transporting radioactive materials for over 70 years with no incidences and maintains a Transportation Program to ensure all shipments of waste are carried out in accordance with all federal regulatory requirements and industry best practices. Additional concerns were expressed regarding whether CNL's Emergency Protection Plan would be sufficient to prevent any spills or leakages into the surrounding environment. CNL confirmed that the potential for leaks or spills due to an accident or malfunction is assessed in the final EIS and that CNL's Emergency Preparedness Program and Fire Protection Program outline effective responses by CNL staff to various situations, including spills or leaks.

CNSC staff analysis and findings

In the review of the draft EIS, CNSC staff assessed CNL's approach for hazard identification and analysis and found the approach to be systematic and adequate. CNSC staff requested that CNL consider the malfunction of detonators used for blasting as a potential conventional occupational hazard and to assess its impacts on workers safety and the environment. CNSC staff suggested that CNL develop procedures in the Blasting Plan to adequately address the malfunction of

detonators for rock blasting. In response to CNSC's request, CNL carried out this assessment of potential malfunctions of detonators, and updated the EIS accordingly to include this information, including any new mitigation proposed for this potential effect.

CNSC staff have assessed CNL's assessment regarding potential accidents and malfunctions for the NSDF Project in accordance with the CNSC Generic Guidelines and REGDOC-2.9.1, and found the dose acceptance criteria, the methodology for the assessment of radiological consequences, and the calculated dose rate to both on-site and off-site workers to be adequate. CNSC staff verified calculations presented in the NSDF Safety Analysis Report for radiological accidents and malfunctions, and that input data were traceable to their original source. This was accomplished by assessing the choice of parameters based on the review of the references from which they were taken, and by ascertaining whether they are current, based on scientific research, and representative of the accident or malfunction scenario under assessment. CNSC staff found that the proponents conclusions of the radiological accidents and malfunctions assessment are credible, and the sources of data selected as a basis for the calculations of doses to persons on-site and off-site are traceable and credible.

CNSC staff found the identification and assessment of key accidents and malfunctions at the ECM and the WWTP, and the proposed mitigation measures, to be adequate. The consequences of each accident and malfunction assessed were found to meet the relevant acceptance criteria. Taking into account the assessment of exposure pathways, appropriate mitigation measures in place, short duration of accidents, and the fact that potential adverse effects are localized (on-site) and would be contained, CNSC staff have found that the residual effects to the public and the environment resulting from the accidents and malfunctions at the ECM and the WWTP are negligible.

Potential conventional accidents and malfunctions were identified through consideration of past industry construction and/or operation experience of typical construction projects to the specific features of the proposed NSDF. The effects and consequences of the key conventional accidents are assessed in more details. Given the awareness of the roles of human factors in these accidents and malfunctions, provisions including training, procedures, and mitigations will be put in place by CNL to achieve as-low-as-reasonably-possible accident and malfunction rates. The mitigation measures identified for conventional accidents include administrative controls, design mitigation and controls. The emergency preparedness program will be in place to address requirements for immediate response and post-event clean-up or remediation if an accident or malfunction situation occurs. The CNSC considers the mitigation measures and the emergency preparedness program are adequate to reduce accident rates, and to prevent and minimize their effects.

CNSC staff have found that potential accidents and malfunctions associated with the NSDF Project are not likely to cause significant adverse environmental effects on human health and the environment, taking into account the implementation of mitigation measures and emergency response procedures and input from federal departments, provincial ministries, Indigenous Nations and communities and the public.

8.3 Effects of the environment on the project

Pursuant to section 19(1) (h) of CEAA 2012, the EA of a designated Project must take into account any change to the Project that may be caused by the environment, including extreme and periodic weather events. These factors may damage project components and increase the potential for accidents and malfunctions (section 8.2).

Proponent's assessment of environmental effects and mitigation

CNL used a systematic approach to identify and categorize the major natural external hazards and initiating events associated with the design and operation of the proposed NSDF Project. Models and scenarios were developed to examine the features, events and processes that could affect the long-term performance and safety of the NSDF Project, including major external events. CNL identified the following major environmental factors, potentially impacted project components, and the corresponding design features of the NSDF to mitigate any effects on the Project and where applicable, proposed mitigation measures (table 8.4). CNL also proposes to implement procedures that address requirements for immediate response and post-event remediation if extreme environmental events occur.

Table 8.4: Potential effects of the environment on NSDF Project components

Environmental factor	Affected project component	NSDF design features and where applicable, proposed mitigation measures
Extreme rain, Snowmelt events	Surface water management ponds	Extreme rainfall and snowmelt events, and the subsequent potential for flooding, are considered in the design for the surface water management ponds. The current design considers climate change over 500 years and reflects the overall storage required to control flows for the 2-year through to the 100-year rainfall events at the site. The design also contains the storage required for sediment control during construction and water quality control during operations. The current design footprints for the surface water management ponds typically assume a maximum 100-year operating water level at 3 metres depth and 1 metre of freeboard, which includes allowance for climate change effects, rain, and snowmelt. In the event that water levels suggest there is a possibility of contact water ponds overflowing and mixing with non-contact water in the ECM, the non-contact water pumps would be shut off or flows diverted back into the ECM until all of the contained water can be treated by the WWTP. Major system flow routes follow the road system and ditches to the relevant surface water management pond.
	ECM and berm	Extreme rainfall and snowmelt events could affect roads and cause failure of natural or engineered slopes (e.g., berms). Designed berms consist of 3 main geotechnical elements or layers, each contributing to the soundness and integrity of the berm itself and the whole ECM.
	ECM and final cover system	The final cover system is designed to limit water infiltration, to direct infiltration and surface water runoff away from the ECM waste placement area, and to resist degradation by surface geologic processes and biotic activity. A series of drainage control features will be installed in conjunction with the placement of the final cover system over the ECM. The topographical slopes within the ECM footprint are sufficient to promote drainage, and by lining the ECM surface water collection ditches and stilling basins with riprap and other erosion control measures, sediment transport will be minimized. Meteorological records will be reviewed annually to confirm that the final cover system performance is not overloaded in any post-closure year.
River flooding	ECM and berm	Flooding of the Ottawa River, as well as nearby creeks and wetlands, has been taken into consideration in the siting for the proposed NSDF Project. The base of the NSDF is located approximately 163 metres above sea level, which is approximately 50 metres above the current water levels of the Ottawa River, situating it well outside any possible flood plains. Other design features provide additional mitigation to flooding, including the topographical slopes of the ECM.

Environmental factor	Affected project component	NSDF design features and where applicable, proposed mitigation measures
Seismic activity	ECM, berm, WWTP, and other infrastructures	Significant seismic events and the potential for damage to the safety features is considered in the design of the NSDF Project infrastructure. The WWTP and other infrastructure are required to be functional for the operation period, which is anticipated to last less than 50 years. They are designed to withstand an earthquake with an annual probability of 1:2475. The ECM has a design life of 550 years and is expected to retain its containment function into the post-closure period. The ECM is designed to retain its containment under a strong earthquake with an annual probability of 1:10000. However, seismic analysis of the ECM has shown that the sandy soil below the ECM footprint could potentially liquefy under a 1:10000 earthquake. As a mitigation measure, CNL has proposed to remove the sandy soil under the berms down to the bedrock and replace it with compacted backfill. During the pre-closure period, any damage to the ECM due to seismic activity will be responded to. During the post-closure period, the impact to human health and the environment from a beyond-design basis earthquake is shown to meet acceptable criteria under several scenarios, which consider failure of the berm and a series of landslides.
High winds	Final cover system	The ECM is designed to minimize erosion caused by high winds. Consequences of erosion in scenarios considered by CNL are within the dose acceptance criteria.
Extreme temperatures	ECM, Final cover system, Liner	The proposed NSDF Project has been designed to include a layer of clean fill on the floor of the ECM to prevent freezing of the base liner systems prior to waste placement. The geomembrane liner components of the sideslope lining system will not be adversely affected by freeze-thaw cycles. The final cover system will be installed to its full thickness progressively as areas of the ECM reach the final waste contours. The final cover system design would have 1.75 metres of granular soil materials above the lining system, which is sufficient to prevent freezing of the final cover system liner components.
	Remediation	Grading of the site will be designed taking into consideration the potential for future extreme weather events. Changes to temperature and precipitation may affect the vegetation used in remediation of the site and will be considered in the closure and post-closure planning. The vegetated top of the final cover system will be designed to withstand erosion and gully initiations, and will be limited to grass species that are drought resistant. Treatments will also be applied to keep grass and soil free of pests and pathogens or disease. Changes to climate can be addressed through adaptive management plans that consider projected changes in climate relevant to the local vegetation.
Forest fires	Surface facilities	The potential for a forest fire to affect the NSDF Project is limited, as the fire would have to cross the minimum distance between the NSDF Project and the forest edge. The Fire Protection

Environmental factor	Affected project component	NSDF design features and where applicable, proposed mitigation measures
		<p>Program provides services to the CRL site, including developing fire prevention processes and conducting fire safety inspections. Fire hazard analyses, code compliance reviews, and fire protection screenings are also conducted as part of the program. Consequences of a fire, such as a power outage, are encompassed by CNL's Emergency Preparedness Program. In addition, as part of the Safety Analysis Report, an assessment of the consequences of a fire during the operations phase at the NSDF Project site was completed. A scenario was developed to evaluate the effects of 800 m³ of bulk waste and packaged waste burning in a temporary staging area for 1 hour. The evaluation concluded radiological doses to workers and members of the public are below regulatory limits and meet safety objectives for the NSDF Project.</p>
Climate change	ECM and Final cover system	<p>Changes to the global and regional climate could affect the proposed NSDF Project during the 50-year operational phase and into the long-term closure phase and beyond. CNL has conducted an effects assessment of climate change following the guidance provided by the Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment. Climate change may result in shifts in the frequency and/or intensity of extreme weather events and forest fires. The NSDF Project design features and all mitigation measures also take into consideration the potential effects of climate change. Moreover, the normal evolution scenario also considered the evolution of the environment over time due to climate change.</p> <p>The effects of climate change are typically measured over long periods of time, with the potential for climate change effects increasing as the period over which they are measured increases. During the post-closure phase, monitoring will be incorporated into the final closure plan to help identify any potential future climate change effects beyond what has been considered in the assessment. This would include evaluating long-term monitoring results, documented changes in the local climate and up-to-date climate predictions.</p>
Glaciation	ECM and Final cover system	<p>Glaciation was not assessed, as the next predicted glaciation event may not occur until 100,000 years into the future, beyond the hazardous lifetime of the NSDF inventory. The NSDF Project incorporates design features to minimize its effect on the environment during facility operation, as well as effects of the environment on the NSDF Project.</p>

Views expressed

The AANTC raised concerns about the inability of CNL to consider potential consequences of extreme weather events such as climate instability, earthquakes, and other yet unknown disrupting factors that defy premature predictions, especially over the very long term. The MNO also raised concerns about effects of the environment on the project including seismic events as well as climate change, in particular rainfall events, which have a recurrence interval of 100 years. Potential impacts of extreme weather events have been considered by CNL and taken into consideration in the design features.

The MNO also expressed concern about ensuring they are made aware of the contingencies and associated plans or measures that CNL has developed throughout the project lifecycle. CNL has indicated that they will continue to provide Indigenous Nations and communities with requested documents, including being committed to obtaining review and input on the EAFMP.

Members of the public expressed concerns relating to the ECM and WWTP's ability to withstand extreme weather events, including extreme winds and rainfall, earthquakes, tornadoes and seismic events. Concerns were expressed about CNL's long-term ability to limit the amount of run-off so that the WWTP is not overwhelmed during an extreme storm event and CNL's consideration of climate change impacts on the facility during and following the institutional control period of 300 years. CNL indicated that the ECM, WWTP and other NSDF structures are designed to meet extreme environmental conditions and comply with all relevant federal and provincial regulations, standards, and codes, including industry best practice. CNL also indicated that the maximum flow rate of the WWTP is designed based on two back-to-back 24-hour, 100-year extreme rain events and that the risk of seasonal flooding and dam failure scenarios has been assessed and included in the final EIS. Potential impacts to the NSDF site from seismic events have also been assessed by CNL and taken into consideration for the site design.

In their review of the draft EIS, NRCAN requested that CNL provide additional information regarding the lower probability calculations used in their seismic analysis. CNL responded to NRCAN confirming that the seismic design analysis for the project has been updated to utilize a more conservative and safer design. NRCAN also requested that CNL update their EIS to clearly identify how the NSDF would retain its integrity after a strong earthquake shaking and to provide contingency plan details. CNL provided additional information and confirmed contingency measures that would be in place in the event of a leak in the ECM liner following an earthquake as well as updated sections of the EIS to include additional information regarding the Leak Detection System that will be part of the ECM and its role in monitoring and early detection of potential leakage of leachate through the liner, that if found, would be redirected to the WWTP.

CNSC staff analysis and findings

CNSC staff have reviewed information on potential effects of the environment on the NSDF Project as reported in the EIS, together with supporting documents on hydrological, climatological, meteorological information and climate change assessment, geotechnical site information, stability and seismic analyses, and post-closure safety assessments. Taking into account input from federal departments, provincial ministries, Indigenous Nations and communities and the public, and the implementation of design features and mitigation measures, CNSC staff is satisfied that the proponent has adequately considered the effects of the environment on the Project and that the proposed preventive measures, mitigation measures and

response measures are appropriate to account for the potential effects of the environment on the Project

8.4 Cumulative environmental effects

The proposed NSDF Project could cause cumulative effects, in combination with the environmental effects of past, existing and reasonably foreseeable projects or activities, on the following VCs (only includes the VCs where cumulative effects from the reasonably foreseeable developments (RFDs) have been identified):

- air quality
- surface water quality
- Blanding's turtle

CNL's cumulative effects assessment evaluated the contribution of effects from the NSDF Project in combination with previous, existing, and RFDs or activities in the region that may overlap spatially (i.e., in the same geographic area) and temporally (i.e., over time) (table 8.5). RFDs can be defined as activities in the region that have not yet been approved, developments and activities that are currently under application review, or that have officially entered a regulatory application process.

CNL's cumulative effects assessment considered all primary pathways that were likely to result in detectable changes in measurements indicators and subsequent residual effects on VCs after the implementation of environmental design features and mitigation.

Table 8.5: Past, existing, and future projects included in the cumulative effects assessment

Physical activity	Distance to NSDF site	Description	Potential interaction with the NSDF Project
Historical activities and past projects			
Neighbouring historical WMAs	300 – 500 m	CRL reactor pits, chemical pit, laundry pit, and WMA A are close to designated area for NSDF Project.	Exposure to elevated radiation fields for terrestrial biota with spatial and/or temporal overlap within SSA.
Contaminated receiving environment	0 m	Significant historical radiological and non-radiological contamination within the Perch Lake watershed and wetlands, Perch Lake, and Perch Creek	Chronic exposure to aquatic and terrestrial biota from elevated historical radiological and non-radiological contamination (above Probable Effects Levels or benchmarks) in environmental media (e.g., water, sediment) within SSA
Existing and reasonably foreseeable future projects			

Physical activity	Distance to NSDF site	Description	Potential interaction with the NSDF Project
New/upgraded CRL research and development facilities	< 1 km (3 candidate sites)	Advanced Nuclear Material Research Centre, Small Modular Reactor	Emission of dust, GHG, and indicator compounds that effect air quality.
New CRL support infrastructure	500 – 1000 m	Office buildings, maintenance facility, logistics facility	Emission of dust, GHG, and indicator compounds that effect air quality.
CRL infrastructure decommissioning	500 – 1000 m	Over 100 buildings on CRL site including nuclear laboratories and conventional buildings	Emission of dust, GHG, and indicator compounds that effect air quality. Possible emission of contaminants within existing infrastructure.
CRL environmental remediation	< 1 km (multiple sites)	Remediation of affected lands and non-operating WMAs	Emission of dust, GHG, and indicator compounds that effect air quality. Possible emission of contaminants within lands being remediated. If in Perch Lake watershed, possible resuspension or release of contaminants to aquatic receiving environment.
In situ disposal of NPD reactor	28 km	The NPD Closure Project (in situ disposal of the NPD waste facility in Rolphton, Ontario)	No residual adverse effects identified as a result of the NPD Project.
Construction of new infrastructure at Garrison Petawawa	10 km	Construction of new facility for the Canadian Dragoons (e.g., renovation of 3 existing buildings, and the replacement of 8 obsolete buildings with a single, centralized 9900 m ³ facility	Emission of dust, GHG, and indicator compounds that effect air quality.

Views expressed

The AANTC, the AOO and the AOPFN, raised concerns about cumulative effects of the NSDF Project on the surrounding environment (e.g., land, air, water, wildlife and wildlife habitat) and traditional land use activities, and the interactions of these potential effects with impacts from historical, current and future activities and impacts on the Chalk River Site. AOPFN also expressed concerns about these potential cumulative effects impacting their use of surrounding lands and resources (e.g., for cultural purposes, to fish, trap and hunt). AOPFN identified further

concerns about the importance of considering the ecological and historic context within which cumulative effects occur, particularly for determining pre-development baseline conditions and assessing NSDF Project effects on VCs. CNL assessed potential cumulative effects to the atmospheric environment, surface water and Blanding's Turtle and stated that residual effects were determined to not be significant. CNL indicated that mitigation and follow-up monitoring program measures would be implemented and that they are committed to collaborating with interested Indigenous Nations and communities on these programs and initiatives moving forward, including the NSDF EAFMP and considering additional mitigation measures to include within the NSDF Project Environmental Protection Plan. CNL also stated that if the NSDF Project follow-up monitoring program identifies a residual effect not predicted or anticipated by the EIS, the cumulative effects of the NSDF Project would be re-evaluated.

Members of the public expressed concerns regarding potential long-term cumulative effects of the NSDF Project on the surrounding terrestrial environment and bodies of water, including drinking water. CNL indicated that the Environmental Protection Plan maintains an effluent and environmental monitoring program which samples more than 400 locations each year throughout the CRL site, which includes all releases to the Ottawa River (including from groundwater plumes and outfalls). CNL also indicated that water is monitored at multiple locations in the Ottawa River both upstream and downstream of the CRL site, and monitoring will continue throughout all phases of the Project lifecycle.

8.4.1 Air quality

Proponent's assessment of environmental effects and mitigation

Site revitalization, remediation, construction, and decommissioning activities at CRL, along with construction at Garrison Petawawa, will generate GHG, air and dust emissions such as CO, oxides of sulphur (SO_x, including SO₂), oxides of nitrogen (NO_x, including NO₂), particulate matter (PM_{2.5}, PM₁₀) and suspended particulate matter (SPM).

Mitigation measures proposed by CNL include limiting activities required and staging over a longer term, implementing procedures and practices for dust management, and limiting idling of vehicles. With mitigation measures in place, the residual effects to air quality are emissions of GHGs, dust and indicator compounds from vehicle and equipment use, and emissions of GHGs and indicator compounds from waste decomposition. These residual cumulative effects were determined by CNL to be non-significant.

The follow-up monitoring program measures for air quality includes the implementation of CNL's management and monitoring of emission procedure for operational control and air verification monitoring, which is intended to verify effects predictions, confirm effectiveness of mitigation, provide information for use in adaptive management, and demonstrate compliance with regulatory requirements.

CNSC staff analysis and findings

CNSC staff have found that cumulative effects on air quality are expected to be negligible in magnitude. CNSC staff found that CNL's identification of cumulative effects on air quality, proposed mitigation, and proposed follow-up monitoring program measures were comprehensive (e.g. procedures for operational control and monitoring, practices for dust management) and adequate to address potential cumulative effects on air quality. Taking into account the project's effects, the effects of other projects, views expressed by federal departments, Indigenous Nations

and communities and the public, and the proposed mitigation and follow-up monitoring program measures, CNSC staff have found that the NSDF Project is not likely to cause significant adverse cumulative effects on air quality. Follow-up monitoring will consider cumulative effects and will be used to confirm predictions and ensure the environment remains protected.

8.4.2 Surface water quality

Proponent's assessment of environmental effects and mitigation

The East Swamp wetland, Perch Lake watershed, Perch Lake, and Perch Creek have existing contamination associated with shallow subsurface plumes from the WMA A and liquid dispersal area (i.e.: Chemical Pit and Reactor Pit 1 and 2). In addition to this contamination from past operations, the NSDF Project will discharge treated effluent to East Swamp stream and Perch Lake. New infrastructure and facilities will generally be located within existing disturbed areas at the CRL site, where existing erosion and sediment control practices and surface water management systems are already in place, ensuring surface water quality remains within federal regulatory standards.

Mitigation measures proposed by CNL include the installation of an exfiltration gallery, to promote the movement of treated effluent into the local groundwater system, and a submerged diffuser for dilution of treated effluent discharged to Perch Lake. Surface water management ponds will be used to address erosion and sediment control concerns during the construction of the ECM.

CNL determined that there are no measurable residual effects from the NSDF Project concerning effluent discharge to East Swamp or Perch Lake, but there are possible existing effects owing to contamination from past operations in the receiving environment. The follow-up monitoring program for the surface water environment includes operational monitoring and enhances environmental monitoring (e.g., water level and surface water flows) to confirm that the ecological function and structure of the wetland system is maintained.

CNSC staff analysis and findings

CNSC staff have found that cumulative effects on surface water quality are expected to be negligible in magnitude. CNSC staff found that CNL's identification of cumulative effects on surface water quality, proposed mitigation, and proposed follow-up monitoring program measures were comprehensive and determined that they are adequate to address potential cumulative effects on surface water quality. Taking into account the project's effects, the effects of other projects, views expressed by federal departments, Indigenous Nations and communities and the public, and the proposed mitigation and follow-up monitoring program measures, CNSC staff have found that the NSDF Project is not likely to cause significant adverse cumulative effects on surface water quality. Follow-up monitoring will consider cumulative effects and will be used to confirm predictions and ensure the environment remains protected.

8.4.3 Blanding's turtle

Proponent's assessment of environmental effects and mitigation

The Blanding's turtle congregates in waterbodies and wetlands throughout the RSA and LSAs, including the wetland habitats that surround the proposed NSDF Project SSA. The projected increase in activities within the CRL site, including new research and development facilities, the

construction and operation of a small modular reactor, and new support infrastructure, is projected to further alter the habitat in the RSA.

Potential impacts to Blanding's turtles and their critical habitat due to cumulative effects include increasingly fragmented populations from extensive road networks and habitat degradation from development and alteration of wetlands. However, CNL predicts that the implementation of mitigation and monitoring measures will be sufficient to limit and offset mortality from previous and existing anthropogenic activities within the RSA. Thus, CNL has stated that residual cumulative effects to the Blanding's turtle are determined to be non-significant.

Mitigation measures proposed by CNL include habitat mapping of all CNL observation records for the Blanding's turtle, identifying all permanent and seasonal wetlands within a 2 km buffer around the observation records, and applying a 240 metre buffer to all those aquatic and wetland features to incorporate suitable terrestrial habitat into the critical habitat mapping. Reptile exclusion fencing will be installed to reduce road kill mortality. To mitigate potential effects associated with critical habitat loss, CNL will also create new nesting mounds on both sides of Priority 2 culverts after they are replaced, as well as install fencing to guide turtles through tunnels and plant native vegetation around culvert entrances.

The follow-up monitoring program for the Blanding's turtle will include an annual assessment of critical habitat, along with reporting any incidences of road kill, exclusion fencing inspections, inspections of culverts for barriers to movement, and time-lapse cameras at culvert entrances to record movement. Nest mounds will be monitored and maintained weekly during nesting seasons and after periods of rain.

CNSC staff analysis and findings

CNSC staff have found that cumulative effects on Blanding Turtles are expected to be negligible in magnitude. CNSC staff assessed CNL's identification of cumulative effects on Blanding Turtles, proposed mitigation, and proposed follow-up monitoring program measures and determined that they are adequate to address potential cumulative effects on the Blanding's turtle. Taking into account the project's effects, the effects of other projects, views expressed by federal departments, Indigenous Nations and communities and the public, and the proposed mitigation and follow-up monitoring program measures, CNSC staff have found that the NSDF Project is not likely to cause significant adverse cumulative effects on the Blanding's turtle.

9.0 Indigenous consultation and assessment of impacts to Indigenous and/or Treaty rights

The common law duty to consult with Indigenous peoples applies when the Crown contemplates actions that may adversely affect Indigenous and/or Treaty rights. The CNSC, as an Agent of the Crown recognizes the obligation to fulfill the duty to consult and ensure that it considers impacts to Indigenous and/or Treaty rights when it makes environmental assessment decisions under CEAA 2012 and licensing decisions under the NSCA.

In order to meet the duty to consult, CNSC staff sought information from potentially impacted Indigenous Nations and communities about the nature of their Indigenous and/or Treaty rights protected under section 35 of the *Constitution Act, 1982* (Indigenous rights) and how they may be impacted by the Project. CNSC staff considered any new information arising from CNL and Indigenous Nations and communities about the potential impacts of the Project, as they emerged,

in an effort to understand the nature, scope and extent of adverse impacts on rights. In an effort to ensure interested Indigenous Nations and communities were able to present their views with respect to impacts of the Project on their Indigenous rights, CNSC staff offered opportunities to co-draft RIAs. This culminated in co-drafted RIAs for the AOO (section 9.3.2), AOPFN (appendix D) and the MNO (appendix D).

9.1 Asserted or established Indigenous and/or Treaty rights in the project area

The NSDF Project is located within the CRL site on the shores of the Ottawa River approximately 200 km northwest of Ottawa within the traditional territories of the below Indigenous Nations and communities.

Anishinabek Nation

Anishinabek Nation (AN) is a political advocacy organization that was incorporated in 1949 and represents 40 First Nations throughout Ontario and includes the AOPFN. AN is broken geographically into 4 regions, Northern Superior, Southwest, Southeast, and Lake Huron. The CRL site is located within the Southeast region.

Algonquin Anishinabeg Nation Tribal Council

The CRL site is located within the AANTC land claim area. AANTC represents 10 Indigenous communities, Conseil de la Première Nation Abitibiwinni, Kebaowek First Nation, Anicinape de Kitcisakik, KZA Nation, Nation Anishnabe du Lac Simon, Long Point First Nation (Winneway), Wahgoshig First Nation as well as, Algonquins of Pikwàkanagàn First Nation, Timiskaming First Nation, and Wolf Lake First Nation who are not official member communities of the AANTC but are affiliated Algonquin communities. Member communities that have been involved in consultation for this Project include Kebaowek First Nation and KZA. Quebec Algonquin First Nations have either individually or collectively asserted Indigenous rights and title to the Ottawa Valley area overlapping with the CRL Site.

Algonquins of Ontario

The AOO are comprised of the AOPFN, Kijicho Manito Madaouskarini (Bancroft), Bonnechere, Greater Golden Lake, Mattawa/North Bay, Ottawa, Shabot Obaadjiwan (Sharbot Lake), Snimikobi (Ardoch) and the Whitney and area. The AOO are currently negotiating a comprehensive land claim with the federal and provincial Governments as they assert Aboriginal rights and interests, including Aboriginal title that have never been extinguished, as they never signed a Treaty with the Crown. The AOO modern Treaty negotiations is one of the largest in Ontario, covering approximately 36,000 km² within the watersheds of the Ottawa and Mattawa Rivers in Ontario. The claim area covers most of eastern Ontario, including CFB Petawawa and City of Ottawa. The NSDF Project and CRL site are also located within the boundaries of the land claim. In 2016, the AOO and the Governments of Canada and Ontario signed an Agreement in Principle, which sets out the main elements of a potential settlement including transfer of provincial Crown land to AOO.

Algonquins of Pikwakanagan First Nation

The Indigenous Nation or community nearest to the proposed NSDF Project site is the AOPFN. The community of Pikwakanagan is located at Golden Lake, approximately 50 km southeast of the site. AOPFN asserts Aboriginal rights and title to lands within the broader Ottawa River and

Mattawa River watersheds in Ontario, which represents their traditional territory AOPFN provided information to CNSC staff that the CRL site is an area of importance for the practice of their Indigenous and/or Treaty rights including harvesting as well as culture. AOPFN is a member of the AOO and is the only currently recognized Indian Act band involved in the Algonquin Land Claim process.

Algonquin Nation Secretariat (ANS)

The ANS was formed in 1992 and is mandated to provide advisory services related to land and resources, policies and political development for the First Nations it represents. It represents 3 First Nations communities, Timiskaming First Nation, Wolf Lake First Nation, and the Algonquins of Barriere Lake.

Métis Nation of Ontario (MNO)

The Project is located within the MNO Region 6 (Kawartha/Ottawa River) however; MNO Region 5 (Lake Nipissing/Mattawa Métis) communities have stronger ties to the Project area. The MNO claims traditional harvesting rights in the areas surrounding the CRL site and indicated that numerous Métis Citizens represented by the MNO live, and harvest within or extensively use the area surrounding the Project.

Williams Treaties First Nations

The Williams Treaties First Nations (WTFNs) consist of HFN, Alderville First Nation, CLFN, Beausoleil First Nation, Mississaugas of Scugog Island First Nation, Chippewas of Georgina Island First Nation and Chippewas of Rama First Nation. In 2018, a settlement agreement was reached between the 7 First Nations that adhered to the Williams Treaties and Governments of Canada and Ontario. The settlement agreement formally recognizes the pre-existing Treaty harvesting rights of the Williams Treaties Signatories members to hunt, trap, fish and gather for food, social and ceremonial purposes within the portions of their traditional territories covered by Treaties No. 5, 16, 18, 20, and 27-271/4 that lie outside of Clauses 1 and 2 of the Williams Treaties. The Project and the CRL site lie outside of the lands covered by the treaties that were subject to the settlement agreement, which re-established Treaty rights to harvest, however, the CRL site is located on lands that are located within Clause 1 lands of the Williams Treaties and is an area of ongoing interest and importance to many of the WTFNs. CLFN and HFN both have directly expressed an interest in the Project.

9.2 Consultation and engagement activities with Indigenous Nations and communities

Based on CNSC staff's assessment of the Project, including information provided by Indigenous Nations and communities and CNL, CNSC staff determined that the proposed Project did require the duty to consult potentially affected Indigenous Nations and communities and communities. For the purposes of the federal environmental assessment and licensing decision, the CNSC acted as the Federal Crown Consultation Coordinator to facilitate consultation with potentially affected Indigenous Nations and communities. Indigenous Nations and communities that were engaged in the consultation process included those identified as having an interest in the Project due to the potential for the Project to adversely impact their potential or established Indigenous and/or Treaty rights.

9.2.1 Consultation led by the CNSC

In order to fulfill the Federal Crown consultation obligations for the Project, CNSC staff conducted consultation activities in an integrated manner with the EA and licensing process to the greatest extent possible. Starting in 2016 with the commencement of the federal EA for the Project, CNSC staff provided multiple opportunities throughout the EA process for dialogue and collaboration with Indigenous Nations and communities about their concerns and areas of focus through multiple phone calls, correspondence, open houses, community meetings and meetings with leadership and community representatives. CNSC staff provided regular updates to interested Indigenous Nations and communities to keep them informed of key developments and to solicit their feedback and perspectives on the Project as well as the regulatory review and consultation processes.

The CNSC also supported, through the CNSC's Participant Funding Program (PFP) the gathering of Indigenous Knowledge and Land Use information specific to the Project through multiple large-scale studies for a number of Indigenous Nations and communities, including the AOO, AOPFN and the MNO. In addition, the CNSC provided all interested Indigenous Nations and communities an opportunity to develop a mutually agreeable approach to consultation that suited their needs, capacity and level of interest in the Project. For example, CNSC staff signed a consultation Terms of Reference (ToR) with AOPFN as well as with MNO that outlined a collaborative approach to review and comment on particular sections of this EA report as well as collaboratively drafting a process for a Rights Impact Assessment (RIA) report for each Indigenous Nation or community, which are appended to this EA report (see appendix D).

CNSC staff also collaborated with the AOO on developing relevant sections of this EA report including collaboratively drafting a RIA (see section 9.3.2). In 2020, due to the COVID-19 pandemic, CNSC staff, in collaboration with each Indigenous Nation or community, adjusted the process for consultation and engagement by shifting to virtual meetings, greater email correspondence and working with Indigenous Nations and communities to adjust process timelines and requests as appropriate. Throughout the pandemic, CNSC staff were able to successfully maintain relationships, information sharing, regular contact and collaboration with all identified Indigenous Nations and communities who are engaged in the process.

Table 9.1 contains summary of some of the key correspondence and opportunities to participate in the consultation and environmental assessment process for the Project since the beginning of the federal environmental assessment process in 2016.

Table 9.1: Key correspondence with Indigenous Nations and communities

Date	Indigenous Nation or community	Activity & topic
May 23, 2016	All identified Indigenous Nations and communities	Letter sent to Indigenous Nations and communities notifying them of the Project and requesting comments on the Project Description and the availability of PFP to review the EIS and participate in the EA Process.
October 26, 2016	All identified Indigenous Nations and communities	Letter sent to Indigenous Nations and communities notifying them of the revised Project Description and request for comment.

Date	Indigenous Nation or community	Activity & topic
March to April 2017	All identified Indigenous Nations and communities	Email notification of the draft EIS review and comment period and request for comment. Follow-up emails and phone calls to Indigenous Nations and communities.
December 6, 2017	All identified Indigenous Nations and communities	Letter sent to Indigenous Nations and communities providing update on status of EIS and pending revised timelines.
September 27, 2018	All identified Indigenous Nations and communities	Letter sent to Indigenous Nations and communities providing update on Project and federal EA process including upcoming consultation opportunities. CNSC staff conducted follow-up phone calls.
March 2019	All identified Indigenous Nations and communities	Informed all interested Indigenous Nations and communities regarding the availability of the second phase of funding through the CNSC's PFP for the remaining steps of the EA and Regulatory review process, including the review of the EA report, Commission member documents (CMD) and participation in the Commission hearing.
June 26, 2020	All identified Indigenous Nations and communities	Letter sent to Indigenous Nations and communities with Project updates, next steps in federal EA process and proposed consultation approaches including the opportunity to collaborate on developing a consultation protocol and the availability of additional funding to support these activities.
Fall & Winter 2021	AANTC, AOO, AOPFN, KZA, KFN, MNO, WTFNs	Concerns and Issues tables sent to Indigenous Nations and communities who had submitted comments or expressed concerns throughout the EA and consultation process for review and comment.
Winter & Spring 2021	AOO, AOPFN, MNO	Work undertaken with Indigenous Nations and communities to complete collaborative RIA.
Spring 2021	AOO, MNO	Tripartite meetings organized between Indigenous Nations and communities, CNL, AECL and CNSC staff to review CNL's commitments.

In order to facilitate the participation of Indigenous Nations and communities in the environmental assessment and regulatory review process, CNSC staff made funding available to all potentially interested Indigenous Nations and communities through its PFP on multiple occasions. In total, since 2016, the CNSC has allocated approximately \$650,000, as shown in table 9.2, to support the participation of multiple Indigenous Nations and communities in the environmental assessment and regulatory review process for the Project.

Table 9.2: Participant funding program

Indigenous Nation or community	Funding awarded
2016 NSDF Funding Opportunity (review of draft EIS)	
AANTC	\$20,000
MNO	\$26,195
2019 NSDF Funding Opportunity (review of EA report and CMDs)	
AANTC	\$33,500
AOO	\$32,240
AOPFN	\$35,509.20
MNO	\$25,800
Indigenous Knowledge Studies and RIA	
AOO and AOPFN Indigenous Knowledge Study	\$245,290.20*
MNO Indigenous Knowledge Study	\$125,000*
AOPFN RIA	\$15,374.06
AOO RIA	\$15,374.06*
Meetings with Indigenous Nations and communities	
Meeting with AOPFN	\$860*
Meeting with AOPFN	\$1,596*
Meeting with HFN, Mississaugas of Scugog First Nation, Chippewas of Rama First Nation, CLFN	\$765.53*
Meeting with CLFN, Alderville First Nation, and HFN	\$444.98*
Meeting with AOPFN	\$2,046*
Meeting with Chippewas of Rama, Beausoleil First Nation, Chippewas of Georgina Island	\$851.67*

*Funding was in relation to both CNL's NSDF and NPD Projects

Consultation activities with the Anishinabek Nation

Starting in 2016 and throughout the entire federal environmental assessment process CNSC staff have continued to communicate and provide information to the AN, a political –territorial organization, as they have expressed interest in the Project as one of the communities they represent (the AOPFN) is directly affected by the proposed Project. Early on, in the process the AN expressed concerns about the consultation process for the Project. Throughout the EA process, CNSC staff have continued to share information and respond to the concerns raised by AN. In 2019, CNSC staff met with representatives of the AN via teleconference in order to provide information about the CNSC as well as an update on regulatory processes and projects of potential interest to AN, including the NSDF Project. CNSC staff answered all questions that AN representatives had and also offered to have additional follow-up meetings to discuss the project or other projects and CNSC regulatory processes of interest, should AN be interested. In 2020, CNSC staff provided an update on the Project and federal environmental assessment process to AN but has not received a response from AN to date. CNSC staff have and continues to be committed to ensuring AN is engaged and provided regular information updates about the Project and related CNSC processes.

Consultation activities with AANTC including Kebaowek First Nation and Kitigan Zibi Anishinabeg

Starting in 2016 and throughout the federal environmental assessment process, CNSC staff have continued to communicate and engage with AANTC as well as Kebaowek First Nation and KZA directly, to provide updates, information on the Project, encourage and support their participation as well as seek their views on the Project. CNSC staff met with representatives and leadership from AANTC, KZA and KFN on multiple occasions to discuss the Project and seek their views, concerns and feedback. For example, in summer 2017 CNSC staff and CNL participated in a half day consultation and engagement meeting hosted by AANTC at their offices in Kitigan Zibi, which included the leadership of all First Nation communities represented by AANTC. CNSC staff and CNL gave presentations on the Project, the EA process and opportunities to be engaged in the process and have their concerns heard. During these meetings CNSC staff clarified that as an Agent of the Crown the CNSC would be responsible for carrying out the Duty to Consult and Accommodate as part of the EA and regulatory process for the Project. The meeting included translation services (simultaneous translation into French and/or English) and was supported by funding from the CNSC's PFP. CNSC staff and CNL both indicated a desire to continue meeting and working collaboratively with AANTC and the First Nations communities they represent throughout the EA process to ensure that they are meaningfully involved and have their concerns and issues addressed.

CNSC staff and representatives from AANTC, KFN and KZA continued to meet, correspond and engage from 2017 to early 2020. In early 2020, AANTC, KFN and KZA raised concerns related to the Project's potential impacts on their Indigenous rights (see section 9.3.1) and the inadequacy of the consultation process, in their view, through various correspondence to both the CNSC and the Minister of NRCan. In response to these concerns, CNSC staff offered on a number of occasions to meet to discuss the Project and their concerns and provide assistance / funding support, including multiple funding opportunities and encouraging/supporting their participation in the review of the draft EIS and other relevant documentation. In addition, CNSC staff offered the possibility of supporting the gathering of Indigenous Knowledge and Land Use Information relevant to the Project and also offered to travel to each of the communities

represented by AANTC to provide community members with information about the Project and answer their questions. To date, CNSC staff have not received a response from AANTC or member First Nations regarding these proposed consultation and engagement activities for the NSDF Project.

In June 2020, CNSC staff sent correspondence to offer to AANTC, KZA and KFN the possibility of developing a mutually agreeable consultation process and protocol, including collaboration on developing a RIA process in relation to the Project, should they be interested. In fall 2020, AANTC and KFN sent letters to the Minister of NRCan, expressing concerns about the CRL site, the NSDF and NPD Projects, radioactive waste and Canada's approach to small modular reactors. While these concerns are outside of the scope of the review of the Project, responses were sent by both the Minister of Natural Resources and the CNSC.

In winter 2021 CNSC staff provided AANTC, KZA and KFN with a summary of the issues and concerns they have raised regarding the Project to date, including CNSC staff's and CNL's responses to their concerns (see appendix C). CNSC staff have not received feedback on AANTC, KZA or KFN's views to date on how their concerns have been addressed throughout the process. Finally, in the spring and summer of 2021, CNSC sent further correspondence to AANTC, KFN and KZA updates regarding the consultation process for the NSDF Project and offered to meet to discuss the project. In July 2021 CNSC staff, the President of the CNSC, and leadership and representatives of AANTC, KFN and KZA held a meeting to discuss the relationship between all parties in general and a potential path forward on consultation and engagement. During the meeting the parties agreed to future meetings to discuss the remaining steps and consultation opportunities for the NSDF Project including participation in the Commission hearing. CNSC staff continue to communicate to AANTC, KFN and KZA that they remain committed to ongoing engagement and information sharing.

Consultation activities with the Algonquins of Ontario

Starting in 2016 and throughout the federal environmental assessment process CNSC staff have continued to meet regularly with the AOO and their leadership, to discuss the Project, their concerns and the EA process. CNSC staff provided regular updates on the federal environmental assessment process and sought to understand the AOO's concerns via letters, emails, phone calls and meetings with AOO staff, the Planning Environmental Working Group and leadership. The AOO raised concerns regarding the Project's potential to impact their Indigenous rights, specifically as it related to harvesting, land use, and areas of cultural importance such as the Kichi-Sibi (Ottawa River) and Pointe au Baptême, as well as lands and waters subject to their Comprehensive Land Claim negotiations.

The AOO also raised concerns regarding CNL's selection of VCs for assessment as part of the EIS and requested involvement in monitoring and follow-up activities. During the review and finalisation of the EIS, CNL worked with the AOO to address their concerns and ensured that the list of AOO VCs was incorporated into the document as well as committed to engagement with the AOO on the monitoring and follow-up monitoring programs. CNSC staff also ensured that these VCs were captured throughout the EA report and RIA conducted collaboratively with the AOO (see section 9.3.2).

During late 2019 and throughout 2020 and 2021, CNSC staff met with the AOO on a regular basis to better understand potential impacts to AOO's Indigenous and/or Treaty rights in relation to the Project. This culminated in the completion of an Algonquin Knowledge and Land Use

Study (AKLUS) for the Project in 2020 and a RIA specific to the AOO, which was supported with funding from both the CNSC and CNL. Information, data and perspectives from the study have been used to inform CNL's EIS and the EA report.

In June 2020, CNSC provided AOO with a proposed consultation approach including the offer to sign a ToR for this Project and others near the CRL site. Although the AOO did not pursue a formal ToR for consultation for the Project due to capacity considerations and constraints, the AOO and CNSC worked together to build a mutually agreeable approach for collaboratively-drafting a RIA for the Project and inputting into sections of the draft EA report.

In January 2021, CNSC staff sought feedback from the AOO on a summary table of the issues and concerns that the AOO raised regarding the Project to date including CNSC staff's and CNL's responses to their concerns (see appendix C).

Throughout winter and spring 2021, CNSC staff continued to meet regularly with the AOO to better understand the AOO's remaining technical concerns and potential impacts to the AOO's Indigenous and/or Treaty rights identified through the AKLUS and the AOO's technical review of the EIS. The AOO identified additional concerns related to the protection of the Kichi-Sibi (Ottawa River), fish and fish habitat, the terrestrial environment, waste acceptance and verification processes, mitigation and follow-up monitoring programs, real and perceived psycho-social impacts, impacts to the health and wellbeing of Algonquins, and impacts on traditional land uses, including access to areas of cultural importance.

CNSC staff communicated to AOO that some of their concerns regarding the broader CRL site are out of scope of the EA for the Project (see Views Expressed sections for each VC), however, CNSC staff worked with the AOO to incorporate their additional concerns into the EA report, the AOO specific RIA and in the summary table of the issues and concerns that the AOO raised regarding the Project. CNSC staff also communicated the AOO's concerns to CNL and AECL, who provided capacity support and regularly engaged with the AOO to better understand their concerns and identify commitments to address outstanding concerns identified by the AOO.

In late May 2021, CNSC facilitated a discussion between the AOO, CNL and AECL to discuss CNL's commitments to address the AOO's outstanding concerns and requests related to the Project. CNSC staff are of the understanding that there are outstanding concerns related to CNL's socio-economic assessment and traditional land use assessment that remain unresolved between CNL and the AOO with no agreed to path forward at this time. CNSC staff are of the view that the concerns raised by the AOO regarding the socio-economic assessment are outside of the scope of CEAA, 2012. From the AOO's perspective, there also remain outstanding requests for additional information and reviews related to the aquatic environment, species at risk, and the human health assessment. However, CNSC staff are of the understanding that CNL and the AOO have developed and documented a mutually agreed upon path forward to continue addressing these outstanding technical issues, including through continuing discussions regarding a long-term relationship agreement that will help to enhance the relationship and foster greater collaboration and inclusion of the AOO in CNL's projects and operations. From the AOO's perspective, the success of this approach in mitigating impacts to AOO's Aboriginal rights and interests are dependent on finalizing and successfully implementing CNL's commitments report and the Long Term Relationship Agreement. If the commitments report and Long-Term Relationship Agreement are not finalized and not successfully implemented, the AOO contend that there will be risks to the AOO's Aboriginal rights and interests. CNSC have

noted to the AOO and CNL that these specific concerns are outside of the scope of the EA and regulatory review process and therefore not issues the CNSC can assess or address specifically.

CNSC staff are committed to ongoing engagement with the AOO for this Project including discussions about developing an agreement for long-term engagement between the CNSC and the AOO, as well as ongoing AOO involvement in the CNSC's Independent Environmental Monitoring Program (IEMP) for the broader CRL Site. These measures and commitments will help ensure that the CNSC can continue to collaborate with the AOO and work towards addressing their concerns and requests moving forward.

Consultation activities with the Algonquins of Pikwakanagan First Nation

Starting in 2016, as per CNSC's understanding at the time that AOPFN is a member of the AOO and that consultation and engagement with AOPFN was overseen by the AOO, CNSC staff consulted with AOPFN through the AOO. In addition to communication and consultation with AOPFN leadership through the AOO, CNSC staff provided correspondence and information updates directly to AOPFN early on and throughout the consultation and EA process. In late 2018, AOPFN requested to be directly consulted on behalf of the community and community members. To accommodate this request, CNSC staff consulted AOPFN separately from the AOO throughout the remainder of the regulatory review process. Since 2018, CNSC staff have met regularly with AOPFN representatives, leadership and the community directly. In late 2018, AOPFN staff invited CNSC staff to the community of AOPFN. AOPFN delivered a presentation on the history and context of the community, programs and services and CNSC staff provided information on the Project and federal environmental assessment process. CNSC staff also participated in a tour to the Omamiwinini Pimadjowin where CNSC staff learned the history, culture and traditions and cumulative impacts of the people of AOPFN. This experience contributed significantly towards building a collaborative relationship between CNSC staff and AOPFN.

During the review of the draft EIS in 2019, AOPFN raised concerns regarding the Project's potential impacts to their Indigenous and/or Treaty rights including harvesting and cultural sites. AOPFN also raised concerns related to cumulative and legacy impacts from the broader CRL site, which have led to community members expressing fear and avoidance behaviours in the area around the Project. AOPFN also raised concerns with respect CNL's incorporation of AOPFN specific VCs into their assessment and requested that CNL involve them in the design and implementation of monitoring and follow-up monitoring program. CNSC staff worked to ensure CNL responded to these comments and concerns. Based on the responses to date CNSC staff's view of CNL's responses is that they are sufficient. AOPFN has identified areas in the Issues and Concerns table (see appendix C) where it believes that CNL's responses have not fully or adequately dealt with the original issue or concern.

CNSC staff have reviewed the VCs identified by AOPFN and have ensured that they were captured in their review of the EIS and EA report. With respect to concerns around fear and avoidance, CNSC staff understand that CNL has committed to engaging AOPFN in relation to follow-up and monitoring plans and programs for the Project. CNSC staff have also offered to facilitate meetings between AOPFN, CNL and AECL to allow for greater dialogue regarding their concerns over legacy impacts, land use planning at CRL and fear and avoidance of the Project and CRL site. Throughout 2019 to 2021, CNSC staff met with AOPFN on a regular basis to understand their concerns and collaborate on addressing them. This culminated in the

completion of an AKLUS for the Project in 2020 and a collaborative RIA specific to AOPFN, which was supported with funding from both the CNSC and CNL. Information, data and perspectives from the study have been used to inform CNL's EIS, Indigenous Engagement Report (IER) and the EA report.

In 2020, CNSC staff shared a proposed consultation approach with AOPFN and offered to negotiate a ToR for consultation for this Project and other projects of interest near the CRL site. An agreement was reached on a ToR, which outlines a proposed path forward for AOPFN's involvement in collaboratively drafting sections of the EA report and a RIA for the Project (see appendix D1). In addition, in winter 2020, CNSC staff sought feedback from AOPFN on a summary table of the issues and concerns they have raised regarding the Project to date including CNSC staff's and CNL's responses to their concerns (see appendix C).

Throughout winter and spring 2021, CNSC staff continued to meet regularly with AOPFN to better understand AOPFN's project-specific concerns and potential impacts to their Indigenous and/or Treaty rights identified through the AKLUS, ongoing AOPFN-led Diet and Harvest and Culture and Rights studies and AOPFN's review of the 2019 EIS. The latter two studies were not only submitted to CNSC staff at the time of the drafting of the EA report and RIA, however CNSC staff worked with AOPFN to ensure information from them was incorporated into both documents. AOPFN intends to submit these studies to the Commission as part of their intervention. AOPFN has identified various outstanding concerns as of the time of writing the EA report, including:

- concerns related to the location of the project in proximity to the Kichi-Sìbì (Ottawa River), and associated lack of integration by CNL of AOPFN into its alternative means assessment
- lack of adherence by CNL to the "Willing Host" principle or to respect any Free, Prior and Informed Consent decision AOPFN makes in relation to the proposed project
- potential impacts of historical and existing cumulative effects of the CRL site on their rights
- CNL underestimating potential effects of the project on traditional land and resource use and cultural continuity, as well as associated rights
- perceived psycho-social impacts such as fear and avoidance and their effects on health, well-being and AOPFN rights practices
- the lack of Indigenous involvement in CNSC's monitoring and independent oversight
- the importation of radioactive wastes from off-site without AOPFN approval

Issues and concerns that AOPFN has identified have largely been dealt with adequately to date include:

- AOPFN's role in the future cultural heritage stewardship and monitoring of the CRL site
- AOPFN's involvement in project and CRL site-wide monitoring with CNL
- project-specific risk communication to Indigenous Nations and communities
- the selected VCs and CNL's use of indicator species

- impacts to fish and fish habitat and the terrestrial environment

CNSC staff engaged with AOPFN to incorporate all of their concerns into the EA report (see Views Expressed sections for each VC), the AOPFN specific RIA (see appendix D1), and in the summary table of the issues and concerns that the AOPFN raised regarding the Project (see appendix C). CNSC staff also communicated AOPFN's concerns to CNL and AECL, who provided capacity support and regularly met with AOPFN to better understand their concerns and identify commitments and a path forward to address outstanding concerns.

CNSC staff met regularly with AOPFN throughout January to June 2021 to develop and implement a mutually agreeable approach for collaboratively drafting the AOPFN specific RIA for the project, including focused discussions on the methodology, structure, scope and content of the RIA. As per the ToR for consultation for this Project, where AOPFN and CNSC staff views diverged, both parties' views were summarized in the collaborative RIA.

In January 2021, AOPFN expressed concerns about the current EA timelines in light of the COVID-19 public health restrictions limiting AOPFN engagement opportunities and requested an extension. CNSC staff, CNL and AECL responded separately to AOPFN's request, expressing support for AOPFN's timeline extension request.

In February 2021, CNSC staff met with AOPFN leadership to discuss the signed ToR for consultation with AOPFN and provide updates on the environmental assessment process for the project in collaboration of AOPFN staff. Both parties agreed to have future meetings to discuss the project in further detail. In March 2021, AOPFN requested that CNSC, CNL and AECL clarify their processes and perspectives regarding the United Nations Declaration on the Rights of Indigenous peoples' (UNDRIP) principle of Free, Prior and Information Consent (FPIC) as well as the "Willing Host" principle. CNSC staff, CNL and AECL provided separate responses to AOPFN in April 2021.

In April 2021, CNSC staff offered to facilitate a discussion between AOPFN, CNL and AECL to discuss CNL's commitments to address the AOPFN's concerns related to the Project. AOPFN confirmed that they were working directly with CNL to develop project-specific commitments to address their outstanding concerns and that a multi-party meeting was not necessary at that time. CNSC staff confirmed that CNL provided a summary of their project-specific commitments to AOPFN and that verified those commitments with AOPFN.

CNSC staff understand that there are outstanding concerns that remain unresolved or in progress between CNL and AOPFN, as noted in the listed bullets above. However, CNSC staff are of the understanding that CNL and AOPFN have developed and documented a mutually agreed upon path forward to continue working together to address outstanding issues, including through continuing discussions regarding a long-term relationship agreement and a CRL site level Memorandum of Understanding (MOU) that will help to enhance the relationship and foster greater collaboration and inclusion of AOPFN in CNL's projects and operations. CNSC staff are also committed to ongoing engagement with AOPFN for this Project including discussions about developing an agreement for long-term engagement between the CNSC and the AOPFN, ongoing AOPFN involvement in the CNSC's IEMP for the broader CRL Site and ongoing engagement with AOPFN on the monitoring of the implementation of CNL's mitigation and commitments for the NSDF Project, should it proceed. These measures and commitments will help ensure that the CNSC can continue to collaborate with the AOPFN to build trust and work towards addressing their concerns and requests moving forward.

Consultation activities with Algonquin Nation secretariat (ANS)

Starting in 2016 and throughout the federal environmental assessment process, CNSC staff communicated and shared information with ANS about the Project and CNSC process. In 2020, CNSC staff sent a letter providing an update to about the remainder of the federal environmental assessment process to ANS and to date has not received a response. CNSC staff are committed to continuing to provide updates and information to ANS on the Project.

Consultation activities with the Métis Nation of Ontario

Starting in 2016 and for the duration of the federal environmental assessment process, CNSC staff communicated regularly with MNO via letters, emails, phone calls, in-person and virtual meetings regarding the Project and the CNSC's environmental assessment and regulatory review process. In addition to meeting with the MNO Land, Resources and Consultation officers regularly, CNSC staff also met in-person a number of times between 2017 and 2019 with MNO Region 5 and Region 6 Councils to present information on the Project and CNSC environmental assessment process.

During the consultation process and review of the 2019, draft EIS, the MNO raised concerns with the Project's potential impacts on their Indigenous rights. MNO also requested that CNL include them in the design and implementation of the monitoring and follow-up monitoring program. MNO also raised concerns about potential impacts of the Project on canoe routes and Pointe au Baptême, a culturally important site to the MNO. CNL confirmed that there will be no changes in access to Pointe au Baptême and confirmed no impacts to canoe routes will occur as a result of the Project.

CNSC staff worked with the MNO to incorporate these concerns and address them in the EA report (section 7.3 and appendix C). In addition, MNO raised concerns about the broader CRL site and the legacy impacts including the land to develop the CRL site being taken up without consultation with the MNO, as well as potential impacts on Métis archaeological resources on the CRL site, and the perpetuation of fear and avoidance behaviours in the lands and waters surrounding the CRL site.

CNSC staff have committed to assessing potential impacts of fear and avoidance concerns as well as potential mitigation for these impacts with the MNO as part of the MNO specific RIA (see appendix D2) for the Project. CNSC staff also communicated to MNO that although their concerns about the broader CRL site are outside of the scope of the environmental assessment for the Project they were captured in the EA report and were also communicated to AECL and CNL who are committed to ongoing collaboration with the MNO to address these concerns, where possible. In order to help mitigate and/or address some of MNO's concerns about the health and safety of the environment in the lands and waters surrounding the CRL site, CNSC staff are committed to engaging the MNO in the CNSC's IEMP activities in relation to the CRL site.

In addition, CNSC staff and CNL provided funding to support the MNO's request for the development of a Traditional Knowledge and Land Use Study (TKLUS) in relation to the Project. The TKLUS, was completed in 2019 and information from which was incorporated into CNL's EIS and the CNSC staff's EA report. In 2020, CNSC staff provided a letter to the MNO outlining a proposed consultation approach and offer to negotiate a ToR for consultation for this Project and others near the CRL site. An agreement was reached on a ToR in October 2020,

which outlined a proposed path forward for the MNO's involvement in collaboratively drafting sections of the EA report and a RIA for the Project (see appendix D2). In fall 2020, CNSC staff provided the MNO with a summary of the issues and concerns they have raised regarding the Project to date including CNSC staff's and CNL's responses to their concerns (see appendix C).

In the spirit of the ToR for long-term engagement signed between CNSC staff and the MNO in 2019, CNSC staff continue to be committed to working with the MNO to build trust and a long-term relationship going forward with respect to the Project and the CRL site. As per the long-term engagement ToR, CNSC staff are committed to developing a Region 5/6 specific engagement plan with a focus on their interests and concerns with regards to the Project and CRL site in general. Moving forward, CNSC staff will work directly with the MNO to develop the engagement plan to ensure it adequately addresses the concerns raised by the MNO to the greatest extent possible.

Consultation activities with the Williams Treaties First Nations

Starting in 2016 and throughout the duration of the federal environmental assessment, CNSC staff regularly communicated with all of the WTFNs, via letters, email, phone calls and meetings to provide information about the Project and the environmental assessment and regulatory review process. CNSC staff met with the WTFNs on multiple occasions to provide information and understand their concerns about the Project. Examples of this include meetings in 2019 and 2020 with representatives from CLFN and HFN, Chippewas of Rama First Nation, Chippewas of Georgina Island First Nation and Beausoleil First Nation. CLFN and HFN were the WTFN's that had expressed the most direct interest in the Project, and had concerns largely related to potential effects to the terrestrial and aquatic environment, which could potentially impact their Indigenous and/or Treaty rights. Both First Nations also expressed concerns regarding the Project's potential to impact archaeological sites of importance on the CRL site. CNL assessed impacts to all of these areas of concern and provided responses to each First Nation and proposed mitigation measures to address any potential impacts. CNL also conducted multiple webinars and meetings with representatives from the WTFNs to address each comment and concern. CNSC staff worked with CLFN and HFN to ensure that proposed mitigation measures for the biophysical environment were appropriate to address their concerns. CNSC staff also analysed CNL's assessment of effects to archaeological resources including proposed mitigation and follow-up measures to ensure they would mitigate any potential effects (see section 7.3) and are satisfied with CNL's responses to proposed measures.

In June 2020, CNSC staff sent a letter with a proposed consultation approach to all WTFNs. In summer 2020 and fall 2020 CNSC staff had 2 virtual follow-up meetings with CLFN and agreed to a path forward for CLFN's involvement in the remainder of the environmental assessment process. In addition, in fall 2020, CNSC staff provided CLFN with a summary of the issues and concerns they have raised regarding the Project to date including CNSC staff's and CNL's responses to their concerns (see appendix C).

To date, none of the WTFNs, including CLFN and HFN, have identified any specific concerns regarding potential impacts from the Project on any of their potential or established rights, however, CNSC staff remain committed to sharing information with all WTFNs including CLFN and HFN related to the assessment of the Project and the broader CRL site. In addition, CNSC staff are committed to ongoing engagement with both CLFN, HFN and WTFNs on CNSC regulated facilities and activities of interest. In 2021, CNSC staff and CLFN finalized a ToR for

Long-Term Engagement, which will include regular updates regarding the NSDF Project, the CRL site and other nuclear activities and facilities of interest to CLFN. In order to help mitigate and/or address some of CLFN's concerns about the health and safety of the environment in the lands and waters surrounding the CRL site, CNSC staff are committed to engaging CLFN in the CNSC's IEMP activities in relation to the CRL site, should they be interested.

9.2.2 Engagement led by CNL (CNL)

CNL engaged all identified Indigenous Nations and communities (see section 9.1) by holding meetings, hosting open houses, conducting webinars, conducting site visits and developing and issuing plain language materials (e.g., fact sheets and newsletters) to share information, discuss issues and receive feedback. This engagement has been continuous, and throughout the environmental assessment process. REGDOC-3.2.2 sets out requirements and guidance for licensees whose proposed Projects may raise the Crown's duty to consult. CNSC staff monitored and assessed CNL's engagement activities and program throughout the environmental assessment and regulatory review process.

CNL demonstrated a flexible and adaptive approach to engagement and worked hard to build relationships and meet the needs and expectations of interested Indigenous Nations and communities. CNL provided financial support to assist Indigenous Nations and communities in their review of the EIS and other supporting documents, as well as to support their participation in meetings, and to obtain professional and technical advisors, where appropriate.

CNL, along with the CNSC, supported the gathering of Indigenous Knowledge and Land Use information and worked to integrate the valuable information and knowledge shared by Indigenous Nations and communities into its EIS and supporting documentation. CNL also worked with each Indigenous Nation or community to respond to and address their concerns in a meaningful way (see appendix C). CNL used innovative ways to communicate with all interested Indigenous Nations and communities including webinars, videoconferences, interactive presentations, workshops, community meetings, summary documents, graphics and diagrams. CNL also ensured that each Indigenous Nation or community had an opportunity to review and comment on the revised EIS to ensure that their concerns and areas of interest were accurately captured prior to finalization and submission to the CNSC. CNL also regularly provided updates to CNSC staff regarding its engagement activities and sought to include the CNSC in its engagement activities where appropriate and agreed to by each Indigenous Nation or community.

Finally, CNL has made a number of specific commitments to address the concerns, comments and requests of interested Indigenous Nations and communities including the development of long-term relationship agreements, involvement and collaboration in environmental monitoring and follow-up monitoring program for the NSDF Project, ongoing communications and updates about the NSDF Project activities, protection of archaeological and cultural sites of importance and engagement with Indigenous Nations and communities for management of the CRL site moving forward.

CNSC staff have found that CNL has a well-established Indigenous engagement program and that CNL met all requirements and followed the guidance in REGDOC-3.2.2 by engaging all interested Indigenous Nations and communities to support and maintain their relationships in relation to the Project and other CNL activities of interest and working to address their concerns and requests. CNSC staff will continue to monitor CNL's ongoing engagement activities and commitments as part of the EAFMP and throughout the life cycle of the NSDF facility, should it

be approved. For information about CNL and CNSC commitments for specific Indigenous Nations and communities please see section 9.3 and the appended RIAs for AOPFN and the MNO.

9.3 Assessment of impacts to rights

In order to fulfill the Crown's duty to consult for the CEAA 2012 and NSCA decisions for the NSDF Project, CNSC staff considered potential impacts to Indigenous and /or Treaty rights related to the Project, by completing RIAs for potentially impacted Indigenous Nations and communities including, AANTC (see section 9.3.1) the AOO (see section 9.3.2), AOPFN (see appendix D1), and MNO (see appendix D2). For the other Indigenous Nations and communities holding Indigenous and/or Treaty rights listed above, including the WTFN, CNSC staff did not obtain information through CNL engagement or CNSC consultation that identified any potential impacts to their Indigenous and/or Treaty rights as a result of the Project.

The purpose of an RIA is to assess the potential severity of impacts of the Project on the Indigenous and/or Treaty rights of an Indigenous Nation or community. The RIA also identifies any potential mitigation and/or accommodation measures that could help to avoid, reduce, or compensate for any identified impacts and communicate the process, outcomes and recommendations in a collaborative way to the Commission as part of its decision-making process.

For the purposes of the RIA, the following context was taken into consideration. The NSDF, a proposed engineered disposal facility for low-level radioactive waste planned for the CRL site, is proposed to be located within the fenced area of the CRL site, which is approximately 4000 ha and is currently inaccessible to the public, including Indigenous Nations and communities for traditional activities. The footprint of the Project site is approximately 37 ha (also called the SSA). The LSA is selected in consideration of the NSDF Project footprint and the spatial extent of potential direct effects of the Project on the VCs identified for the EA, whereas the regional study area (RSA) is defined as the area within which the potential effects of the NSDF Project may interact with the effects of other existing or reasonably foreseeable projects and extends beyond the CRL site boundaries.

9.3.1 Algonquin First Nations represented by the Algonquin Anishinabeg Nation Tribal Council including Kebaowek First Nation and Kitigan Zibi Anishinabeg

The methodology undertaken for the RIA for the First Nations represented by AANTC used a "pathways approach", in which pathways of impacts on rights from project-related activities are identified. The 2 key pathways where potential impacts of the Project were identified to be considered in the assessment are access, and the quality of experience of exercising the Indigenous rights of identified Algonquin First Nations' in Quebec.

The criteria and matrix listed in tables 9.4 and 9.5 were used for assessing the severity of impacts to Indigenous and/or Treaty rights. CNSC staff offered on multiple occasions to collaborate with AANTC, KFN and KZA on the RIA however, no response was received.

Context

The following is a description of *Algonquin First Nations' in Quebec*, including Kebaowek First Nation, KZA and those communities represented by the AANTC, Indigenous rights and context

in which they practice these rights as it relates to the Project. As mentioned in section 9.1, the Project site is located within the area that Algonquin First Nations in Quebec have either individually or collectively asserted Indigenous rights and title to. Throughout the EA process for the Project, representatives of the AANTC, Kebaowek First Nation and KZA have raised concerns about the Project's potential to impact their Indigenous and/or Treaty rights as well as the importance of the Project site and surrounding area for the practice of those rights. In particular, the AANTC, Kebaowek First Nation and KZA raised concerns with respect to the project's ability to potentially impact sites of cultural importance such as the Kichi Sibi (Ottawa River).

9.3.1.1 Access

As mentioned above, the NSDF Project is proposed to be located within the restricted, fenced area of the CRL site, which is approximately 4000 ha and is currently inaccessible to AANTC members for the practice of Indigenous rights, including harvesting. The footprint of the proposed NSDF Project site is approximately 37 ha. If constructed, the NSDF Project site would remain inaccessible to Algonquin First Nations in Quebec, including Kebaowek First Nation, KZA and those represented by the AANTC, indefinitely.

The AANTC, Kebaowek First Nation and KZA identified in their comments on CNL's draft EIS that there are VCs important for their harvesting rights in the area of the CRL site including animals, plant and fish species. However, it is expected that the magnitude of changes from the current baseline conditions as a result of the Project on the ability for Algonquin First Nations' in Quebec to access harvesting locations would be low. The proposed project footprint is currently not accessible for traditional harvesting practices as it is within the CRL site. Although the project footprint itself represents the permanent use of approximately 37 ha of the CRL site, it is likely to have little additional or new impact on the exercise of hunting rights in the RSA, compared to the current baseline conditions. Therefore, the potential overall severity of this impact pathway is assessed as low for the proposed NSDF Project.

9.3.1.2 Experience

Throughout the environmental assessment process, the AANTC, Kebaowek First Nation and KZA raised concerns regarding the CRL site being potentially contaminated as a result of historic and ongoing nuclear operations and activities. Due to this perceived risk of contamination, it is possible that some of the Algonquin First Nations in Quebec currently avoid using the land and resources near the site to exercise their rights. In addition, it is possible that members of these First Nations may continue to alter their land use because of perceived environmental contamination and impacts in the vicinity of CRL, which may affect land use and enjoyment into the future, as a result of the NSDF Project.

As the NSDF Project is a permanent facility, it would effectively end the possibility of removing a source of fear that leads to avoidance behaviour within the CRL site. As a result, it is unclear how much the proposed Project would contribute to the perpetuation of avoidance behaviours over time, given the historical and present context of existing fear and avoidance behaviours as CNSC staff did not obtain reliable information about this impact directly from AANTC. As indicated in section 9.2.1, CNSC staff made efforts to consult AANTC, Kebaowek First Nation and KZA Nation including offering participant funding and to collaboratively complete this RIA, however, did receive a response to date. Therefore, this analysis is conducted using the information currently available to CNSC staff.

In addition, it is possible that the Project may lead to some avoidance behaviours in the RSA during particular phases of the Project, due to an anticipated increase in traffic, noise, and dust during the construction and operation phases of the Project. However, CNSC staff confirmed in the EA report that when taking into consideration CNL's proposed mitigation measures (see section 6.1), there are no residual adverse environmental effects expected as a result of the Project, including in relation to noise, dust and traffic.

Therefore, taking into consideration proposed mitigation measures, CNSC staff do not expect the Project to lead to any new adverse impacts on the rights and interests of Algonquin First Nations in Quebec, including their quality of experience in the RSA. CNSC staff have found that the potential overall severity of this impact pathway is low based on the rights impact severity criteria decision matrix (see table 9.5).

9.3.1.3 Mitigation, monitoring and follow-up

The potential impacts on the rights and interests of Algonquin First Nations in Quebec, identified were found through the analysis in section 9.3.1 to be of a low overall severity. However, to ensure that the concerns raised by AANTC, Kebaowek First Nation and KZA regarding any potential impacts to their rights and interests related to the Project are appropriately managed during all phases of the project, CNSC staff assessed mitigation and other measures proposed by CNL to determine their adequacy and effectiveness.

CNSC staff confirmed that the mitigation measures identified in CNL's EIS are adequate to address potential biophysical impacts from the Project in relation to potential impacts on wildlife and potential concerns around access and the sensory experience in the RSA. CNL has committed to engaging the AANTC, Kebaowek First Nation and KZA in their NSDF Project specific monitoring and follow-up monitoring program and provide the draft EAFMP to AANTC in order to help address concerns and build trust in the proposed NSDF Project as well as current and ongoing operations at the CRL site. CNL has also committed to continuing engagement with AANTC, Kebaowek First Nation and KZA, and notifying the groups of project activities. CNSC staff found that these proposed measures and commitments would assist to address the concerns raised by the AANTC, Kebaowek First Nation and KZA and will help manage the concerns raised regarding potential impacts identified through this RIA throughout the life cycle of the NSDF.

In addition to the mitigation measures and the follow-up and monitoring activities summarized above, CNSC staff are committed to long-term engagement with the AANTC, Kebaowek First Nation and KZA and have offered to discuss the development of a consultation agreement, as well as a ToR for *long-term engagement, to assist in building a collaborative relationship and trust with the Algonquin First Nations* in Quebec, should they be interested.

When taking into consideration the overall low severity of potential impacts as well as the proposed mitigation and other measures to address the concerns raised, no residual impacts to the Indigenous rights of the Algonquin First Nations in Quebec were identified in relation to the Project that required further analysis or consideration of additional mitigation or follow-up measures.

Table 9.3: Summary of the severity of potential impacts to Indigenous rights for Algonquin First Nations in Quebec with respect to the Near Surface Disposal Project

Established/potential/assessed right (Nature, scope, exercise)	Algonquin First Nations in Quebec perspective on the importance, value, uniqueness of an area, resources or species	Context	Potential project impact (Type and description)	Magnitude	Geographic extent	Reversibility	Duration	Frequency & timing	Overall severity	Mitigation and follow-up measures (proponent)	Mitigation and follow-up measures (CNSC)	Residual impacts
Harvesting												
Hunting, trapping, fishing and gathering of natural resources for food, social or ceremonial purposes	<ul style="list-style-type: none"> - Key source of food - Cultural importance through food sharing, knowledge transfer, and traditional protocols 	<p>Regional:</p> <ul style="list-style-type: none"> - CNSC staff is of the view that the NSDF will not impact AANTC First Nations' including Kebaowek First Nation and KZA, ability to harvest at the regional level <p>Local:</p> <ul style="list-style-type: none"> - use of CRL site before the site was established -access to the CRL site has been restricted since establishment of the site in the 1940's and there are currently no plans for re-establishing general public access and use for traditional practices for the CRL site 	1. Access 37 ha of land become permanently inaccessible for hunting and harvesting	Low	Site Specific	Permanent	Long-term	Continuous	Low to no impacts	-The mitigation measures identified in CNL's EIS are adequate to address potential biophysical impacts from the Project in relation to wildlife and potential concerns around access and the sensory experience in the RSA.	Long-term engagement with the Algonquin First Nations in Quebec including their representative organization AANTC through the development of a Long-Term Engagement ToR which would include collaborating on CNSC environmental monitoring activities around the CRL site, ongoing communications and regular meetings, as well as engagement with Algonquin First Nations in Quebec including their representative organization AANTC.	None identified. Mitigation and follow-up measures are deemed adequate to address and manage concerns related to potential impacts.
			2. Experience (Fear and Avoidance) Perceived contamination of animals, water and plants near the CRL site causes avoidance behaviour due to low trust in quality of resources. (Sensory) Noise, traffic, and dust from construction and operation activities degrades the sensory experience of being on the	Low	Local	Permanent	Long-term	Continuous	Low to no impacts	-CNL has committed to engaging the Algonquin First Nations in Quebec including their representative organization AANTC in their NSDF Project Follow-up Monitoring Program in order to help address concerns raised regarding fear and avoidance behaviours -CNL has committed to enhancing its engagement with the Algonquin First Nations in Quebec including their representative organization AANTC, by sharing results of monitoring activities and follow-up monitoring program including those for air quality, surface water quality, terrestrial environment, aquatic		None identified. Mitigation and follow-up measures are deemed adequate to address and manage concerns related to potential impacts.

			land, causing avoidance of the area							environment and ground water quality. -CNL also is committed to sharing its Archaeological Master Plan and CRM Program with the Algonquin First Nations in Quebec including their representative organization AANTC		
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9.3.1.4 Findings on potential impacts on the rights of Algonquin First Nations in Quebec

Based on the information gathered throughout the environmental assessment process, CNSC staff have found that the potential impacts identified as a result of the NSDF Project on the Algonquin First Nations in Quebec including Kebaowek First Nation and KZA, are considered to be of overall low severity. With the mitigation and follow-up measures proposed by CNL and CNSC staff, all identified impacts and concerns can be adequately managed and addressed in relation to the Project. Therefore, there are no residual impacts expected to the rights and interests of Algonquin First Nations in Quebec in relation to the Project. CNL and the CNSC are committed to ongoing engagement and dialogue to work towards addressing concerns raised by the AANTC, Kebaowek First Nation and KZA and enhancing the relationships through collaboration in relation to the NSDF Project and CRL site in general.

9.3.2 Algonquins of Ontario

9.3.2.1 Assessment of impacts to Algonquins of Ontario's rights

As discussed in section 9.2 of the CNSC's EA report for the NSDF Project, the AOO provided input into the RIA conducted by the CNSC and the AOO. The approach undertaken by the AOO and CNSC staff included the sharing a draft of this section for AOO's review and input, as well as multiple meetings and correspondence to ensure that the AOO's view and concerns were accurately captured.

The methodology undertaken for the RIA with the AOO used a "pathways approach", in which pathways of impacts on rights from project-related activities are identified. The 2 key pathways where potential impacts of the project were identified by the CNSC to be considered in the assessment are access, and the quality of experience of exercising AOO's Aboriginal rights.

The AOO's views

It is important to note that the AOO raised concerns regarding potential effects to species harvested and of importance to Algonquin community members. From the AOO's perspective, quality and quantity of species available, harvested and/or important to the AOO is an additional pathway to be fully considered in the RIA. The AOO identified concerns regarding species health and abundance that may be impacted by the Project and that further degradation to the quantity and quality of certain species could adversely impact the quality of the AOO's experience as well as ability to exercise its Aboriginal rights and interests. These concerns are focused on the effects to water quality where Perch Creek discharges into the Kichi-Sibi⁶ (Ottawa River) and the potential exposure of fish species to contaminated surface water in the Perch Lake watershed that could impact the health and wellbeing of Algonquins. The AOO also expressed concerns about impacts to wildlife that migrate in and out of the LSA. The Algonquin community members harvest several species (animal, plant and fish) in the RSA and beyond. Accordingly, they are concerned about the potential cumulative effects to Algonquin community members' health from potential contamination from consuming these species.

⁶ The Ottawa River, otherwise known as the Big River, has also been referred to in the Algonquin language as "Kichi-Sibi", "Kichissippi", "Kitchissippi" and "Kichissippi"

CNSC staff understand the concerns raised by the AOO with regards to potential effects on species that their members harvest and they are captured in sections 6.3, 7.1 and 7.2 of the EA report. However, CNSC staff have not identified any residual impacts to the quality and quantity of resources as a result of the Project within the RSA, based on staff's analysis of the information on mitigation measures and follow-up and monitoring in CNL's EIS. Therefore, as part of the RIA, these specific impact pathways were not identified for further analysis in terms of potential impact severity. It should also be noted that CNL has committed to engaging the AOO in the EAFMP to ensure that the AOO are involved in the process and that their concerns are adequately addressed through avoidance, mitigation and accommodation, as required.

The criteria and matrix in tables 9.4 and 9.5 below were used for assessing the severity of impacts to AOO Aboriginal rights as a result of the Project.

Table 9.4. Criteria for assessing the severity of impacts to Aboriginal and/or Treaty rights.

Criterion	Definition	Rating		
Magnitude	Degree and importance of the change the impact will likely cause relative to an established baseline. Takes into account context and territorial capacity to withstand additional stressors.	Low Little impact on quality or quantity of resources, locations, conditions and other factors required for the exercise of rights, relative to an established baseline. Impact is considered by the Indigenous Nation (rights holders) to be of relatively low importance and of a minor degree.	Moderate Changes in the quality, quantity, and accessibility of resources, locations, conditions, and other factors that affect the ability or willingness to exercise the right in the preferred manner and locations are considered by the Indigenous Nation (rights holders) to be of moderate importance and degree relative to an established baseline.	High Changes in the quality, quantity, and accessibility of resources, locations, conditions, and other factors such that the right can or will no longer be exercised in the preferred manner and locations and the impacts are considered by the Indigenous Nation (rights holders) to be of high/critical importance and degree relative to an established baseline.
Geographic Extent	Area over which impact is expected to occur. This may differ from the physical footprint of the change.	Site-specific Project footprint, avoids preferred areas, little impact on interconnectedness.	Local Extends beyond project footprint, may affect preferred/valued areas, disrupts interconnectedness.	Regional Significant portion of the Indigenous Nation's territory affected, especially preferred/valued areas, disrupts interconnectedness.
Reversibility	Ability to return to established baseline. Considers both the reversibility	Reversible Easily reversible	Partially reversible Reversible but requires significant effort and cost or will take a long time	Irreversible Permanent or persistent.

Criterion	Definition	Rating		
	of the impact pathway and the reversibility of the impact to the exercise of rights.		via natural processes.	
Duration	How long an impact may last.	Short-term Short-term, only a year or 2.	Medium-term Lasts for more than a year or 2 but less than 1 generation.	Long-term Persists beyond 1 generation.
Frequency	When an impact may occur.	Infrequent.	Frequent or at regular intervals.	Continuous impact.
Timing	When an impact may occur. This considers seasonality, time of day, predictability of occurrence.	Timing is not expected to coincide with sensitive activities, and/or is predictable and can be easily planned around.	Timing may coincide with some sensitive activities and would be an imposition to plan around.	Timing will coincide with sensitive activities and/or is highly unpredictable.

Table 9.5. Decision matrix for applying the assessment criteria to determine the overall severity of the impact to a right

Magnitude	Reversibility	Duration*	Geographic Extent	Severity
Low**	Any level of reversibility	Any duration	Any extent	low
Magnitude	Reversibility	Duration*	Geographic Extent	Severity
Moderate	Fully reversible	Short- or medium-term	Site-specific or local	Low
			Regional	Moderate
		Long-term	Site-specific	Low
			Local or regional	Moderate
	Partially Reversible	Short-term	Site-specific	Low
			Local or regional	Moderate
		Medium or long-term	Site-specific or local	Moderate
			Regional	High
	Permanent	Long-term***	Site-specific	Moderate
			Local or regional	High
Magnitude	Reversibility	Duration*	Geographic Extent	Severity
High	Fully reversible	Short- or medium-term	Any	Moderate
			Site-specific	Moderate
		Long-term	Local or regional	High
	Partially reversible	Short- or medium-term	Site-specific	Moderate
			Local or regional	High
		Long-term	Any	High
	Permanent	Long-term***	Any	High
			Any	High

Rationale for severity determination decision tree (table 9.5)

- *The contribution of timing and frequency is considered on a case-by-case basis when determining severity. Timing and frequency may not be relevant to all impacts, and therefore is not included in the generic decision trees.
 - Frequency is assumed to be continuous, therefore if less frequent, it may downgrade the severity.
 - Timing is assumed not to coincide with sensitive activities, therefore if timing is relevant, it may upgrade the severity.
- **Impacts deemed to be of low magnitude are generally considered of low severity regardless of the other assessment criteria.
 - These impacts are those, which have little to no impact on the right concerned, or are within acceptable/normal variation of baseline conditions.
 - Permanent, regional effects may be upgraded to moderate severity.
- ***Irreversible impacts can't be short or medium-term, only long-term

Context

The AOO's Views

The following is a description of the AOO's asserted Aboriginal rights and interests, including Aboriginal title, and the context in which they practice these rights as it relates to the Project from the AOO's perspective. As Aboriginal rights and title holders within the unceded Algonquin Settlement Area, and as parties to the ongoing modern Treaty negotiations with Ontario and Canada, the AOO have a strong prima facie claim to Aboriginal rights and title in the Project area. The AOO's Aboriginal rights and title have never been ceded nor surrendered to the Crown and the strength of the AOO's outstanding assertion of Aboriginal rights and title resulted in the commencement of the aforementioned Treaty negotiations with the Crown in the early 1990s. In 2016, the AOO and the Governments of Canada and Ontario signed an Agreement in Principle, which sets out the main elements of a potential settlement including transfer of provincial Crown land to the AOO. The AOO and the Governments of Canada and Ontario are currently engaged in negotiations to reconcile the Aboriginal rights and title assertions with the Crown's interests through a negotiated Settlement Agreement that will form the basis for a modern day Treaty.

While those negotiations are underway, Algonquin community members continue to exercise their Aboriginal right to harvest wildlife, fish and gather for sustenance, medicinal, and other cultural purposes within the AOO unceded Settlement area. In addition, the AOO have identified cultural sites of importance, travel routes and Algonquin Ecological Knowledge regarding presence of habitat important to support the exercise of those rights. The AOO have expressed that the project site, including the CRL site and surrounding area, is important for the practice of their Aboriginal rights and includes areas of spiritual and cultural importance.

Throughout the federal environmental assessment process for the Project, the AOO has raised concerns with respect to the project's potential adverse impact on sites of cultural importance

such as the Kichi-Sìbì (Ottawa River), and species of importance to the AOO, which in turn, would impact the AOO's ability to exercise their Aboriginal rights and interests. Similarly, the AOO also raised concerns about how cumulative effects impacting on their Aboriginal rights were considered in the environmental assessment and the ongoing cumulative impacts of development along the Kichi-Sìbì. From the AOO's perspective, the current scope of cumulative effects assessments under CEAA 2012 allows for new projects to incrementally impact the AOO's rights and interests in seemingly minor and/or negligible ways. From the AOO's perspective, the development and implementation of a cumulative effects assessment under the new IAA, 2019 may have drawn different and more accurate conclusions for this Project, in that the cumulative effects may cause serious adverse impacts.

The AOO also expressed that harvesting rights are not only about harvesting, fishing, trapping, and gathering, but also includes the opportunity to transfer knowledge of the Algonquin way of life, including language; and to connect present-day Algonquins to the Algonquin culture and spirits of their ancestors. For the purposes of this Project and assessment of impacts to rights, the AOO's harvesting rights were considered given the potential pathways for impacts and concerns raised by the AOO as well as the interconnectedness of the practice of their harvesting rights to their culture, knowledge and language transmission, way of life and well-being. For the AOO, a critical gap in the EIS is an assessment that provides an inter-dependent, or holistic analysis of impacts to the health, wellbeing and socio-economic of Algonquins as a result of this Project.

In addition, the AOO raised concerns regarding impacts of the broader CRL Site and its impacts of taking up lands from their traditional territory. CNSC staff discussed this issue with the AOO, however it is outside of the scope of the assessment of the NSDF Project. This issue has been brought to the attention of CNL and AECL who have committed to having ongoing discussions to work collaboratively to address the concerns raised by the AOO, where possible.

Lastly, CNSC staff have also raised concerns around the taking up of lands and impacts with respect to lands outside of the scope of this project with Crown Indigenous Relations and Northern Affairs Canada who is leading the negotiation of the AOO comprehensive land claim agreement negotiations on behalf of the Government of Canada, to ensure they are aware of these issues and concerns.

9.3.2.2 Access

The NSDF Project is proposed to be located within the restricted, fenced area of the CRL site, which is approximately 4000 ha and is currently inaccessible to Algonquin community members for the practice of Aboriginal rights, including harvesting. The footprint of the NSDF Project site is approximately 37 ha. If constructed, the NSDF Project site would remain inaccessible to Algonquin community members indefinitely.

The AOO expressed that the Kichi-Sìbì (Ottawa River) is a culturally important waterbody, and that the Pointe au Baptême site located on the CRL site is culturally and spiritually significant to them. The Pointe au Baptême site is located within the RSA and CNL has confirmed that they are aware of the importance of this site to Indigenous peoples, including the AOO, and do not intend to restrict access to it. In addition, the proposed Project is not predicted to impact this site or access to it. With respect to the Kichi-Sìbì, access will not be restricted as a result of the Project. The AOO also raised that Oiseau Rock is an area of importance to them and they want to ensure continued access be made available. It is CNSC staff's understanding that this site is located outside of the LSA and therefore access will not be altered as a result of the Project. For

the AOO, access is not only a matter of the AOO's ability to reach the site, but also that those areas remain protected and maintained to support the visual quality and enjoyment of these culturally and spiritually significant areas for Algonquins. The AOO has long standing issues with the poor management of these culturally significant sites and seeking longer term solutions to protect and have continued access to these areas.

The AOO identified in their AKLUS that there are a number of VCs important for harvesting in the vicinity of the CRL site including animals, plant and fish species, and that their ability to conduct traditional harvesting activities in the RSA is already impacted by a number of existing stressors, including existing developments and land restrictions such as the CRL site and CFB Petawawa. However, it is expected that the magnitude of changes from the current baseline conditions as a result of the Project on the ability for Algonquin community members to access harvesting locations would still be low. The AOO has expressed concerns with using current baseline conditions from the last 10 – 20 years since it does not account for the significant cumulative impact of development within the area on AOO's rights and interests. The proposed project footprint is currently not accessible for traditional harvesting practices as it is within the CRL site. Although the project footprint itself represents the permanent use of approximately 37 ha of the CRL site, it is likely to have little additional or new impact on the exercise of hunting rights in the RSA, compared to the current baseline conditions. Therefore, the potential overall severity of this impact pathway is assessed as low for the proposed NSDF Project.

9.3.2.3 Experience (Avoidance)

Based on information gathered in their AKLUS, Algonquin community members have expressed concerns about the CRL site being potentially contaminated as a result of historic and ongoing nuclear operations and activities. Due to this perceived risk of contamination, some Algonquin community members currently avoid using the land and resources near the site to exercise their rights.

In addition, AKLUS participants noted that some Algonquin community members may continue to alter their land use because of perceived environmental contamination and impacts in the vicinity of CRL, which may affect land use and enjoyment into the future, as a result of the NSDF Project.

As the NSDF Project is a permanent facility, it would effectively end the possibility of removing a source of fear that leads to avoidance behaviour within the CRL site from the AOO's perspective. As a result, it is unclear how much the proposed Project would contribute to the perpetuation of avoidance behaviours over time, given the historical and present context of existing fear and avoidance behaviours.

In addition, it is possible that the Project may lead to some avoidance behaviours in the RSA during particular phases of the Project, due to an anticipated increase in traffic, noise, and dust during the construction and operation phases of the Project. However, CNSC staff confirmed in the EA report that when taking into consideration CNL's proposed mitigation measures (see section 6.1), there are no residual adverse environmental effects expected as a result of the Project, including in relation to noise, dust and traffic.

Therefore, CNSC staff do not expect the Project to lead to new adverse impacts on the AOO's quality of experience, including potential avoidance behaviours in the RSA. CNSC staff found

that the potential overall severity of this impact pathway is low based on the rights impact severity criteria decision matrix (see table 9.5 above).

9.3.2.4 Mitigation, accommodations, monitoring and follow-up

The 2 main project pathways to potential impacts on the AOO's rights and interests that were identified were found through the analysis in section 9.3.2.1 to be of a low overall severity. However, to ensure that the concerns raised by the AOO regarding any potential impacts to access and the quality of experience (avoidance) to conduct traditional activities related to the Project are appropriately managed during all phases of the project, CNSC staff and the AOO assessed mitigation and other measures proposed by CNL to determine their adequacy and effectiveness.

CNSC staff confirmed that the mitigation measures identified in CNL's EIS are adequate to address potential biophysical impacts from the Project in relation to potential impacts on wildlife and potential concerns around access and the sensory experience in the RSA. CNL has committed to engaging the AOO in their NSDF Project follow-up monitoring program in order to help address concerns raised regarding fear and avoidance behaviours and build trust in the proposed NSDF Project as well as current and ongoing operations at the CRL site. This will be done through the development of a Long-Term Relationship Agreement with the AOO, and involvement, including capacity, in the EAFMP. The success of these mitigation measures are dependent on finalizing and successfully implementing the Long Term Relationship Agreement. If the Long Term Relationship Agreement (LTRA) is not finalized and not successfully implemented, the AOO contend that there will be risks to the AOO's Aboriginal rights and interests. This underscores the importance of including these commitments in the LTRA as conditions of approval for the Project from the AOO's perspective.

CNL has also committed to enhancing its engagement with the AOO, providing additional capacity and sharing results of monitoring activities and follow-up monitoring program including those for air quality, surface water quality, terrestrial environment, aquatic environment and ground water quality. CNL will also share its Archaeological Master Plan and CRM Program with the AOO. CNL will continue to maintain access to Pointe au Baptême, which is a culturally significant site identified by the AOO and ensure appropriate measures are taken should any undocumented archaeological resources be discovered.

In addition to these overarching commitments, CNL also committed to a number of specific actions with the AOO and these are outlined in CNL's commitments report. From the AOO's perspective, the commitments report captures the current status of how AOO and CNL are seeking to resolve several project-specific issues raised through the AKLUS and the AOO's technical review of the EIS. The AOO is of the view that additional commitments may be required to be added to the list based on the enhanced engagement activities described above. CNSC staff found that these proposed measures and commitments would assist to address the concerns raised by the AOO and will help manage the potential impacts identified through this RIA throughout the life cycle of the NSDF. Given that the CNL's commitments report contains avoidance and mitigation measures to address impacts to the AOO's Aboriginal rights and interests, the AOO requires that the commitments report, and the successful implementation of those commitments, be included as conditions of approval if the NSDF Project is approved.

For the AOO, a critical gap in the assessment is that the socio-economic effects assessment does not provide an inter-dependent, or holistic analysis of impacts to the health and wellbeing of

Algonquins. This requires an Indigenous lens and approach that is relevant to the AOO's Aboriginal rights, interests and way of life. From the AOO's perspective, CNL's EIS remains inadequate in assessing and addressing impacts to Algonquin health, wellbeing and socio-economics, and in turn has not adequately conveyed the full range and depth of impacts to AOO's Aboriginal rights and interests, including Aboriginal title as per section 35 of Canada's Constitution. CNSC staff noted this issue raised by the AOO, however the approach requested by the AOO for assessing socio-economic effects is considered outside of the scope of the CEAA 2012 and NSCA regulatory processes for the NSDF Project. Additionally, as the RIA is tied to the scope of the decision of the regulatory processes under CEAA 2012 and the NSCA, CNSC staff also considered this request outside of the scope of the RIA. CNSC staff encourage the AOO to continue to discuss these broader issues with CNL and AECL as part of Long Term Relationship Agreement discussions.

In addition to the mitigation measures and the follow-up and monitoring activities summarized above, CNSC staff are committed to long-term engagement with the AOO and have offered to discuss the development of a ToR for Long-Term Engagement to assist in building a collaborative relationship and trust with the AOO. CNSC staff have also raised AOO's broader concerns regarding the CRL site and other activities and stressors in their modern land claim territory, to the attention of AECL and Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC).

When taking into consideration the overall low severity of potential impacts on AOO's rights, as well as the proposed mitigation and other measures to address the concerns raised by the AOO in relation to the Project, no residual impacts were identified in relation to the Project that required further analysis or consideration of additional mitigation or follow-up monitoring program measures.

Table 9.6: Summary of the severity of potential impacts to Aboriginal rights for AOO with respect to the Near Surface Disposal Project

Established/potential/asserted right (Nature, scope, exercise)	AOO perspective on the importance, value, uniqueness of an area, resources or species	Context	Potential project impact (Type and description)	Magnitude	Geographic extent	Reversibility	Duration	Frequency & timing	Overall severity	Mitigation and follow-up monitoring program measures (proponent)	Mitigation and follow-up monitoring program measures (CNSC)	Residual impacts
Harvesting												
Hunting, trapping, fishing and gathering of natural resources for food, social or ceremonial purposes	<ul style="list-style-type: none"> - Key source of food - Cultural importance through food sharing, knowledge transfer, and traditional protocols 	<p>Regional:</p> <ul style="list-style-type: none"> - CNSC staff is of the view that the NSDF will not impact Algonquin community members' ability to harvest at the regional level <p>Local:</p> <ul style="list-style-type: none"> - use of CRL site before the site was established -access to the CRL site has been restricted since establishment of the site in the 1940's and there are currently no plans for re-establishing general public access and use for traditional practices for the CRL site 	1. Access 37 ha of land become permanently inaccessible for hunting and harvesting	Low	Site specific	Permanent	Long-term	Continuous	Low to no impacts	<ul style="list-style-type: none"> -The mitigation measures identified in CNL's EIS are adequate to address potential biophysical impacts from the Project in relation to wildlife and potential concerns around access and the sensory experience in the RSA. -CNL has committed to engaging the AOO in their NSDF Project EAFMP in order to help address concerns raised regarding fear and avoidance behaviours 	Long-term engagement with the AOO through proposal of negotiating a Long-Term Engagement ToR which would include collaborating on CNSC environmental monitoring activities around the CRL site, ongoing communication and regular meetings, as well as engagement with Algonquin community members.	None identified at this time, but to be determined and monitored over time. Mitigation and follow-up measures are deemed adequate to address and manage potential impacts.
			2. Experience (Fear and Avoidance) Perceived contamination of animals, water and plants near the CRL site causes avoidance behaviour due to low trust in quality of resources. (Sensory) Noise, traffic, and dust from construction and operation activities degrades the sensory experience of being on the land, causing avoidance of the area	Low	Local	Permanent	Long-term	Continuous	Low to no impacts	<ul style="list-style-type: none"> -CNL has committed to enhancing its engagement with the AOO, sharing results of monitoring activities and follow-up monitoring program including those for air quality, surface water quality, terrestrial environment, aquatic environment and ground water quality. -CNL will also share and engage the AOO on its Archaeological Master Plan and CRM Program with the AOO. -CNL will also continue to maintain access to Pointe au Baptême -CNL and the AOO are in the process of developing a long-term relationship agreement that will help to enhance the relationship and foster greater collaboration and inclusion. 		None identified at this time, but to be determined and monitored over time. Mitigation and follow-up measures are deemed adequate to address and manage potential impacts.

9.3.2.5 Findings on potential impacts on the AOO's rights

Based on the information gathered and the collaborative RIA process conducted between the CNSC and the AOO, CNSC staff have found that the potential impacts identified as a result of the NSDF Project on AOO's asserted Aboriginal rights and interests, including Aboriginal title, are considered to be of an overall low severity. With the mitigation and follow-up measures proposed by CNL, AECL and CNSC staff, all identified impacts and concerns can be adequately managed and addressed in relation to the Project. Therefore, there are no residual impacts expected to AOO's rights in relation to the Project.

The AOO's views

The AOO disagrees with the CNL's and CNSC's assessment that there are no residual impacts expected to the AOO's rights in relation to the Project based on the inadequacy and narrow scope of the cumulative effects and socio-economic impact assessments under CEAA 2012. The NSDF Project is a single project within a landscape that has been significantly impacted by nuclear research and development. With both the CRL site and the NPD sites subject to assessments for projects that are at varying stages of the impact assessment process (e.g., NSDF, Global First Power's Micro-Modular Reactor, and CNL's decommissioning of NPD), the cumulative impacts of historic, ongoing and future nuclear activities is of concern to the AOO. The AOO are steadfast in its interest to move beyond compliance and ensure that the full range of impacts on the AOO's Aboriginal rights and interests are understood, assessed, properly mitigated, and monitored over the lifecycle of the Project.

All parties involved, including the AOO, CNL, AECL and the CNSC are committed to ongoing engagement and dialogue to work towards addressing concerns raised by the AOO and enhancing the relationships through collaboration in relation to the NSDF Project and the CRL site in general.

9.3.3 Summary of findings on potential impacts on AOPFN's rights

CNSC staff considered potential impacts to AOPFN rights by completing a specific RIA with AOPFN captured in a separate RIA Report (see appendix D). AOPFN members assert and exercise a variety of rights throughout their traditional territory that includes the CRL site where the NSDF Project is proposed. For the purpose of this RIA with AOPFN, a variety of harvesting, governance and stewardship and cultural continuity rights were identified as the principle asserted rights that could potentially be impacted by the Project. Project impacts on the following rights include:

- Harvesting rights - impacts may occur through the perception of contamination associated with the CRL site will likely continue due to the creation of a permanent radioactive waste disposal facility on site.
- Governance and stewardship rights – impacts may occur through the temporal, effectively permanent extension of the current inability to manage this portion of its unceded lands in a manner agreeable to AOPFN.
- Cultural continuity rights – impacts may occur through increased stigma of contamination from the NSDF impacting on AOPFN connection to land and ability to pass on knowledge about the area down to future generations.

Based on the information gathered, from AOPFN, CNL and CNSC staff's analysis and the collaborative RIA process conducted between the CNSC and AOPFN, CNSC staff have found

that the potential impacts identified as a result of the NSDF Project on AOPFN harvesting and cultural continuity rights are considered to be of an overall low severity with the exception of the perceived contamination and stigma impacts, which may have a low to moderate severity. With respect to the severity of impacts to governance and stewardship rights due to a permanent extension of the current inability to manage this portion of AOPFN's traditional territory CNSC found a low severity, however AOPFN concluded a moderate severity. However, with the mitigation and follow-up monitoring program measures proposed by CNL, AECL and CNSC staff, CNSC staff and AOPFN feel that the agreed to Project impacts and concerns can be adequately managed and addressed. AOPFN's perspective, however, differs on the manageability of impacts on governance and stewardship rights. In addition, all parties involved, including AOPFN, CNL, AECL and the CNSC are committed to ongoing engagement and dialogue to work towards addressing concerns raised by AOPFN and enhancing the relationships through collaboration in relation to the NSDF Project and the CRL site in general. Lastly, with respect to the severity of impacts to governance and stewardship rights, AOPFN identified an additional impact with respect to the lack of adherence to AOPFN's stated nuclear principles, 'Willing Host' principle and right to free, prior and informed consent and considers the overall impacts to governance and stewardship rights to be of moderate to high severity. In addition, AOPFN continues to raise concerns with the approach taken in the RIA for the assessment of cumulative impacts on their rights. More information regarding AOPFN's views can be found in the RIA and its annexes (see appendix D1). With respect to issues and impacts related to AOPFN's governance and stewardship rights, CNSC staff encourage AOPFN to continue to work with CNL and AECL to find a path forward to resolve these issues.

9.3.4 Summary of findings on potential impacts on the MNO's rights

CNSC staff considered potential impacts to the MNO Indigenous rights and interests by completing a specific RIA with the MNO captured in a separate RIA report that is appended to CNSC staff's EA report (see appendix D2). Métis Citizens assert and exercise a variety of rights throughout their traditional territory and regions in Ontario, including in the vicinity of the Project and the CRL site. For the purpose of this RIA, Métis harvesting rights were identified as the principle asserted rights that could potentially be impacted by the Project. Harvesting rights are understood to be premised on the right to hunt for food in the traditional hunting grounds of the Métis Nation. Project impacts on the exercise of harvesting rights by MNO Citizens may occur through access restrictions, avoidance behaviours, and/or sensory disturbances. Based on the information gathered and the collaborative RIA process conducted between the CNSC and the MNO, CNSC staff have found that the potential impacts identified as a result of the NSDF Project on MNO rights and interests are considered to be of an overall low severity. With the mitigation and follow-up monitoring program measures proposed by CNL, AECL and CNSC staff, all identified Project impacts and concerns can be adequately managed and addressed. Therefore, there are no residual impacts expected to MNO's Indigenous rights in relation to the Project. All parties involved, including the MNO, CNL, AECL and the CNSC are committed to ongoing engagement and dialogue to work towards addressing concerns raised by the MNO and enhancing the relationships through collaboration in relation to the NSDF Project and CRL site in general. MNO agrees with the findings, recommendations and proposed approach.

9.4 CNSC findings regarding Indigenous consultation and impacts to Indigenous and/or Treaty rights

CNSC staff have conducted a thorough, transparent, flexible and collaborative consultation process throughout the EA and regulatory process for the NSDF Project. All identified Indigenous Nations and communities were provided with multiple opportunities to participate in the regulatory review process including funding support, comment periods, workshops, multiple meetings, project updates, gathering of Indigenous Knowledge and Traditional Land use data, collaborative development of key sections of CNSC staff's EA report and the completion of RIAs. CNSC staff have monitored and assessed CNL's engagement activities throughout the regulatory review process as per REGDOC 3.2.2. CNSC staff have ensured that CNL has conducted a thorough engagement process with all identified Indigenous Nations and communities including the identification, addressing and validation of key issues and concerns raised by each Indigenous Nation or community. CNSC staff are satisfied with the level and quality of engagement that CNL has conducted, including the collaborative development of commitments lists to address the key concerns raised by each Indigenous Nation or community.

In addition, CNSC staff have verified that CNL's EIS meets the requirements of CEAA 2012 as it pertains to the assessment of potential effects on Indigenous peoples. Based on the analysis of environmental effects of the Project on Indigenous peoples (section 7.3) and the related mitigation, follow-up monitoring program, and monitoring measures, as well as the potential impacts and commitments discussed above and in Appendices E1 and E2, CNSC staff are satisfied that the potential impacts of the Project on Indigenous and/or Treaty rights have been adequately identified and appropriately mitigated to the greatest extent possible. Based on the information to date and notwithstanding the opportunities for Indigenous Nations and communities to express their views to the Commission during the public hearing process, CNSC staff are of the view, and recommend to the Commission that they determine the duty to consult under section 35 of the *Constitution Act* as having been discharged in an appropriate and adequate manner. As mentioned above and in appendices E1 and E2, CNSC staff remain committed to our long-term relationships with each of the identified Indigenous Nations and communities and involving them in the ongoing monitoring and oversight of the implementation of mitigation measures and commitments, should the NSDF Project proceed.

10.0 Public engagement

This section of the report is focused on CNSC staff's EA-specific public engagement activities. Details on all public engagement activities conducted by CNL and CNSC staff with respect to the NSDF Project are provided in section 6.1 of staff's CMD.

Pursuant to section 24 of CEEA 2012, the RA must ensure that the public is provided with an opportunity to participate in the EA of a designated project. CEEA 2012 does not prescribe for CNSC-led EAs, when and for which steps in the EA process, the opportunities are to be provided. The breadth and timing of public participation is at the discretion of the CNSC.

The CNSC provided four formal opportunities for the public, Indigenous Nations and communities, and government reviewers to participate in the EA process for the NSDF Project. Notices of these opportunities to participate were posted on the Canadian Impact Assessment Registry (CIAR) (formally the Canadian Environmental Assessment Registry)'s Internet site (CIAR reference number 80122). During these opportunities, comments were solicited on:

- the NSDF Project Description (May - June 2016)
- the revised NSDF Project Description (October - November 2016)
- the proponent's draft EIS (March- May 2017)
- the NSDF EA report (this report)

In addition to the formal opportunities for participation, CNSC staff responded to NSDF related inquiries (telephone calls and e-mails) as they were received, throughout the duration of the EA process. CNSC staff also kept the CIAR up to date, posting regular project updates, as well as posting all relevant documentation on an ongoing basis.

This EA report includes the CNSC's findings and recommendations and as demonstrated in previous sections of the report, was informed by comments received from the public, Indigenous Nations and communities and government reviewers.

10.1 CNL-led public participation activities

CNL held a number of public information sessions and site tours for the communities of Renfrew County, Pontiac Regional County, the Town of Deep River, Pembroke City, Laurentians Hills Town, Arnprior Town, and L'Isle-Aux-Allumettes from 2015 to 2019. CNL also organized other forms of NSDF Project-specific engagement activities, including but not limited to:

- posting and publishing Project-specific fact sheets
- webinar information sessions
- conducting Project-specific employee information sessions
- participating in public events
- emails to stakeholders including notifications of the draft EIS submissions and responses to questions submitted

Project material was prepared and distributed in both French and English at all public participation opportunities. In addition, a number of interviews and meetings were conducted with regional organizations, businesses, municipalities and other interested parties. Public

outreach and communication were carried out using public radio, webinars, local newspapers, community newsletters, and by mail.

10.2 CNSC-led public participation activities

CNSC open house sessions

On April 26 and 27, 2017, CNSC staff held 3 public outreach open house sessions on the NSDF regulatory review process, 2 sessions (afternoon and evening) in Deep River, ON and 1 session in Sheenboro, QC. A total of 80 individuals participated in the Open House sessions. Main concerns discussed and raised by attendees included:

- project site selection (proximity to the Ottawa River)
- the quality of the EIS
- the reliability of the facility design
- intermediate-level waste
- concerns over the short timeframe for public engagement
- the adequacy of CNL's Public Information Program
- the credibility of the regulator
- the receipt of waste for permanent storage at the Chalk River facility
- a general sense of opposition to the project by cottagers and some local residents due to the proximity of the proposed site to the Ottawa River
- the remoteness of the area in the face of a nuclear accident
- the lack of access to information on the project in the community
- the misunderstanding that part of the waste will come from outside of Canada
- the lack of alternative sites considered outside of CNL's properties

On October 2, 3 and 4, 2017, CNSC staff held a total of 5 CNSC public open house sessions in Deep River, ON, Pembroke, ON and Sheenboro, QC, on the NSDF regulatory review process. A total of 89 individuals participated in the Open House sessions. Main questions/concerns/comments heard throughout all of the open houses included:

- social acceptability
- what alternatives to an NSDF were considered
- proximity of the NSDF (1km) to the Ottawa River
- adequacy of the design for the proposed waste inventory
- concerns about radioactive waste being transported in from off-site sources to this location
- if this facility fails, what are the potential impacts on the Ottawa River
- concerns about the impact of seismic activity on the NSDF

- requests for more information about existing similar successfully constructed facilities around the world and how they compare to the proposed NSDF design
- concerns about the current timeline to construct the NSDF (perception that it is accelerated)
- confusion about the Government-owned, Contractor-operated (GoCo) model and the role of AECL with respect to NSDF
- request for additional IEMP monitoring in the local area to include sampling of fish
- questions regarding whether public concerns will be taken into consideration when the Commission is making a decision on this project

CNSC Participant funding program

The CNSC supported public participation in the EA through its PFP.

On May 25, 2016, the CNSC announced it was offering up to \$100,000 under its PFP to assist participation of members of the public, Indigenous Nations and communities, and other stakeholders in the EA process, licence application review and Commission hearing for CNL's NSDF Project. A total of \$124, 824.79 was allocated to 9 recipients.

In March 2019, the CNSC announced it was offering up to \$150,000 under PFP to assist participation of members of the public, Indigenous Nations and communities, and other stakeholders in the remaining steps of the EA process, licence application review and Commission hearing for CNL's NSDF Project. A total of \$192,328.92 was allocated to 11 recipients.

11.0 Follow-up monitoring program

The purpose of a follow-up monitoring program under the CEAA 2012 is to verify the accuracy of the EA and to determine the effectiveness of the mitigation measures taken to mitigate the adverse environmental effects of the Project. Where appropriate, the results of a follow-up monitoring program may also support the implementation of adaptive management measures to address previously unanticipated adverse environmental effects.

Monitoring and follow-up will be carried out throughout all phases of the NSDF Project. The specific follow-up monitoring program elements (location, reporting, frequency and timelines) will be modified based on future permits, licences, authorizations and/or approvals. The program may also need to be updated or revised to address changes in environmental conditions and observations of the Project's effects on the environment.

CNL will be required to design and implement an EAFMP in consultation with Indigenous Nations and communities and relevant regulators. The CNSC compliance program will include expected timelines and will be used as a mechanism for ensuring the final design and implementation of the follow-up monitoring program, and for the reporting of the program results.

CNL submitted a draft EAFMP to CNSC staff in June 2021, and it is currently under review by the FPRT. CNL has also been engaging with Indigenous Nations and communities to obtain feedback on the EAFMP and has held three public webinars on the draft EAFMP to date, in an effort to obtain feedback and to answer questions on the draft EAFMP. CNL will continue to engage with Indigenous Nations and communities and will share the results of the monitoring and follow-up monitoring program throughout all phases of the Project. CNL's [draft EAFMP](#) is available on CNL's website.

12.0 CNSC staff findings and recommendations

In preparing this report, CNSC staff took into account CNL's EIS, its responses to information requests and comments, and the views of government agencies, Indigenous Nations and communities and the public.

The environmental effects of the NSDF Project and their significance have been determined using assessment methods and analytical tools that reflect current accepted practices of environmental and socio-economic assessment practitioners, including consideration of potential accidents and malfunctions and the potential for cumulative effects.

CNSC staff assessed the likelihood of the NSDF Project to cause significant adverse environmental effect, following the application of mitigation measures, in accordance with the CNSC Generic Guidelines, CNSC REGDOC-2.9.1, and the Canadian Environmental Assessment Agency's (now the Impact Assessment Agency of Canada) [*Operational Policy Statement: Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under CEAA 2012*](#).

CNSC staff recommend that the Commission conclude that, taking into account the implementation of proposed mitigation and follow-up monitoring program measures, the Project is not likely to cause significant adverse environmental effects as defined by CEAA 2012. The Commission's decision should be based on the description of effects under subsections 5(1) and 5(2) of CEAA 2012, as well as the scope of factors defined in paragraphs 19(1) (a) to (h) of

CEAA 2012, as determined in the Commission’s decision on the scope of the EA for NSDF of March 8, 2017.

CNSC staff recommend that the implementation of CNL’s list of identified mitigation measures and follow-up monitoring program measures, as identified and included in the proposed document titled “Near Surface Disposal Facility Project Consolidated Commitment Lists”, become an enforceable condition that is set out in the Commission’s decision. Refer to section 1.2.3 of the CMD and section G (General) of the licence and the associated licence conditions handbook (LCH) for the facility-specific condition.

CNSC staff also recommend that the following CNSC commitments be included in the Commission decision:

CNSC staff commit to the following, in an ongoing effort to enhance transparency, and to foster confidence and trust in the regulator:

1. CNSC staff commit to engaging with members of the public, Indigenous Nations and communities, and local authorities and seeking feedback early on future IEMP sampling campaigns related to the NSDF and/or CRL site.
2. CNSC staff commit to long-term relationships with each of the identified Indigenous Nations and communities and to involving them in the ongoing monitoring and oversight of the implementation of mitigation measures and follow-up monitoring program measures, should the NSDF Project proceed.
3. CNSC staff commit to conducting engagement activities with Indigenous Nations and communities at a frequency mutually agreed upon with each of the Indigenous Nations and communities.
4. CNSC staff commit to conducting regular outreach activities related to the NSDF Project and/or the CRL site with local communities.

CNSC staff will systematically track the implementation of these commitments and will report publicly on any updates and the progress made towards achieving these objectives.

Appendix A. Environmental effects rating criteria

Table A.1 - General Assessment criteria for significance determination

Assessment criterion	Effects rating definitions		
Residual adverse effect	Low	Moderate	High
Magnitude* severity of the adverse effect*	VC-Specific	VC-Specific	VC-Specific
Geographic extent spatial reach of the adverse effect	<u>Site-specific</u> Within the Project Study Area	<u>Local</u> Within the LSA	<u>Regional</u> Within the Regional Study Area
Duration length of time a VC would be affected by the adverse effect	<u>Short-term/Temporary</u> Effects that occur within the construction phase OR that occur within one generation or recovery cycle of the environmental component CULR**: Effect lasts less than one complete seasonal round (<1 year)	<u>Medium-term</u> Effects that extend through the operation and decommissioning phases (from 2 to 50 years) OR that extend to one or 2 generations or recovery cycles of the environmental component CULR**: Effect lasts less than one generation of land users (< 25 years)	<u>Long-term</u> Effects that extend into abandonment and beyond (>300 years) OR that extend for 2 or more generations or recovery cycles of the environmental component CULR**: Effects last for more than one generation of land users (> 25 years)
Frequency rate of recurrence of the adverse effect	<u>Once</u> Occurs once during any phase of the Project	<u>Intermittent</u> Occurs occasionally or at intermittent intervals during any phase of the Project	<u>Continuous</u> Occurs continuously during any phase of the Project
Reversibility degree to which the environmental conditions can recover after the adverse effect occurs	<u>Reversible</u> Reversible within the lifetime of the Project, or after project decommissioning and reclamation	<u>Partially Reversible</u> Partially reversible within the lifetime of the Project or after project decommissioning and reclamation	<u>Irreversible</u> Persists after project decommissioning and reclamation

Assessment criterion	Effects rating definitions		
Residual adverse effect	Low	Moderate	High
Timing*** consideration for the time of year that a project activity is undertaken	<u>Inconsequential</u> Timing of predicted project activities is not expected to affect sensitive activities	<u>Moderate</u> Timing of predicted project activities may affect some sensitive activities	<u>Unfavorable</u> Timing of predicted project activities will affect some sensitive activities

*Magnitude effects rating definitions are VC-specific. The list of VCs and the definitions of the effects ratings for each are to be determined on a Project-specific basis.

**CULR = Current Use of Lands and Resources for traditional purposes

*** Timing is a VC-specific consideration, applied to fish and fish habitat, where disturbance may occur during sensitive life stages, and for the current use of lands and resources for traditional purposes, which may be affected seasonally by changes to the environment.

Table A.2 - Description of magnitude ratings for CNSC-identified VCs specific to NSDF Project

VC	Magnitude Ratings		
	Low	Moderate	High
Fish and fish habitat	Little to no effect on fish health or fish populations in the receiving environment	Measurable effect on fish health or fish populations in receiving environment, but one which would not likely result in changes to the regional status of fish populations and health	Measurable effect on fish health or fish populations in the receiving environment which could result in changes to the regional status of fish populations and health
Migratory birds	Little or no effects on migratory birds or unique migratory bird habitats	Detectable change on many individual migratory birds or unique migratory bird habitats, but one which would not likely change the status of the regional populations or availability of unique habitats	Detectable change on the majority of migratory birds or unique migratory bird habitats which would result in changes to the status of regional populations or availability of unique habitats
Indigenous uses: Current use of land and resources for traditional purposes	The effect results in a change to locations or resources, experience, or use of locations or resources for traditional purposes, but the activity and use by an Indigenous Nation or community could be practiced in the same or similar manner as before	The effect results in a change to locations or resources, experience, or use of locations or resources for traditional purposes, and preferred locations or means to practice the activity and use by an Indigenous Nation or community may be modified or limited	The effect results in a change to locations or resources, experience, or use of locations or resources for traditional purposes, and the activity can no longer be carried out by an Indigenous Nation or community in its preferred manner and locations
Human health (including Indigenous peoples health)	The effect results in a change in health status, but the change would be negligible or low and exposure does not approach health-based standards	The effect results in a change in health status, with exposures below but nearing health-based standards	The effect results in a change in health status, with exposures above health-based standards

VC	Magnitude Ratings		
	Low	Moderate	High
Transboundary environmental effects: GHG emissions	Emissions are detectable but within normal variability of baseline	Emissions would cause an increase relative to baseline but are within regulatory limits and objectives	Emissions would singly or as a substantial contribution in combination with other sources cause exceedances of objectives or standards beyond the Project boundaries

Table A.3 - CNSC Decision tree for determining overall significance of a residual effect for a CEAA 2012 Project

Magnitude*	Geographic extent	Duration	Frequency	Reversibility	Significance
Low	Any extent	Any duration	Any level of frequency	Any level of reversibility	Not significant
Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Significance
Moderate	Site-specific	Short-term or medium-term	Once or intermittent	Any level of reversibility	Not significant
			Continuous	Fully or partially reversible	Not significant
				Irreversible	Significant
		Long-term	Any level of frequency	Fully or partially reversible	Not Significant
				Irreversible	Significant
	Local	Short-term	Once or intermittent	Any level of reversibility	Not significant
			Continuous	Fully or partially reversible	Not significant
				Irreversible	Significant
		Medium-term or long-term	Once	Any level of reversibility	Not significant
			Intermittent or continuous	Fully or partially reversible	Not significant

				Irreversible	Significant
	Regional	Short-term	Once or intermittent	Any level of reversibility	Not significant
			Continuous	Any level of reversibility	Significant
		Medium-term	Once	Any level of reversibility	Not significant
			Intermittent or continuous	Any level of reversibility	Significant
		Long-term	Any level of frequency	Any level of reversibility	Significant
Magnitude	Geographic extent	Duration	Frequency	Reversibility	Significance
High		Short-term or medium-term	Any level of frequency	Any level of reversibility	Not significant
		Long-term	Any level of frequency	Fully or partially reversible	Not significant
				Irreversible	Significant
	Local	Any duration	Any level of frequency	Fully or partially reversible	Not significant
				Irreversible	Significant
	Regional	Any duration	Any level of frequency	Any level of reversibility	Significant

*All effects of low magnitude were considered not significant, regardless of other criteria.

Appendix B.

Table B-1 Summary of significance determination for predicted residual adverse effects from NSDF Project

Predicted degree of residual effect							
Residual adverse effect	Magnitude	Geographical extent	Duration	Frequency	Reversibility	Timing	Significance of residual effect
Valued component – fish and fish habitat							
Fish habitat loss and alteration	Moderate Physical changes to fish habitat are expected from the installation of the diffuser and transfer line construction; however, mitigation measures are expected to counterbalance the alteration of fish habitat.	Moderate Effect predicted to extend into the LSA.	Medium-term Effect predicted to occur during the construction and operation phases.	Intermittent Effect predicted to occur at intermittent intervals during the construction and operation phases.	Reversible Effect predicted to be fully reversible once project activities cease.	Moderate Timing of project activities may affect some spawning and egg/larvae development activities, despite proposed timing of activities to avoid sensitive seasons.	Not significant It is expected that fish habitat loss and alteration, while not expected to affect fish populations, would continue until project activities cease.
Fish health	Moderate Effluent discharge and leakage of leachate could cause fish health effects, but are not	Moderate Effect predicted to extend into the LSA.	Medium-term Effect predicted to occur during the construction and operation phases.	Continuous Effect predicted to occur continuously during the construction	Reversible Effect predicted to be fully reversible once project activities cease.	Moderate Timing of project activities may affect some spawning and egg/larvae development	Not significant It is expected that there would be health effects on individual fish but populations of fish would not be affected outside of the LSA.

Predicted degree of residual effect							
Residual adverse effect	Magnitude	Geographical extent	Duration	Frequency	Reversibility	Timing	Significance of residual effect
	likely to result in changes to fish populations and health at a regional level.			and operation phases.		activities, despite proposed timing of activities to avoid sensitive seasons.	
Valued component – Migratory birds							
Habitat loss and alteration	Low Removal of habitat is predicted to reduce bird abundance and reduce the quality of nesting habitat in the SSA. No likely change to the status of regional populations.	Low Effect predicted to occur within the SSA.	Long-term Effect predicted to extend into abandonment.	Continuous Effect predicted to occur continuously during any phase of the project.	Irreversible Effect predicted to persist after decommissioning and reclamation.	Moderate Timing of habitat removal may affect breeding and nesting activities, despite proposed timing of activities to avoid sensitive seasons.	Not significant Suitable habitats are available within the LSAs and RSAs, and the conversion of forested habitat to turf-grass habitat at the SSA is not likely to affect regional populations.
Sensory disturbance	Low Noise, light and human disturbance during the construction	Moderate Effect predicted to extend into the LSA.	Medium-term Effect predicted to occur during the construction	Continuous Effect predicted to occur continuously during the construction	Reversible Effect predicted to be fully reversible once the construction and	Moderate Timing of sensory disturbance may affect breeding and	Not significant Migratory birds predicted to inhabit or frequent the LSAs and RSAs, where sensory

Predicted degree of residual effect							
Residual adverse effect	Magnitude	Geographical extent	Duration	Frequency	Reversibility	Timing	Significance of residual effect
	and operation phases is predicted to have little effect on regional populations.		and operation phases.	and operation phases.	operation phases cease.	nesting activities during the construction and operation phases, despite proposed timing of activities to avoid sensitive seasons.	disturbance would be similar to the baseline.
Valued component – Human health (including Indigenous peoples health)							
Exposure to air and water non-radiological contaminants by inhalation and ingestion	Moderate Receptors may see a change in health status, with exposures expected to be below health-based standards.	Moderate Effect predicted to occur within the LSA.	Long-term Effect predicted to extend into abandonment.	Intermittent Effect predicted to occur occasionally and intermittently.	Partially reversible effect predicted to be partially reversible as changes to water and fish tissue concentrations would require a long time to return to existing conditions.	-	Not significant
Exposure to air and water radiological contaminants by	Moderate Receptors may see a change in health status,	Moderate Effect predicted to	Long-term Effect predicted to extend into abandonment.	Intermittent Effect predicted to occur occasionally	Partially reversible Effect predicted to be partially	-	Not significant

Predicted degree of residual effect							
Residual adverse effect	Magnitude	Geographical extent	Duration	Frequency	Reversibility	Timing	Significance of residual effect
inhalation and ingestion	with exposures expected to be below health-based standards.	occur within the LSA		and intermittently.	reversible as changes to water and fish tissue concentrations would require a long time to return to existing conditions.		
Valued component – Transboundary environmental effects							
GHG emissions	Low Emissions from the Project would result in less than a 0.02% increase of annual Ontario emissions.	-	-	-	-	-	Not significant Project would not contribute a significant quantity of GHG into the atmosphere.

Appendix C. Issue and Concern Summary Table for Algonquins of Pikwakanagan First Nation (AOPFN)
with respect to the Proposed Near Surface Disposal Facility (NSDF)

Table C-1 AOPFN concerns and issues table

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme	Proponent response	Crown response	Status of issue/concern
AOPFN01	<p><i>Historic harms and cumulative effects</i></p> <p>Algonquins of Pikwakanagan First Nation (AOPFN) is concerned that the Environmental Impact Statement (EIS) does not adequately characterize the degree of significance of historic and existing impacts at and around CRL site and fails to assess the impacts of cumulative effects on AOPFN’s Indigenous or Treaty Rights, interests and traditional land use. AOPFN disagrees with the approach that considers present-day environmental conditions to reflect historic harms and cumulative effects. AOPFN is of the view that Atomic Energy of Canada Limited (AECL) is responsible for historic harms and expects CNSC to require CNL to integrate considerations of historic impacts into the EA process. AOPFN is concerned that because there are existing significant cumulative effects at the Chalk River Laboratories (CRL) site, NSDF should be required to show beneficial improvements to an area, rather than just avoiding or mitigating effects. AOPFN is seeking commitment from AECL and CNL to support further research into the historic harms caused by the CRL site on AOPFN Rights and traditional land use, including perceived risks and psychosocial harm to AOPFN members, and to develop a recognition and reconciliation framework on the issue of historic harms.</p>	<p>Environmental Assessment (EA) process; cumulative effects assessment</p>	<p>Canadian Nuclear Laboratories (CNL) worked collaboratively with AOPFN to better understand their concerns regarding historic harms and cumulative effects through regular working group discussions supported by a CNL-AOPFN NSDF Project Contribution Agreement, which includes capacity and engagement activities.</p> <p>CNL also provided revised iterations of written responses to AOPFN’s Comments on the 2019 Draft NSDF EIS. In CNL’s responses and in the Final EIS, CNL communicated to AOPFN that historic cumulative effects of the CRL site are not specific to the NSDF project and that historical and site-wide issues are being discussed with AECL and CNL separately. CNL expressed that the NSDF Project is necessary to enable environmental remediation of the CRL site thus will result in a general improvement of the current environmental conditions. CNL confirmed that as the landowner, AECL is engaging with Indigenous Nations and communities alongside CNSC and CNL to build meaningful and productive relationships.</p> <p>In CNL’s responses to AOPFN’s Comments on the 2019 Draft NSDF EIS, AECL acknowledged that the CRL site was very likely established without consulting Indigenous Nations and communities and indicated that AECL is very interested in establishing positive and mutually beneficial relationships with Indigenous Nations and communities going forward, including AOPFN. 0AECL recommended that AOPFN and AECL together engage with Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) to explore how to address historic harms related to the AECL sites as part of Algonquins of Ontario (AOO)/AOPFN’s ongoing treaty negotiations with the governments of Canada and Ontario.</p>	<p>In the CNSC’s August 2020 Disposition Table of AOPFN’s May 2020 Comments on the NSDF EIS and throughout regular discussions with AOPFN as part of the collaborative Rights Impact Assessment (RIA) process, CNSC staff indicated that pursuant to subsection 19(1)(a) of <i>Canadian Environmental Assessment Act</i>, 2012 (CEAA 2012), the EA and AOPFN RIA for NSDF will take into account “any cumulative environmental effects that are likely to result from the designated project in combination with the environmental effects of other physical activities that have been or will be carried out”. CNSC staff communicated to AOPFN that as per the guidance from the Impact Assessment Agency of Canada for CEAA 2012 EA projects, the baseline considered by CNSC staff for cumulative effects is present day conditions, encompassing all past and present effects. However,</p> <p>CNSC staff collaborated with AOPFN to ensure that a summary of the appropriate historical context from AOPFN’s perspective and associated potential impacts to AOPFN’s Rights are documented and reflected as part of the RIA approach and the CNSC’s EA report. This context on effects from past activities was used to inform the effects of the project being assessed and the mitigation measures applied to it. CNSC staff encourage AOPFN to continue working with CNL and AECL to address concerns about historic and ongoing operations, including those related to the Chalk River site and in AOPFN territory, including the development of a Long-term Relationship Agreement (LTRA).</p> <p>CNSC staff are encouraged by CNL and AECL’s commitment to continue discussions with AOPFN to develop an LTRA which can help to address AOPFN’s concerns about historic and cumulative effects related to the CRL site.</p>	<p>CNSC staff are of the view that AOPFN’s concerns related to historic harms and cumulative effects have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the <i>Nuclear Safety and Control Act</i> (NSCA).</p> <p>AOPFN is of the view that this concern is outstanding as AOPFN’s position remains that decisions about future activities at the CRL site need to be made with a focus on total cumulative effects loading, rather than on the incremental addition of impacts on rights and resources of each individual Project.</p>

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme	Proponent response	Crown response	Status of issue/concern
			CNL worked with AOPFN to develop a mutually agreed upon list of commitments that CNL will undertake to mitigate or lessen AOPFN’s NSDF Project-specific concerns. CNL committed to continuing discussions with AOPFN and AECL to develop an LTRA, which is meant to identify areas of mutual benefit, enable communications and engagement, and address broader AOPFN interests related to AECL and CNL activities. The agreement will include provisions for AOPFN involvement in environmental and cultural stewardship and monitoring.		
AOPFN02	<p><i>EA timelines</i></p> <p>AOPFN is concerned about the need to extend EA report timelines to reflect COVID-19 engagement limitations that impact AOPFN’s ability to meaningfully engage in the EA process. AOPFN requested a three month-extension to the existing EA review timelines.</p>	EA process	<p>CNL and AECL responded to AOPFN’s EA timeline concerns and extension request and acknowledged the challenges of the pandemic and the associated impacts on AOPFN’s ability to engage meaningfully.</p> <p>CNL expressed support for an extension that is reflective of the current lockdown measures in Ontario and indicated that they will adhere to the process and timelines established by the CNSC. CNL also offered to provide support to mitigate further pandemic-related impacts on engagement (e.g., technological equipment and capacity).</p> <p>AECL indicated that while the timelines are determined by the CNSC, they are supportive of AOPFN’s timeline extension request.</p>	<p>CNSC staff worked with AOPFN to ensure that the timelines for completion of different phases of the EA and regulatory process, including the Commission hearing dates, allow a reasonable amount of time for AOPFN to be meaningfully involved.</p> <p>CNSC staff are aware that CNL and AECL responded to AOPFN’s letter and expressed their support for AOPFN’s timeline extension request. In February 2021, CNSC staff met with AOPFN to discuss AOPFN’s extension request for the current EA review timelines. CNSC staff responded to AOPFN’s request in writing and agreed to extend the current RIA and EA timelines to July 2021 to provide the AOPFN with additional time to work with CNSC staff on the drafting sections of the EA report and RIA for NSDF.</p>	<p>CNSC staff are of the view that AOPFN’s concerns related to the EA timelines have been addressed to allow a reasonable amount of time for AOPFN to be meaningfully involved.</p> <p>AOPFN appreciates the reasonable extensions provided by CNL and CNSC. However, AOPFN is of the view that the EA timelines should allow for AOPFN’s Culture and Rights Study and Diet and Harvest Study to be fully integrated into the EA process.</p>
AOPFN03	<p><i>Meaningful engagement</i></p> <p>AOPFN raised concerns about the inadequate level of meaningful engagement by CNL of AOPFN until very late in the EA process, including limited involvement of AOPFN during the development of the EIS, limited information on the project and EA process and lack of site tours. AOPFN would like to work with AECL and CNL to co-develop consultation plans, formal engagement agreements, workplans for EA drafting, and long-term relationship/benefit</p>	Indigenous consultation	Throughout 2016-2019, CNL engaged AOPFN on NSDF through engagement activities with the AOO. CNL initiated discussions directly with AOPFN in early 2020 in response to AOPFN’s request to be engaged directly. In September 2020, CNL signed a Project-specific contribution agreement with AOPFN to support AOPFN’s participation in the EA process. CNL engaged with AOPFN through regular AOPFN-CNL working group meetings to better understand and address concerns raised by AOPFN. These meetings resulted in an increased level of	The CNSC understands the importance of building a strong and ongoing relationship with AOPFN and ensuring that the consultation process is meaningful and addresses the concerns raised by AOPFN. Starting in 2016, CNSC staff engaged AOPFN on the NSDF project primarily through the AOO, including sending all correspondence regarding the NSDF project to both AOPFN and AOO leadership. As per AOPFN’s request, CNSC staff began engaging with AOPFN directly in 2019 to discuss the NSDF Project, their concerns and the EA process.	<p>CNSC staff are of the view that AOPFN’s concerns related to meaningful engagement have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns.</p> <p>AOPFN is of the view that there are outstanding Project-specific concerns, which have been identified throughout the ‘status of issue/concern’ column relevant to the issues identified in this table.</p>

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme	Proponent response	Crown response	Status of issue/concern
	agreements for the EA process. AOPFN continues to request that CNSC and AECL work with AOPFN directly to set up a Chalk River site table at a Nation-to-Nation level to discuss the proposed project. AOPFN is of the view that for all proposed projects in their traditional territory, AOPFN has the right to provide or withhold consent, following the principle of Free, Prior and Informed Consent, as identified in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and that the “Willing Host” approach should be applied to NSDF with respect to the AOPFN community. AOPFN requested that CNL, AECL and CNSC clarify their processes and perspectives regarding free, prior and informed consent and the “Willing Host” principle. Going forward, AOPFN expects greater participation in the identification and assessment of effects for Projects occurring in AOPFN territory.		<p>engagement which CNL is committed to continuing as the EA proceeds.</p> <p>CNL (and the CNSC) has also supported the gathering of AOPFN’s Algonquin Knowledge and Land Use information and collaborated with AOPFN to incorporate that information and knowledge into the Final EIS and supporting documentation, including the Indigenous Engagement Report (IER).</p> <p>In CNL’s written responses to AOPFN’s Comments on the 2019 Draft NSDF EIS, CNL acknowledged that while AOPFN’s request for a Chalk River site table is outside the scope of the NSDF project and requires a tripartite discussion with AECL, CNL looks forward to continued engagement with AOPFN at a CRL-site wide level.</p> <p>In April 2021, CNL and AECL responded separately to AOPFN’s request for clarity on their processes and perspectives regarding free, prior and informed consent and the “Willing Host” principle. CNL clarified that it is not possible for CNL to commit to "willing host" as a requirement for the NSDF Project to proceed given the NSDF Project is critical to the environmental clean-up mission and will result in a general improvement of the current environmental conditions at the CRL site.</p> <p>In advance of submitting the Final EIS, AOPFN and CNL developed mutually agreeable commitments to mitigate some of AOPFN’s concerns. CNL indicated they are committed to trying to achieve understanding and support from the AOPFN as part of the NSDF Project engagement and will continue discussions with AOPFN to mitigate their concerns and develop commitments related to the NSDF Project. Any issues that are in progress or not resolved are captured within Section 6.2.4.3.3 of the Final EIS. CNL also committed to providing funding to continue NSDF Project activities with the AOPFN, including the AOPFN-CNL working group as an interface for project engagement, pending a successful regulatory decision.</p> <p>In CNL’s initial and revised responses to AOPFN’s Comments on the 2019 Draft NSDF EIS, AECL</p>	<p>CNSC staff and AOPFN signed a formal Terms of Reference (ToR) to outline objectives and responsibilities for meaningful and collaborative consultation for the NSDF, the Nuclear Power Demonstration Project and Global First Power’s Micro Modular Reactor (MMR) Project. The ToR also identifies each parties’ roles and responsibilities for drafting of relevant sections of the EA report and sets out the basis for collaboration on developing a Rights Impact Assessments (RIAs) for each project.</p> <p>In April 2021, CNSC staff responded to AOPFN’s request for clarity on their processes and perspectives regarding free, prior and informed consent and the “Willing Host” principle. CNSC staff communicated that the CNSC’s processes for consultation and engagement with Indigenous peoples, including public Commission proceedings are mindful of the principles articulated in UNDRIP, including FPIC, and that our approach aims to advance to the extent possible, the framework for reconciliation. CNSC indicated that as an independent regulator, the CNSC does not have the authority to dictate the location of where nuclear projects are proposed, including the NSDF project as licensees or applicants are responsible for the site selection process.</p> <p>CNSC staff are committed to developing a long-term relationship ToR for engagement with AOPFN, which can identify specific areas where AOPFN and CNSC staff can further collaborate. CNSC staff propose to initiate discussions on this ToR over the coming year.</p> <p>CNSC staff is supportive of the contribution agreement that CNL signed with AOPFN in September 2020, which includes capacity and details of a schedule for AOPFN and CNL to discuss comments/responses and incorporation of AOPFN’s feedback into the final EIS schedules. CNSC staff confirmed that CNL is open to arranging NSDF site tours with AOPFN, if requested.</p>	Related to engagement and consultation, AOPFN is of the view that their concerns about “willing host” and AOPFN’s ultimate FPIC decision have not been adequately addressed.

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme	Proponent response	Crown response	Status of issue/concern
			indicated that they are committed to engaging with Indigenous Nations and communities and building meaningful and productive relationships. Alongside with CNL, AECL is very interested in pursuing two-way dialogue and exploring options for building and maintaining such relationships.	<p>CNSC staff confirmed that CNL worked closely with AOPFN to address and summarize their concerns in the Final EIS and supporting documentation, including CNL’s IER and Project Commitments Report. It is CNSC staff’s understanding that CNL committed to providing AOPFN with additional capacity support to continue NSDF Project activities with CNL, pending a successful regulatory decision. CNSC staff will continue to monitor CNL’s Indigenous engagement activities to ensure CNL is responsive and provides adequate answers to AOPFN’s concerns and requests.</p> <p>CNSC staff encourages AOPFN to continue raising their concerns regarding a Chalk River site table with CNL and AECL and are open to coordinating a meeting between CNL, AECL and AOPFN to facilitate this discussion, should AOPFN express an interest.</p>	
AOPFN04	<p>Alternative means assessment</p> <p>AOPFN raised several concerns about the methodology used for the alternative means assessment, including a lack of meaningful engagement with Indigenous peoples and little consideration of their values and perceptions of the preferability of different alternative means. AOPFN is concerned that the CNSC has not actioned AOPFN’s request to require CNL to meaningfully engage with AOPFN on alternative means prior to the finalization of Project design and report back to CNSC in a supplemental submission.</p>	EA methodology	<p>CNL engaged with AOPFN to better understand and address their concerns related to the alternative means assessment through revised iterations of written responses to AOPFN’s Comments on the 2019 Draft NSDF EIS and subsequent working group discussions in early 2021. In their responses and discussions, CNL provided additional information on the methodology used for the alternative means assessment, including clarity on how the alternative means assessment was prepared in accordance with CEAA 2012. CNL highlighted that in June 2017, Algonquin Negotiation Representatives from AOPFN participated in an NSDF site tour, which included presentation material about alternative means, and that in June 2020, CNL invited AOPFN to attend a webinar that focused on the NSDF alternative means assessment.</p> <p>CNL provided additional information on the purpose, design and site selection process for the Project and offered to meet with the AOPFN Advisory Committee (AAC) to discuss the NSDF alternative means approach. CNL confirmed the NSDF Project has demonstrated how public and Indigenous feedback was incorporated during the</p>	<p>CNSC staff communicated to AOPFN that as per the requirements of CEAA 2012, the proponent is required to include in their EIS a clear description of the alternative means assessment that was carried out for the proposed project, including a clear explanation and justification of the methodologies used to address alternative means. As the Responsible Authority for the federal CEAA 2012 EA, the CNSC has completed a technical review of the draft EIS, including a review of the alternatives means assessment and has deemed CNL’s approach to be acceptable. AOPFN’s views expressed related to the alternative means assessment were taken into consideration by CNSC subject matter experts in making their conclusion on potential effects for the EA report, which was shared with AOPFN for review prior to finalization.</p> <p>CNSC staff confirmed that CNL had discussions with AOPFN and provided written responses to clarify the alternative means assessment and selection of the proposed alternative for the proposed NSDF project, including an explanation of the steps that were taken to ensure that the assessment considered concerns expressed by</p>	<p>CNSC staff are of the view that AOPFN’s concerns related to the alternative means assessment have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p> <p>AOPFN is of the view that this concern is outstanding as the close proximity of the NSDF site to the Kichi-Sibi and the proposed acceptance of waste from other facilities continue to be problematic issues for the Nation, as they are not in line with AOP’N's Nuclear Project Principles.</p>

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme	Proponent response	Crown response	Status of issue/concern
			<p>development of the EIS, including expanding the alternative means assessment in the final EIS. CNL acknowledged that how feedback was integrated may not be clear to AOPFN community members and committed to providing capacity for an AOPFN employed Communication Specialist to work with CNL on project communications for AOPFN members.</p> <p>In CNL’s Project Commitments Report, CNL also committed to providing the funding to continue the AOPFN working group and AAC until a site-wide arrangement is established, which would allow AOPFN and CNL to collaboratively address AOPFN’s concerns and for AOPFN to verify the implementation of NSDF-specific mitigation, monitoring and compensatory commitments related to AOPFN rights and interests.</p>	<p>Indigenous Nations and communities. CNSC staff confirmed that CNL and AOPFN developed a mutually agreed upon list of commitments to mitigate AOPFN’s concerns and is supportive of CNL’s commitments to continue engaging with AOPFN on these issues. As per REGDOC 3.2.2, CNSC staff expect CNL to document and report on how CNL has or plans to address the concerns raised by AOPFN, in their EIS and/or IER for the NSDF project.</p>	
AOPFN05	<p><i>Valued component effects assessment indicators</i></p> <p>AOPFN has concerns about indicator species for aquatic vegetation, terrestrial vegetation, semi-aquatic amphibians and pollinators that the Proponent selected for the VC effects assessment for ambient radioactivity and ecological health. AOPFN is requesting clarity, details and written rationales for the selection of indicators, and for some indicators, AOPFN requested alternatives.</p> <p>AOPFN also raised concerns about gaps between the VC’s that were identified by AOPFN knowledge keepers and the VC’s captured in the EIS. AOPFN expects CNL to engage with AOPFN through a mitigation table to further develop and refine CNL’s mitigation and monitoring measures for the Project and CRL site level. AOPFN also expects CNSC to work with AOPFN to address these gaps through the RIA process.</p>	EA methodology	<p>CNL (and the CNSC) supported the gathering of AOPFN’s Algonquin Knowledge and Land Use information, including VCs of importance, and collaborated with AOPFN to incorporate summaries of that information and knowledge into the Final EIS and supporting documentation, including the IER.</p> <p>CNL engaged with AOPFN to better understand and address their concerns related to the VC effects assessment indicators through revised iterations of written responses to AOPFN’s Comments on the 2019 Draft NSDF EIS and subsequent working group discussions in early 2021. CNL provided AOPFN with detailed responses on its VCs and rationale for their selection of indicator species (VCs) for the aquatic vegetation, terrestrial vegetation, semi-aquatic amphibians and pollinators effects assessment. CNL also offered to discuss this issue further with AOPFN staff and the AAC to more clearly link CNL’s VCs with the VCs identified by AOPFN.</p> <p>In CNL’s Project Commitments Report, CNL committed to:</p> <ul style="list-style-type: none">- engage with AOPFN in the NSDF project Environmental Assessment Follow-up	<p>CNSC staff confirmed that CNL discussed this concern in detail with AOPFN through working group discussions and that CNL provided revised iterations of written responses to AOPFN regarding their concerns about indicator species selected for the VC effects assessment. CNSC staff is supportive of the mutually agreeable commitments identified by CNL and the AOPFN to ensure that AOPFN VCs of importance are incorporated into the EAFMP. As per REGDOC 3.2.2: Indigenous Engagement, CNSC staff will continue to monitor CNL’s Indigenous engagement activities, including with regards to the incorporation of VCs and Indigenous Knowledge, to make sure they are responsive and provide adequate answers to the AOPFN’s concerns and comments.</p> <p>While carrying out their technical review of the CNL EIS, CNSC staff ensured that AOPFN’s list of important VCs that was included as part of the AOPFN Aboriginal knowledge and land use study (AKLUS), have been either included in CNL’s assessment directly, or represented by an appropriate indicator species by CNL. This information was also documented and taken into consideration as part of the collaborative RIA process, and by CNSC subject matter experts in</p>	Addressed. AOPFN is of the view that actions and commitments by CNL have meaningfully dealt with this concern.

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			<p>Monitoring Program (EAFMP) development, including providing AOPFN with a co-development role in identifying adaptive management triggers/thresholds and responses in relation to VCs related to AOPFN rights and interests, to be built into the EAFMP</p> <ul style="list-style-type: none">- develop with AOPFN potential a practical, meaningful role for AOPFN in the NSDF monitoring program, and support Indigenous knowledge monitoring in relation to the Project, including providing financial support for the development and implementation of an AOPFN Guardian Program, as it relates to the NSDF Project- co-developing with the AOPFN additional mitigation measures to include within the NSDF Project Environmental Protection Plan (EPP)- seek AOPFN’s inputs prior to finalizing the NSDF project construction work control documents- assist with the logistics and funding for a pre-construction “Inventory” data collection period where AOPFN guardians and TK holders can conduct an inventory of the NSDF project footprint, including identifying the presence of any culturally valued indicator species	<p>making their conclusion on potential effects for the CEAA 2012 EA report, which was shared with the AOPFN for review prior to finalization.</p>	
AOPFN06	<p><i>Residual effects classification criteria</i></p> <p>AOPFN states that the EIS does not indicate that Indigenous peoples played any role in the residual effects classification and significance estimation process. AOPFN is concerned about the lack of evidence from CNL confirming that there are no viable “primary pathways” of effect from NSDF on AOPFN traditional land use or rights.</p> <p>AOPFN would also like the classification criteria to consider cultural, ecological, and historical context and requests that the Proponent provide clarity and further</p>	EA methodology	<p>CNL engaged with AOPFN to better understand and address their concerns about the residual effects assessment, including the role of Indigenous Peoples in the assessment, through written responses to AOPFN’s Comments on the 2019 Draft NSDF EIS and subsequent working group discussions in early 2021.</p> <p>CNL indicated that engagement opportunities were made available to AOPFN to discuss and provide input into the EA process for NSDF and committed to continue engaging with AOPFN and the AAC to understand their concerns and answer any questions on the NSDF Project. CNL stated that the approach used in the NSDF EIS to classify residual</p>	<p>CNSC staff have reviewed CNL’s EIS and verified that CNL’s approach used in the NSDF EIS to classify residual environmental effects on VCs is adequate and in alignment with the CNSC’s Generic EIS Guidelines.</p> <p>As per REGDOC 3.2.2, CNSC staff expect CNL to document and report on how CNL has or plans to address the concerns raised by AOPFN, in their EIS and/or IER for the NSDF project. CNSC staff confirmed that CNL provided adequate written responses to AOPFN regarding their concerns about the residual effects assessment and that CNL subsequently discussed this concern with AOPFN through working group discussions in 2021. CNSC</p>	<p>CNSC staff are of the view that AOPFN’s concerns related to the residual effects classification criteria have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA. CNSC staff notes that CNL is not required to complete an RIA under CEAA 2012 as the Duty to Consult rests with the CNSC as an Agent of the Crown.</p> <p>AOPFN is of the view that while CNL has made efforts to identify commitments to address AOPFN’s concerns, this issue is outstanding as AOPFN continues to disagree with the methods and findings that there are there are no primary pathways of effect on culture, Traditional Land and</p>

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	analysis on the magnitude of effects for VCs.		<p>environmental effects on VCs followed the Generic EIS Guidelines. CNL explained that the context within which the EA of the NSDF Project is established is inherent in the description of the baseline conditions of the NSDF and CRL site, and that the VCs that were used to assess residual environmental effects cannot be selected without proper context. CNL provided a detailed description of how context and magnitude were considered in the assessment for terrestrial and wildlife VC’s and indicated that a residual effects assessment and determination of significance is only completed when there are primary pathways. No primary pathways were identified for the Indigenous traditional land use and resource use and socio-economic environment components and thus a residual effects classification and determination of significance was not provided for these components. CNL worked with AOPFN to understand the implications of the AOPFN AKLUS report and incorporate the findings into the Final EIS and IER.</p> <p>In CNL’s Project Commitments Report, CNL committed to:</p> <ul style="list-style-type: none">- develop with AOPFN potential a practical, meaningful role for AOPFN in the NSDF monitoring program, and support Indigenous knowledge monitoring in relation to the Project, including providing financial support for the development and implementation of an AOPFN Guardian Program, as it relates to the NSDF Project- provide AOPFN with a co-development role in identifying adaptive management triggers/thresholds and responses in relation to VCs related to AOPFN rights and interests, to be built into the EAFMP- continue discussions with AOPFN and AECL to develop an LTRA, which is meant to identify areas of mutual benefit, enable communications and engagement, and address broader AOPFN interests related to AECL and CNL activities,	<p>staff is supportive of the mutually agreeable commitments identified by CNL and the AOPFN to mitigate these concerns, including CNL’s commitment to work with AOPFN to explore potential for a practical and meaningful role for the AOPFN in the NDSF EAFMP. CNSC staff will continue to monitor CNL’s Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to AOPFN’s concerns.</p> <p>CNSC staff worked closely with AOPFN through the collaborative RIA process to ensure that a summary of the appropriate cultural, historical and ecological context from AOPFN’s perspective is documented and reflected as part of the collaborative RIA approach and the CNSC’s EA report, which AOPFN reviewed prior to finalization.</p>	Resource Use and AOPFN rights. AOPFN’s position is that the RIA completed by AOPFN and CNSC Staff more accurately reflects the potential for the Project to impact on AOPFN rights, which concludes that most impact pathways from the NSDF Project on AOPFN rights will likely be low to moderate severity adverse impacts. AOPFN further notes that its analysis estimates moderate to high level impacts on AOPFN governance rights are likely in the Project Case.

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			<p>including AOPFN involvement in environmental and cultural stewardship and monitoring</p> <p>- co-develop with the AOPFN additional mitigation measures to include within the NSDF Project EPP</p>		
AOPFN07	<p><i>Accidents and spills</i></p> <p>AOPFN raised general concerns about storing radioactive waste at the ground level and the NSDF accepting waste from other sites beyond CRL. AOPFN is concerned about potential accidents, leaks and spills both during the transport of waste to the NSDF site and from the NSDF and broader CRL site releasing radiological and non-radiological contaminants, and the corresponding potential for contamination impacts on the integrity and health of the surrounding environment, wildlife, vegetation and waterbodies, particularly the Kichi-Sibi.</p>	<p>Accidents and malfunctions</p>	<p>In the EIS, CNL indicates that they have an emergency preparedness program in place to address requirements for immediate response and post-event clean-up or remediation if an accident or malfunction situation occurs. Emergency response procedures for the NSDF Project will be prepared to address any potential emergencies from accidents and malfunctions.</p> <p>CNL engaged with AOPFN to better understand and address their concerns about accidents and spills and potential impacts from transporting and storing nuclear waste at the CRL site through iterations of written responses to AOPFN’s Comments on the 2019 Draft NSDF EIS and working group discussions in early 2021. CNL clarified that the transportation of waste from external sites to the NSDF is outside the scope of the EA and is managed by Transport Canada's Transportation of Dangerous Goods Regulations and CNSC's Packaging and Transport of Nuclear Substances Regulations. CNL clarified that the intention of the NSDF project is to address long-term remediation and decommissioning of the CRL site and improve the environmental footprint of the overall facility. CNL stated that only low level radioactive waste will be accepted at the NSDF, and that offsite waste streams at the NSDF will be limited to 5% commercial sources and 5% other AECL sites.</p> <p>CNL provided additional information on the mitigation measures proposed in the EIS that are designed to protect human and ecological health against exposure to radiological and non-radiological contaminants and indicated that the effectiveness of the application of these mitigation measures will be verified in the EAFMP throughout critical phases of the NSDF Project.</p>	<p>CNSC staff collaborated with AOPFN to ensure AOPFN’s concerns regarding potential accidents and spills were documented and considered in the EA report and as part of the RIA process. CNSC staff have reviewed CNL’s EIS and conducted an assessment of the project’s potential effects of accidents and malfunctions as part of CNSC staff’s EA report, which was shared with AOPFN for review prior to finalization. Taking into account the implementation of mitigation measures and emergency response procedures, and the views and concerns expressed by Indigenous Nations and communities, including AOPFN, CNSC staff concluded that accidents and malfunctions associated with the project is not likely to cause significant adverse effects on health, safety of workers and the public, or on the environment. CNSC staff concur that <i>The Transportation of Dangerous Goods Act</i> will apply to NSDF, which has requirements specifically for dealing with accidents and release (which covers spills) during transportation of dangerous goods. Under CNSC licence, CNL would also have to comply with the CNSC waste characterization requirements as outlined in CNSC Regulatory Document, REGDOC-2.1.1.1, volume 1.</p> <p>CNSC staff confirmed that CNL collaborated with AOPFN to better understand AOPFN’s concerns about potential accidents and spills from the NSDF and developed mutually agreeable commitments to mitigate some of the AOPFN’s concerns. CNSC staff is satisfied with the responses provided by CNL with regards to contamination of the site as a whole and proposed mitigation measures. CNL’s ongoing engagement with AOPFN will be reported through CNL’s Public Information and Disclosure Program as part of their Annual Compliance Reports. As per REGDOC 3.2.2: Indigenous</p>	<p>CNSC staff are of the view that AOPFN’s concerns related to accidents and spills have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p> <p>AOPFN is of the view that while CNL has provided technical evidence to address some of AOPFN’s concerns, AOPFN has outstanding concerns as the transportation of up to 10% of the waste material on site from other facilities and the psychosocial risks associated with a permanent radioactive waste disposal facility at the CRL site continue to be problematic issues for the Nation.</p>

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			<p>CNL worked with AOPFN to develop a mutually agreed upon list of commitments that CNL will undertake to mitigate or lessen AOPFN’s concerns. CNL committed to:</p> <ul style="list-style-type: none">- continue discussions with AOPFN and AECL to develop an LTRA, which is meant to identify areas of mutual benefit, enable communications and engagement, and address broader AOPFN interests related to AECL and CNL activities, including AOPFN involvement in environmental and cultural stewardship and monitoring and verification of mitigation commitments related to AOPFN rights and interests- co-develop with the AOPFN additional mitigation measures to include within the NSDF Project EPP- engage with the AOPFN in the NSDF project EAFMP development and implementation, including to identify Algonquin knowledge to be included in adaptive management approach- develop with AOPFN potential a practical, meaningful role for AOPFN in the NSDF monitoring program, and support Indigenous knowledge monitoring in relation to the Project, including providing financial support for the development and implementation of an AOPFN Guardian Program, as it relates to the NSDF Project	<p>Engagement, CNSC staff will continue to monitor the CNL’s Indigenous engagement activities, including with regards to monitoring and follow-up measures.</p>	
AOPFN08	<p><i>Water quality and aquatic environment</i></p> <p>AOPFN is concerned about the close proximity of the Project to the Kichi-Sibì (Ottawa River) and its tributaries, the potential for radiological and non-radiological contaminants to enter and bioaccumulate in surrounding waterways and the corresponding impacts on the people, fish, aquatic environment and ecosystem that depend on those waterways. AOPFN also raised concerns related to effluent management and the need for</p>	<p>Aquatic environment</p>	<p>CNL engaged with AOPFN to better understand and lessen their concerns about potential project impacts on the Kichi-Sibì (Ottawa River) through iterations of revised responses to AOPFN’s Comments on the 2019 Draft NSDF EIS and subsequent working group discussions in early 2021. CNL stated that mitigation measures and follow-up actions would be implemented to mitigate effects on surface water quality and downstream discharge, including designing the Project to avoid wetlands and limit disturbance to the natural environment, ensuring effluent discharge targets for waste water discharges are protective of the environment and human health,</p>	<p>CNSC staff collaborated with AOPFN to ensure that the importance of the Kichi-Sibì from AOPFN’s perspective is documented and reflected as part of the RIA approach and is reflected in the CNSC’s EA report. AOPFN’s views expressed related to water quality and the aquatic environment were taken into consideration by CNSC subject matter experts in making their conclusion on potential effects for the EA report, which was shared with AOPFN for review prior to finalization.</p> <p>CNSC staff determined that the CNL’s identification, proposed mitigation, and proposed</p>	<p>CNSC staff are of the view that AOPFN’s concerns related to water quality and the aquatic environment have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p> <p>AOPFN is of the view that this concern is outstanding as the close proximity of the NSDF site to the Kichi-Sibi continue to be problematic for the Nation.</p>

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	independent Indigenous water monitoring, and requested more information about the proposed effluent quality criteria/thresholds.		<p>and monitoring and sampling to verify surface water quality.</p> <p>CNL provided clarity on the federal and provincial regulations and data used to inform the radiological and non-radiological contaminant effluent/ discharge concentration criteria for NSDF, and indicated that the targets are conservative based on the guidelines. CNL also provided further information about the methods and results of the Ecological Risk Assessment, which assessed the interactions of wildlife and terrestrial vegetation with the NSDF site during the Post-Closure period, and further clarity on the mitigation measures that were identified in the EIS to mitigate the potential impacts on water quality and the aquatic environment. CNL also acknowledges AOPFN’s connection to the Kichi-Sibi (Ottawa River) and their concerns about the location of the NSDF in proximity to the Kichi-Sibi (Ottawa River) in the final EIS.</p> <p>CNL worked with AOPFN to develop a mutually agreed upon list of commitments that CNL will undertake to mitigate or lessen AOPFN’s concerns. CNL committed to:</p> <ul style="list-style-type: none">- continue discussions with AOPFN and AECL to develop an LTRA, which is can identify areas for further engagement, including AOPFN involvement in environmental and cultural stewardship and monitoring and verification of mitigation commitments related to AOPFN rights and interests- co-develop with the AOPFN additional mitigation measures to include within the NSDF Project EPP, which includes a Surface Water Management Plan- engage with the AOPFN in the NSDF project EAFMP development and implementation, including to identify Algonquin knowledge to be included in adaptive management approach- develop with AOPFN potential a practical, meaningful role for AOPFN in the NSDF monitoring program, and support Indigenous	<p>follow-up program measures are adequate for residual effects to the surface water environment. CNSC staff concludes the project is not likely to cause significant adverse effects to the surface water environment as the magnitude of effects are expected to be negligible.</p> <p>CNSC staff confirmed that CNL provided iterations of written responses to AOPFN regarding their concerns about the water quality and the aquatic environment and that CNL subsequently discussed this concern with AOPFN through working group discussions in 2021. CNSC staff is satisfied with the responses provided by CNL and is supportive of the mutually agreeable commitments identified by CNL and the AOPFN to mitigate AOPFN’s concerns, including CNL’s commitment to work with AOPFN to explore potential for a practical and meaningful role for the AOPFN in the NDSF EAFMP. CNSC will continue to monitor CNL’s Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to AOPFN’s concerns.</p>	

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			<p>knowledge monitoring in relation to the Project, including providing financial support for the development and implementation of an AOPFN Guardian Program, as it relates to the NSDF Project</p> <p>Also see Proponent Response to comment AOPFN07 regarding concerns about potential contamination impacts.</p>		
AOPFN09	<p><i>Water quantity and flow</i></p> <p>AOPFN expressed concerns about potential effects of the Project on altering surface water flows and water management in wetlands, and the corresponding effects on the people, plants and wildlife that depend on them.</p>	Aquatic environment	<p>CNL responded to this concern through iterations of written responses to AOPFN’s Comments on the 2019 Draft NSDF EIS and through subsequent working group discussions in early 2021. CNL indicated that there are no wetlands, flooded areas or aquatic habitat features within the majority of the SSA and provided information on the assessment and mitigation measures to limit impacts to groundwater elevation and levels in the SSA.</p> <p>In the EIS, CNL indicates that mitigation and follow-up measures would be implemented to address effects on surface water quantity, including ensuring an even outlet flow from surface water management ponds to wetlands, and that the surface water meets the water quality and quantity criteria established for wetland receiving waters. Operational and environmental monitoring would also be implemented to monitor wetland water elevations and surface water flows.</p> <p>CNL worked with AOPFN to develop a mutually agreed upon list of commitments that CNL will undertake to mitigate or lessen AOPFN’s concerns related to water quality and flow. CNL committed to:</p> <ul style="list-style-type: none">- continue discussions with AOPFN and AECL to develop an LTRA, which is can identify areas for further engagement, including AOPFN involvement in environmental stewardship and monitoring and verification of mitigation commitments related to AOPFN rights and interests- co-develop with the AOPFN additional mitigation measures to include within the NSDF	<p>CNSC confirmed that CNL provided written responses to AOPFN regarding their concerns about the water quantity and flow in CNL’s dispositions to AOPFN’s comments on the 2019 draft EIS, and that CNL subsequently discussed this concern with AOPFN through working group discussions in 2021. CNSC staff is satisfied with the responses provided by CNL with regards water quantity and flow. CNSC staff will continue to monitor CNL’s Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to AOPFN’s concerns.</p> <p>CNSC staff collaborated with AOPFN to ensure that AOPFN’s concerns related to water quantity are documented and reflected as part of the RIA approach and the CNSC’s EA report. AOPFN’s views expressed related to water quality and the aquatic environment were taken into consideration by CNSC subject matter experts in making their conclusion on potential effects for the EA report, which was shared with AOPFN for review prior to finalization. Taking into account views expressed by Indigenous Nations and communities, and the implementation of mitigation and follow-up program measures, CNSC staff are satisfied with CNL’s assessment and concludes the Project is not likely to cause significant adverse effects to the geological and hydrogeological environment.</p>	Addressed.

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			<p>Project EPP, which includes a Surface Water Management Plan</p> <ul style="list-style-type: none">- engage with the AOPFN in the NSDF project EAFMP development and implementation, including to identify Algonquin knowledge to be included in adaptive management approach- develop with AOPFN potential a practical, meaningful role for AOPFN in the NSDF monitoring program, and support Indigenous knowledge monitoring in relation to the Project, including providing financial support for the development and implementation of an AOPFN Guardian Program, as it relates to the NSDF Project		
AOPFN10	<p><i>Effects on wildlife and habitat</i></p> <p>AOPFN is concerned about potential project impacts on the abundance and health of species and habitats that are important for AOPFN culture and rights (including the critical Mónz and Wawáshkeshi habitat bordering the NSDF site), species at risk, the broader ecosystem and species that are likely to be sensitive to project effects (various migratory birds, mixed wood forest, moose, deer, beaver, blandings turtle). AOPFN requests that the Proponent provide more analysis on the potential effects of the Project on these species and habitats. AOPFN expects additional information and engagement on how the mitigation measures will protect species and habitats of importance, consider Indigenous Knowledge and ensure net positive impacts, in addition to the type of offsets that will be used, and how impacts will be monitored. AOPFN is particularly concerned about the mitigation and monitoring measures for Mònz and Wawáshkeshì and requests involvement. AOPFN would like to be notified of any dead eagle found on the Chalk River site, and for the remains to be donated to the AOPFN Omamiwinini Pimadjowin.</p>	General environment	<p>CNL (and the CNSC) supported the gathering of AOPFN’s Algonquin Knowledge and Land Use information, including VCs of importance, and collaborated with AOPFN to incorporate relevant information and knowledge into the Final EIS and supporting documentation, including the IER.</p> <p>CNL worked closely with AOPFN to better understand and address AOPFN’s concerns and recommendations regarding potential project impacts on wildlife and habitat through iterations of written responses to AOPFN’s Comments on the 2019 Draft NSDF EIS and through subsequent working group discussions in early 2021.</p> <p>CNL provided detailed information and clarity on the selection of terrestrial (wildlife and habitat) VCs, the assessment of potential impacts and effects of the project on those VCs and other wildlife species and habitat, and the various mitigation measures that CNL proposed and committed to implement to limit those potential impacts due to NSDF project activities. CNL offered to discuss CNL’s VC selection process further with AOPFN and the AAC. CNL indicated that the NSDF Project is committed to protecting the environment as reflected in CNL’s corporate Environmental Policy.</p> <p>With regards to concerns about the loss of mature forest, CNL committed to offset the loss of forested</p>	<p>CNSC staff collaborated with AOPFN to ensure that AOPFN’s concerns related to project impacts on wildlife and habitats are documented and considered as part of the collaborative RIA process and is reflected in the CNSC’s EA report and technical assessments, and that options for avoiding, mitigating, or accommodating adverse impacts were considered.</p> <p>CNSC staff have reviewed CNL’s EIS and conducted an independent assessment of the project’s potential effects to the terrestrial environment as part of CNSC staff’s EA report, which was provided to AOPFN for review prior to finalization. CNSC staff concluded that the residual effects to the terrestrial vegetation and wildlife species are not expected to result in significant adverse impacts due to a very low magnitude of impacts at the regional scale when taking into consideration of the proposed mitigation measures and follow-up monitoring programs.</p> <p>As per REGDOC 3.2.2, CNSC staff expect CNL to document and report on how CNL has or plans to address the concerns raised by AOPFN, in their EIS and/or IER for the NSDF project. CNSC staff confirmed that CNL provided adequate responses to this concern in CNL’s dispositions to AOPFN’s comments on the 2019 draft EIS, and that CNL subsequently discussed this concern with AOPFN</p>	<p>CNSC staff are of the view that AOPFN’s concerns related to Project-specific effects on wildlife and habitat have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p> <p>AOPFN is of the view that its concerns related to potential Project effects on wildlife habitat and the inclusion of Indigenous Knowledge and monitors in the NSDF Project EA and CRL site level remain ongoing while CNL, AECL and CNSC implement Project-specific commitments to address these concerns.</p>

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			<p>area with a CRL-site wide Sustainable Forest Management Plan (SFMP), and to create opportunities for AOPFN’s direct engagement and input in the co-development of the SFMP, including where enhancement and protection of Mõnz and Wawáshkeshi habitat can be included as objectives. CNL stated that this proposed offset will contribute to no net loss of habitat by the NSDF Project and will benefit the large mammal population within the Algonquin territory. CNL will also consider support for offsets at off-site locations brought forward by AOPFN, which are commensurate with the wildlife habitat impacts associated with the NSDF Project.</p> <p>CNL explained that the effectiveness of mitigation measures to protect cultural and ecological VC during NSDF activities will be determined through the EAFMP and operational control and effluent verification monitoring. CNL is committed to including AOPFN in the development and implementation of the NSDF EAFMP, including identifying species of importance and refining mitigation and monitoring measures for the Project, particularly for Mõnz and Wawáshkeshì.</p> <p>Noting that it is a CRL site-wide concern, CNL committed to co-development of protocols and procedures for notification to AOPFN of any Eagle found dead, and to arrange that Eagle feathers found, in or within proximity to the NSDF Project footprint are donated to the AOPFN Omamiwinnini Pimadjwowin (Algonquin Way Culture Centre).</p> <p>CNL also committed to:</p> <ul style="list-style-type: none">- continue discussions with AOPFN and AECL to develop an LTRA, which is can identify areas for further engagement, including AOPFN involvement in environmental stewardship and monitoring and verification of mitigation commitments related to AOPFN rights and interests- co-develop with AOPFN additional mitigation measures to include within the NSDF Project EPP	<p>through working group discussions in 2021. CNSC staff is supportive of the mutually agreeable commitments identified by CNL and the AOPFN to mitigate these concerns, including CNL’s commitment to work with AOPFN to explore potential for a practical and meaningful role for the AOPFN in the NDSF EAFMP. CNSC staff is satisfied with the responses provided by CNL with regards to the terrestrial environment and will continue to monitor CNL’s Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to AOPFN’s concerns.</p>	

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			<div><div><div>- engage with AOPFN in the NSDF project EAFMP development and implementation, including to identify Algonquin knowledge to be included in adaptive management approach</div><div>- provide financial support for the development and implementation of an AOPFN Guardian Program, as it relates to the NSDF Project</div></div><div>Also see CNL’s response to AOPFN’s concerns about Blanding’s Turtle in comment [AOPFN16].</div></div>		
AOPFN11	<p><i>Scope of Project Footprint</i></p> <p>AOPFN is concerned that the scope of the project footprint (SSA) may exclude infrastructure routes. AOPFN requests the Proponent to confirm the Project footprint captures all Project infrastructure and activities, including increased traffic routes, and to provide clarity on the routes and traffic levels that are included in the main Project components.</p>	EA Methodology	<p>CNL responded to this concern in CNL’s responses to AOPFN’s Comments on the 2019 Draft NSDF EIS and through subsequent working group discussions in early 2021. CNL provided clarity around the scope of the SSA and indicated that the SSA for the terrestrial environment does include the NSDF project, which accounts for the direct physical disturbance and alteration of vegetation communities and wildlife habitat caused by construction and operations of the engineered containment mound (ECM) and related facilities, buildings and infrastructure.</p> <p>CNL also indicated that the CRL site haul roads and other associated roads that will be used to transport waste from other areas of the CRL site to the NSDF area are encompassed within the RSA because the potential effects from the NSDF Project may interact with effects of other existing or reasonably foreseeable development. As such, residual environmental impacts on these roads cannot be exclusively attributed to NSDF operations.</p> <p>After subsequent discussions with AOPFN, CNL further clarified that the transportation of waste on and off-site of the CRL site is an activity covered by the existing CRL site licence and other additional transport regulations.</p> <p>CNL also committed to develop additional communication materials for AOPFN community members and to communicate the NSDF project details more clearly and more frequently. CNL will provide capacity support to AOPFN through an</p>	<p>As per REGDOC 3.2.2, CNSC staff expects CNL to document and report on how CNL has or plans to address the concerns raised by AOPFN, in their EIS and/or IER for the NSDF project. CNSC staff confirmed that CNL provided adequate responses to this concern in CNL’s dispositions to AOPFN’s comments on the 2019 draft EIS, and that CNL subsequently discussed this concern with AOPFN through working group discussions in 2021. CNSC staff is satisfied with the responses provided by CNL and will continue to monitor CNL’s Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to AOPFN’s concerns.</p> <p>CNSC technical experts have reviewed the proponent’s assessment of the project’s potential effects to the terrestrial environment, including the scope of the project footprint (SSA). Given the proposed mitigation measures identified in the EIS, and taking into views expressed by Indigenous Nations and communities, including AOPFN, CNSC staff does not anticipate any significant adverse effects to the terrestrial environment as a result of the proposed project.</p>	Addressed.

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			amendment to the existing contribution agreement for an AOPFN employed Communications Specialist to work with CNL on project communications for AOPFN members.		
AOPFN12	<p>Risk communication</p> <p>AOPFN is concerned about the lack of plain language materials available to assess the risks from radioactive material. AOPFN is requesting the Proponent to engage and provide plain language materials in this regard. AOPFN also continues to request the proponent make formal commitments to work with AOPFN to develop or enhance its Risk Communication Program, alongside an independent Indigenous Guardian monitoring program for the CRL site as part of CNL’s mitigation measures.</p>	Communication	<p>CNL worked collaboratively with AOPFN to better understand and address AOPFN’s concerns regarding risk communication through regular working group discussions and through CNL’s responses to AOPFN’s Comments on the 2019 Draft NSDF EIS. CNL signed a contribution agreement with AOPFN in September 2020, which includes capacity, schedule, studies and engagement activities, and committed to including AOPFN in the development of the NSDF risk communication activities.</p> <p>CNL provided AOPFN with a plain language summary and resources regarding radiation, the radioactivity of NSDF wastes, and information about CNL’s commitment to transparency and Public Information Program. CNL also offered to meet with the AAC to discuss and develop risk communication tools to support community discussions and committed to including input from the discussion into the NSDF IER which supports CNL’s CMD required for the public Commission hearing. CNL also committed to facilitating engagement between AOPFN and the CNL corporate program to address AOPFN’s site level mitigation and monitoring concerns.</p> <p>In CNL’s Project Commitments Report, CNL committed to:</p> <ul style="list-style-type: none">- Develop with AOPFN an Indigenous-driven Country Foods Monitoring and Risk Communication Strategy for the NSDF Project- develop with AOPFN potential a practical, meaningful role for AOPFN in the NSDF monitoring program, and support Indigenous knowledge monitoring in relation to the Project, including financial support from CNL for the development and implementation of an AOPFN	<p>CNSC staff and AOPFN signed a formal ToR to outline objectives and responsibilities for meaningful and collaborative consultation for the NSDF, NPD and MMR Projects and remains open to adjusting our communication strategy with AOPFN to ensure it is mutually agreeable. CNSC staff are also committed to developing a long-term relationship ToR for engagement with AOPFN, which can identify specific areas where AOPFN and CNSC staff can further collaborate, such as communication, education and information sharing on the risks of radiation and radioactive materials.</p> <p>CNSC staff are aware that CNL signed a contribution agreement with AOPFN in September 2020, and that CNL provided written responses to this concern in CNL’s dispositions to AOPFN’s Comments on the 2019 Draft NSDF EIS. CNSC staff is satisfied with CNL’s responses regarding risk communication and is supportive of the mutually agreeable commitments identified by CNL and the AOPFN to continue working together to continue to enhance communications and develop an appropriate and mutually acceptable communication and collaboration protocol that takes into account AOPFN’s unique rights and interests. CNSC staff will continue to monitor CNL’s Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to AOPFN’s concerns.</p>	<p>CNSC staff are of the view that AOPFN’s concerns related to risk communication have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p> <p>AOPFN is of the view that commitments made by AECL and CNL in relation to the NSDF Project are a step in the right direction to better, more trusted, and plain language risk communication for AOPFN members.</p>

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			<p>Guardian Program, as it relates to the NSDF Project</p> <ul style="list-style-type: none">- develop additional communication materials for AOPFN community members and to communicate the NSDF Project details more clearly and more frequently, and providing capacity for an AOPFN-employed full-time Communications Specialist to work with CNL on project communications for AOPFN members- continue discussions with AOPFN and AECL to develop an LTRA, which is meant to identify ways to enhance communications and engagement opportunities, and address broader AOPFN interests related to AECL and CNL activities		
AOPFN13	<p><i>Impacts to rights</i></p> <p>AOPFN asserts that the area within the vicinity of the CRL site is integral to the exercise of AOPFN’s rights and interests and AOPFN members continue to prefer to use and practice their way of life in their territory surrounding the project. AOPFN is concerned about the lack of engagement and consideration of the Project’s potential adverse effects on AOPFN’s interests and Indigenous and/or Treaty Rights. AOPFN asserts that although their rights have been heavily infringed on in the CRL area, those rights are not extinguished and AOPFN expects that such rights will be practicable in the CRL area in the future, as they were in the past. AOPFN requests the Proponent to provide clarity on how potential impacts on AOPFN’s Indigenous and Treaty Rights were assessed and how AOPFN was engaged, including the use of traditional knowledge from AOPFN members.</p>	<p>Indigenous and/or Treaty Rights</p>	<p>CNL engaged with AOPFN to better understand AOPFN’s concerns about the project’s potential adverse effects on AOPFN’s interests and Indigenous and/or Treaty Rights through regular working group discussions and meetings with the AAC. CNL also provided iterations of revised written responses to AOPFN’s Comments on the 2019 Draft NSDF EIS.</p> <p>CNL communicated to AOPFN that because CNL is of the opinion that there are no traditional land uses determined to be affected by the proposed project, CNL is of the view that Aboriginal Rights will not be impacted by NSDF activities. CNL acknowledged that AOPFN disagrees with this conclusion and that AOPFN is of the view that there are project specific activities that may directly impact traditional land uses and Aboriginal Rights and interests. CNL indicated that while the determination regarding project impacts on Aboriginal and/or Treaty Rights remains with the CNSC, CNL remains committed to continuing to explore mitigation measures and formulate commitments with AOPFN with the intention of trying to remove or lessen the concern.</p> <p>In consideration of various traditional land uses by the Algonquin peoples (i.e., hunting and/or fishing),</p>	<p>CNSC staff collaborated with AOPFN to ensure that consultation for the proposed Project is meaningful, addresses AOPFN’s concerns, and upholds the honour of the Crown. CNSC staff and AOPFN signed a formal arrangement for consultation through a ToR, which includes a collaborative approach and methodology for assessing the proposed Project’s potential impacts on the rights of AOPFN community members through a RIA. The ToR also identifies each parties’ roles and responsibilities for drafting and reviewing sections of the EA reports specific to AOPFN such as Traditional Knowledge and Land Use information, potential impacts of the proposed Project on AOPFN rights and traditional uses, and concerns expressed.</p> <p>CNSC staff and AOPFN are working together to assess potential impacts from the NSDF project on AOPFN’s Indigenous Rights and interests through a collaboratively-drafted RIA. CNSC staff communicated to AOPFN that the federal EA process is not a rights determining process and that the RIA focuses on rights that are practiced in and around the project and the potential impacts on those rights. CNSC staff collaborated with AOPFN to incorporate relevant information from the</p>	<p>CNSC staff are of the view that AOPFN’s concerns related potential adverse effects from the Project on AOPFN’s rights have been addressed through the collaborative RIA process to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA. CNSC staff notes that CNL is not required to complete an RIA under CEAA 2012 as the Duty to Consult rests with the CNSC as an Agent of the Crown.</p> <p>AOPFN continues to disagree with CNL’s finding that there will be no measurable adverse effects from the Project on AOPFN’s rights. AOPFN’s position is that the RIA completed by AOPFN and CSNC Staff more accurately reflects the potential for the Project to impact on AOPFN rights, and should be the focus of the Commission’s review.</p>

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			<p>CNL ensured that objectives from the 2019 Algonquin Agreement-In-Principle were integrated into the EIS (section 6.4.4). CNL also collaborated with AOPFN to incorporate the results of the AOPFN AKLUS into the final EIS and revised IER, which is a supporting document to the EIS and living document through the EA and licensing process. CNL is continuing to work with AOPFN through the AOPFN-CNL working group to discuss the implications of AOPFN’s NSDF-specific Culture and Rights Study, particularly as the parties develop implementation tools related to commitments made by CNL to increase the role for the AOPFN in monitoring and adaptive management of the NSDF Project, should it proceed.</p>	<p>AOPFN AKLUS and AOPFN NSDF Culture and Rights Study into the collaborative RIA process. CNSC staff also encouraged AOPFN to submit relevant AOPFN studies directly to the Commission through the intervention process.</p> <p>The collaborative AOPFN-CNSC RIA for the NSDF project concludes that when taking into consideration mitigation, monitoring and follow-up measures, most impact pathways from the NSDF Project on AOPFN rights will likely be low to moderate severity adverse impacts on AOPFN traditional use and harvesting rights.</p> <p>CNSC staff have also raised AOPFNs broader concerns regarding the CRL site and other activities and stressors in their modern land claim territory, to the attention of AECL, as well as CIRNAC, who is leading the negotiation of the AOO comprehensive land claim agreement on behalf of the Government of Canada negotiations to ensure they are aware of these issues.</p> <p>Also see Crown Response to comment AOPFN15 regarding traditional land and resource use.</p>	
AOPFN14	<p><i>Impact Assessment Act Standards</i></p> <p>AOPFN expects the CNSC and the Proponent to apply the higher standards of assessment for effects on Indigenous peoples and RIAs that were adopted under the 2019 Impact Assessment Act (IAA).</p>	EA methodology	<p>CNL responded to this concern in CNL’s initial dispositions to AOPFN’s comments on the 2019 draft EIS indicating that CNL received a letter from CNSC stating that the NSDF EA federal review process would continue under CEAA 2012, as outlined in subsection 182 of the Impact Assessment Act. CNL confirmed that the NSDF EIS was prepared following guidance from the Canadian Environmental Assessment Agency.</p>	<p>CNSC staff have clarified that the NSDF Project has been subject to an EA that was started under CEAA 2012 on May 5th, 2016. As per the transition provision described in subsection 182 of the IAA, the CNSC is respecting and adhering to the applicable regulatory regime under CEAA 2012 and the interim principles that the Government of Canada announced in 2016 for major project reviews.</p> <p>CNSC staff are collaborating with AOPFN to ensure that consultation for the proposed Project is meaningful, addresses AOPFN’s concerns, and upholds the honour of the Crown. CNSC staff and AOPFN signed a formal ToR for consultation and an associated approach and methodology for an RIA to assess, understand and address the issues and concerns raised by AOPFN in relation to the proposed Project.</p>	<p>CNSC staff are of the view that AOPFN’s concerns related to the EA process and standards have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p> <p>AOPFN is of the view that CNSC’s formal collaborative RIA largely addresses this concern from the regulator’s perspective. AOPFN is of the view that the findings of the RIA disagree with CNL’s finding that there will be no measurable adverse effects from the Project on AOPFN’s rights.</p>

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AOPFN15	<p><i>Historic and cultural sites</i></p> <p>AOPFN raised concerns about highly valued cultural areas that exist close to the Project. AOPFN is concerned about potential degradation, contamination and disruptions impacting archaeological, historic and cultural sites on the proposed NSDF site and surrounding area. AOPFN raised concerns about protecting the integrity of these sacred sites, in addition to AOPFN member experiences and access to and within these sites. AOPFN is requesting direct involvement in culture and heritage matters at the NSDF site, including roles in stewardship and cultural heritage recognition, protection and promotion. AOPFN requests the Proponent develop in collaboration with AOPFN a contingency plan for artifact discovery and work stoppage, as well as an archaeological research program to support AOPFN capacity in archaeology and inform the management of culture and heritage resources for the wider CRL site.</p>	Archaeology	<p>CNL engaged with AOPFN to better understand AOPFN’s concerns about the project’s potential impacts on archaeological, historic, and cultural sites located near the project through regular working group discussions and meetings with the AAC. CNL provided iterations of revised written responses to AOPFN in their responses to AOPFN’s Comments on the 2019 Draft NSDF EIS.</p> <p>CNL acknowledged that there may be misconceptions about the CRL site boundaries, and committed to ensuring continued access to Algonquin sites of importance. CNL completed a four-stage archaeological assessment on the NSDF project, which involved a field crew with members of various Indigenous Nations and communities, including the AOPFN. AOPFN was also provided an opportunity to review and comment on the archaeological stage 2, 3, and 4 reports. CNL indicated that there are no effects anticipated to archaeological resources. CNL confirmed that no cultural heritage value or interest remains and the locations have been fully documented and the information is preserved for future study. However, should undocumented archaeological resources be discovered on the NSDF project site, CNL will suspend construction immediately and will engage a licensed consultant to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the <i>Ontario Heritage Act</i>.</p> <p>Although out of scope of the NSDF project, CNL will also be implementing a Cultural Resource Management (CRM) Program and is committed to facilitating opportunities for AOPFN’s involvement.</p> <p>CNL also worked with AOPFN to develop a mutually agreed upon list of commitments that CNL will undertake to mitigate or lessen AOPFN’s concerns. CNL committed to:</p> <ul style="list-style-type: none">- supplement the NSDF project’s existing mitigations for an undocumented archaeological resource being discovered in accordance with AOPFN’s view of “chance-find procedure”	<p>CNSC staff collaborated with AOPFN to ensure that AOPFN’s concerns related to potential impacts related to archaeological, historic and cultural sites that are important for AOPFN culture and rights were documented and reflected as part of the RIA approach and the CNSC’s EA report, and that options for avoiding, mitigating, or accommodating adverse impacts are considered.</p> <p>Through the collaborative RIA process, CNSC staff confirmed that the mitigation measures identified in CNL’s EIS are adequate to address potential biophysical impacts from the Project in relation to potential concerns around access and the sensory experience in the RSA.</p> <p>CNSC staff confirmed that CNL met regularly with AOPFN to better understand and mitigate their concerns regarding potential Project impacts to archaeological, historic and cultural sites of importance. CNSC staff also confirmed that CNL collaborated with AOPFN to incorporate results from the AOPFN AKLUS into the Final EIS and develop mutually agreeable commitments to mitigate AOPFN’s concerns. CNSC staff are satisfied with CNL’s responses and are supportive of CNL’s commitments to continue actively engaging and involving AOPFN in archaeological assessments, planning and monitoring work and to continue discussions regarding an LTRA that can help to enhance the relationship and foster greater collaboration and inclusion of AOPFN in CNL’s projects and operations within their territory, including the management of culture and heritage resources for the wider CRL site. CNSC staff will continue to monitor CNL’s Indigenous engagement to make sure CNL is responsive and provide adequate answers to AOPFN regarding archeological findings and concerns.</p> <p>CNSC staff are committed to long-term engagement with AOPFN and have offered to discuss the development of a ToR for Long-Term Engagement to assist in building a collaborative relationship and trust with AOPFN.</p>	<p>CNSC staff are of the view that AOPFN’s concerns related to Project-specific effects on archaeological and heritage resources have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p> <p>AOPFN is of the view that while CNL’s commitments help to mitigate AOPFN’s concerns, AOPFN views this issue as outstanding due to there likely being inevitable, low severity adverse impacts on AOPFN cultural continuity from the Project.</p>

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme	Proponent response	Crown response	Status of issue/concern
			<ul style="list-style-type: none">- co-draft with AOPFN a "traditional land and resource use discovery plan" to protect undocumented areas of importance at or in close proximity to the NSDF project site- co-develop a project specific cultural and heritage protection plan (CHPP) with the AOPFN, which can be integrated into the NSDF Project Environmental Protection Program- seek AOPFN’s inputs prior to finalizing the NSDF project construction work control documents- support AOPFN with the logistics and funding for location-specific commemoration and/or cultural recognition activities by AOPFN with respect to the NSDF project, prior to construction and prior to beginning of operations- engage with AOPFN to co-develop a project-specific site access protocol for AOPFN members which supports facilitating NSDF project specific commitment <p>continue discussions with AOPFN and AECL to develop an LTRA, which will include provisions for AOPFN involvement in environmental and cultural stewardship and monitoring and can help to address broader AOPFN interests related to AECL and CNL activities</p>		
AOPFN16	<p><i>Traditional land and resource use</i></p> <p>AOPFN raised concerns about the location of the NSDF project site within the Algonquin Settlement Area. AOPFN is of the view that the assessment of Traditional Land and Resource Use does not adequately capture AOPFN’s Traditional Knowledge or perceptions of aesthetic and non-physical impacts to AOPFN’s traditional use (e.g., hunting, fishing), including risks that extend beyond the fence line (e.g., contamination, health and safety concerns, sensory and noise impacts, and restricted access to</p>	EA methodology	<p>CNL (and the CNSC) supported the gathering of AOPFN’s Algonquin Knowledge and Land Use information and collaborated with AOPFN to incorporate the findings of the AOPFN AKLUS into the final EIS and supporting documentation, including the IER. CNL also signed a contribution agreement with AOPFN that included support for AOPFN to conduct additional studies related to NSDF and NPD projects and committed to using the results of the study to verify that the assumptions in consumption habits within the Post Closure Safety Assessment were conservative for the NSDF (i.e., modelling of the self-sufficient Indigenous receptor).</p>	<p>CNSC (and CNL) provided support to AOPFN for gathering AOPFN’s Indigenous Knowledge and Land Use information. CNSC staff collaborated with AOPFN through regular RIA discussions and co-drafting activities to ensure that the final AKLUS and the associated implications identified by AOPFN were incorporated into the EA process, including the CNSC’s CEAA 2012 EA report and the RIA process, as well as any recommendations that are presented to the Commission.</p> <p>The collaborative AOPFN-CNSC RIA for the NSDF project concludes that when taking into consideration mitigation, monitoring and follow-up</p>	<p>CNSC staff are of the view that AOPFN’s concerns related to traditional land and resource use have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p> <p>AOPFN remains concerned that the findings of CNL’s assessment on traditional land and resource use differs from that of the collaborative AOPFN-CNSC RIA for the NSDF project, particularly with regards to impacts on AOPFN traditional use and harvesting rights. However, AOPFN is of the view that CNL’s commitments will support</p>

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	<p>traditional lands and waters). AOPFN is of the view that AOPFN’s Traditional Land Use Study (AKLUS) should inform the EIS and that not all of AOPFN VC’s related to traditional land and resource use are captured in the EIS. AOPFN expects the Proponent to commit to a mitigation table with AOPFN to clarify the Proponent’s commitments to address AOPFN member concerns not addressed in the EIS, including those identified in the AKLUS report findings and which pertain to the broader CRL site.</p> <p>AOPFN completed a Culture and Rights Study and a Diet and Harvest Study in late June 2021 and expects these studies, and the AKLUS report to be included in the RIA and EA processes, IER and in mitigation discussions with CNL.</p>		<p>CNL engaged with AOPFN to better understand the implications of the AOPFN AKLUS and AOPFN’s concerns about the project’s potential impacts on traditional land and resource use through regular working group discussions and iterations of revised written responses to AOPFN’s Comments on the 2019 Draft NSDF EIS. CNL clarified that its assessment on traditional land and resource use concludes that there would be no impacts on current traditional land and resource use with the NSDF project because there are no traditional use activities occurring on the CRL site and there are no off-site effects predicted that would affect traditional land use and resource VCs.</p> <p>CNL indicated that while the selected VCs are considered final in the EIS, the verification and monitoring of predicted residual effects and mitigation measures will be routinely conducted through the EA Follow Up Monitoring Program, in which CNL committed to involving AOPFN. See [AOPFN20] for further details on CNL’s response to AOPFN’s environmental monitoring concerns.</p> <p>To mitigate AOPFN’s concerns about aesthetic and sensory impacts, CNL provided AOPFN with visual mock-ups showing different viewpoints of the completed NSDF, and confirmed that the facility will not be visible from outside of the CRL property. CNL indicated that mitigation measures will be implemented to prevent any effects such as noise or dust impacting off-site use.</p> <p>CNL acknowledged and discussed with AOPFN their concerns about ensuring appropriate measures are in place to sustain a local population of Blanding’s turtle suitable for Indigenous harvest. CNL indicated that a Blanding’s Turtle Road Mitigation Plan will be implemented alongside monitoring and an adaptive management approach to achieve a neutral or positive contribution to Blanding’s turtles. The plan includes offsets to the loss of critical habitat that will be effective for the CRL site conditions.</p> <p>In the final EIS, CNL recognizes that AOPFN disagrees with CNL’s findings regarding traditional</p>	<p>measures, most impact pathways from the NSDF Project on AOPFN rights will likely be low to moderate severity adverse impacts on AOPFN traditional use and harvesting rights.</p> <p>While carrying out their technical review of the CNL EIS, CNSC staff ensured that the VCs of importance identified in the AOPFN AKLUS and AOPFN 2019 draft EIS comments, have been either included in CNL’s assessment directly, or represented by an appropriate indicator species by CNL. This information was also taken into consideration by CNSC subject matter experts in making their conclusion on potential effects for the EA report, which was shared with AOPFN for review prior to finalization. Upon receiving AOPFN’s Culture and Rights Study results in June 2021, CNSC staff collaborated with AOPFN to ensure relevant findings were documented and considered as part of the collaborative RIA process. CNSC staff received the AOPFN-led Harvest and Diet study in late June 2021 and is processing AOPFN’s confidentiality request.</p> <p>CNSC staff confirmed that CNL collaborated with AOPFN to incorporate Algonquin Knowledge and Land Use information into the final EIS and to inform the development of mutually agreeable commitments to mitigate AOPFN’s Project-related concerns. CNSC staff is supportive of the mutually agreeable commitments identified by CNL and AOPFN and will continue to monitor CNL’s Indigenous engagement activities, including with regards to the incorporation of Algonquin Knowledge in the EA process and related follow-up and monitoring programs. CNSC staff encourages AOPFN to continue working with CNL on reflecting and incorporating the results of the Harvest and Diet study anticipated in 2021 in the EA process, including relevant follow-up monitoring programs.</p> <p>CNSC staff worked with AOPFN to ensure that the timelines for completion of different phases of the EA and regulatory process, including the Commission hearing dates, allow a reasonable</p>	<p>identification and management of impacts should they occur.</p>

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			<p>land and resource use, in part because of AOPFN members’ sense of safety on the land (fears of contamination real or perceived). CNL worked with AOPFN to develop a mutually agreed upon list of commitments that CNL will undertake to mitigate or lessen AOPFN’s concerns. CNL committed to:</p> <ul style="list-style-type: none">- continue working with AOPFN to address these concerns through ongoing working group discussions, developing a Risk Communication Strategy for the NSDF Project, and continuing LTRA discussions which can facilitate the implementation of an Indigenous-driven country foods monitoring program for the CRL site- co-draft with AOPFN a "traditional land and resource use discovery plan" to protect undocumented areas of importance at or in close proximity to the NSDF project site- assist AOPFN with a pre-construction inventory of the NSDF Project LSA which would allow AOPFN to identify the presence of any culturally valued indicator species in advance of construction- co-develop with the AOPFN additional mitigation measures to include within the NSDF Project EPP- engage with the AOPFN in the NSDF project EAFMP development and implementation, including providing AOPFN with a co-development role in identifying adaptive management triggers/thresholds and responses in relation to VC related to AOPFN rights and interests, to be built into the EAFMP- provide adequate capacity to AOPFN to update the AKLUS within 3 years of NSDF Project approval and on a period thereafter no more than every 5 years of the Project in order to inform the EAFMP and demonstrate effectiveness of an AOPFN Risk Communication Strategy for the NSDF Project	<p>amount of time for AOPFN to be meaningfully involved.</p>	

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme	Proponent response	Crown response	Status of issue/concern
			<ul style="list-style-type: none">- provide financial support for the development and implementation of an AOPFN Guardian Program, as it relates to the NSDF Project		
AOPFN17	<p>Mitigation measures</p> <p>AOPFN is concerned that the proposed mitigation measures for impacts on AOPFN culture and heritage resources and other VCs of concern are not adequate and requests engagement with the Proponent to identify culturally appropriate mitigation measures, including but not limited to a Traditional Land and Resource Use Discovery Plan, and to be engaged in drafting Project conditions. AOPFN expects the Proponent to commit to establishing a project-specific mitigation table with AOPFN to clarify the Proponent’s commitments to address AOPFN member concerns not addressed in the EIS, including those identified in the AKLUS report findings and which pertain to the broader CRL site. AOPFN would like to co-develop mitigation measures, and be actively involved in both the implementation and monitoring of their effectiveness.</p>	EA methodology	<p>CNL signed a Project specific contribution agreement with AOPFN to support AOPFN’s participation in the EA process and engaged with AOPFN through regular AOPFN-CNL working group meetings and iterations of written responses to AOPFN’s Comments on the 2019 Draft NSDF EIS. CNL indicated that CNL will maintain discussions and engagement with interested Indigenous Nations and communities, including AOPFN, with respect to their definition of culturally appropriate mitigation measures. Since monitoring will be conducted routinely at the NSDF site, CNL will be able to continuously determine whether the mitigation measures applied are culturally appropriate as defined by Indigenous Nations and communities.</p> <p>CNL collaborated with AOPFN through regular working group meetings to better understand their concerns related to the NSDF project, provide clarity on CNL’s proposed mitigation measures related to AOPFN’s concerns and to develop a mutually agreed upon list of commitments that CNL will undertake to mitigate or lessen AOPFN’s concerns. CNL committed to:</p> <ul style="list-style-type: none">- include AOPFN in the development of the NSDF EAFMP, including identifying species of importance, refining mitigation and monitoring measures for the Project- provide the funding to continue the Working Group and AOPFN AAC until a site-wide arrangement is established, where AOPFN can confirm appropriate implementation of NSDF-specific mitigation, monitoring and compensatory commitments related to AOPFN rights and interests- co-draft with AOPFN a "traditional land and resource use discovery plan"	<p>CNSC staff worked collaboratively with AOPFN work with AOPFN to ensure that AOPFN’s concerns related to potential impacts on AOPFN’s culture and rights are documented as part of the RIA approach and the CNSC’s EA report, and that options for avoiding, mitigating, or accommodating adverse impacts are considered.</p> <p>CNSC staff offered to facilitate a discussion between AOPFN, CNL and AECL to discuss CNL’s commitments to address the AOPFN’s concerns related to the Project. AOPFN confirmed that they were working directly with CNL to develop project-specific commitments to address their outstanding concerns and that a multi-party meeting was not necessary at that time.</p> <p>CNSC staff confirm that CNL prepared a Commitments Report as part of its final EIS documentation that includes all of the mitigation measures, follow-up program measures and commitments that CNL has made, including commitments CNL made in collaboration with AOPFN. CNSC staff confirmed that relevant sections of this report were verified by AOPFN prior to CNL submitting the Final EIS to the CNSC.</p> <p>CNSC staff have reviewed and assessed CNL’s assessment, project commitment report and proposed mitigation and follow-up measures as part of CNSC staff’s EA report and analysis and conclusions in the RIA. CNSC staff are satisfied with CNL’s assessment. However, the collaborative AOPFN-CNSC RIA for the NSDF project concludes that when taking into consideration mitigation, monitoring and follow-up measures, most impact pathways from the NSDF Project on AOPFN rights will likely be low to moderate severity adverse impacts on AOPFN traditional use and harvesting rights.</p>	<p>CNSC staff are of the view that AOPFN’s Project-specific concerns related to CNL’s proposed mitigation measures have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p> <p>AOPFN is of the view that while CNL has made strong efforts to address gaps in its mitigation and monitoring plans, programs and commitments, this issue is ongoing as there are outstanding issues that have not been addressed at the time of the issuance of this EA report. AOPFN is of the view that these issues are ongoing while CNL, AECL and AOPFN continue to discuss solutions for these issues at the Project Working Group and AECL/CNL/AOPFN MOU Working Group tables.</p>

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme	Proponent response	Crown response	Status of issue/concern
			<div>- co-develop with the AOPFN additional mitigation measures to include within the NSDF Project EPP</div> <div>Also see Proponent Response to comments related to Historic and Cultural sites [AOPFN 15] and Traditional Land and Resource Use [AOPFN 16].</div>	CNL’s Commitment Report will inform the CNSC’s list of recommended EA conditions as well as the Licence Conditions Handbook (LCH) that provides compliance verification criteria and non-mandatory recommendations and guidance. CNSC staff will track progress on CNL’s commitments through the IER. Additionally, CNL’s ongoing engagement with AOPFN will be reported through CNL’s Public Information and Disclosure Program as part of their Annual Compliance Reports.	
AOPFN18	<p><i>Socioeconomic impacts and accommodation</i></p> <p>AOPFN indicated that their concerns are not reflected in the assessment of socio-economic benefits from the Project, and that there should be a program to monitor how AOPFN members benefit from the Project and the broader Chalk River site over time. AOPFN requests further engagement with the Proponent on these issues, including the need for a reconciliation and compensation framework and to identify appropriate socio-economic accommodation measures to address cumulative effects and unavoidable impacts on Algonquin ecological and cultural species and sites of importance.</p>	EA methodology	<p>CNL engaged with AOPFN to better understand AOPFN’s concerns about the project’s potential socioeconomic impacts through regular working group discussions and iterations of written responses to AOPFN’s Comments on the 2019 Draft NSDF EIS.</p> <p>CNL communicated to AOPFN that they are supportive of working towards a reconciliation framework and indicated that further discussions are necessary with AECL/AOPFN/CNL to further discuss a reconciliation and compensation framework. CNL indicated that they are committed to working with AOPFN to identify barriers for accessing economic opportunities from the Project, mitigation of those barriers and ways to monitor the degree to which AOPFN members are able to take advantage of benefits of the Project. CNL and AOPFN also signed a Contribution Agreement which includes capacity to support the AOPFN development and ongoing management of the community’s Labour and Skills database.</p> <p>CNL explained that CNL’s services agreement with the NSDF Construction services contract requires the use of local and Indigenous suppliers and reporting on diversity and inclusion of subcontractors, including tracking Indigenous suppliers.</p> <p>With respect to concerns about the potential social impacts from a potential in-migration workforce, CNL indicated that the numbers are not expected to be significant enough to result in social problems for local communities. CNL also committed to continuing LTRA discussions with AOPFN, which</p>	<p>CNSC staff have reviewed and assessed CNL’s assessment of the socio-economic environment and proposed mitigation and follow-up measures as part of CNSC staff’s EA report and are satisfied with CNL’s assessment.</p> <p>CNSC staff confirmed that CNL worked with AOPFN to better understand AOPFN’s concerns about potential socio-economic impacts and that CNL provided additional information and developed mutually agreeable commitments to mitigate AOPFN’s concerns. CNSC staff are aware that CNL signed a contribution agreement with AOPFN in September 2020, and that CNL provided a written response to this concern in CNL’s initial dispositions to AOPFN’s comments on the 2019 draft EIS. CNSC staff are satisfied with CNL’s responses regarding Project-specific socioeconomic impacts and are supportive of CNL’s commitment to work with AOPFN to address concerns raised regarding socio-economic impacts including a commitment to explore ways to monitor those impacts with AOPFN. CNSC staff encourages AOPFN to continue working with CNL to address concerns related to potential socio-economic impacts and opportunities for AOPFN. CNSC staff will continue to monitor CNL’s Indigenous engagement to make sure CNL is responsive and provide adequate answers to AOPFN regarding socio-economic impacts and concerns, including with regards to monitoring and follow-up measures.</p>	<p>CNSC staff are of the view that AOPFN’s Project-specific concerns related to socioeconomic impacts have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p> <p>AOPFN recognizes that there are multiple forums now set up, at the Project specific and CRL Site level, where socio-economic benefits, Indigenous peoples ability to take advantage of them, and reconciliation/ compensation can be discussed.</p>

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme	Proponent response	Crown response	Status of issue/concern
			<p>can facilitate discussions on CRL site-wide issues, including economic opportunities for AOPFN related to the CRL site. CNL will also engage AOPFN in how timber salvage will occur at the site and whether there are economic development opportunities related to forest clearing that AOPFN can access.</p> <p>In the final EIS, CNL acknowledges AOPFN’s strong interest in obtaining economic benefits from the NSDF Project and CNL generally. CNL is of the view that they have resolved AOPFN’s concerns regarding socioeconomic impacts through the commitments listed above.</p>		
AOPFN19	<p>Health assessment</p> <p>AOPFN is concerned that the health assessment does not consider impacts on AOPFN’s community well-being or determinants of Indigenous health, including potential psychosocial and/or mental health impacts. AOPFN expects CNSC to require the Proponent to engage AOPFN more meaningfully on these issues, and to update the health assessment (specifically section 6.6 of the EIS) and follow-up programs accordingly. AOPFN expressed concerns about the need for a follow-up country foods survey and holistic monitoring program that involves AOPFN members and recognizes the interdependencies between ecological, socio-economic, community and cultural health, assesses potential contamination pathways (real or perceived) and risks to AOPFN health, and ensures the safety of foods harvested and consumed in the area surrounding NSDF.</p>	EA methodology	<p>CNL engaged with AOPFN to better understand and mitigate AOPFN’s concerns about the health risk assessment through regular working group discussions and iterations of written responses to AOPFN’s Comments on the 2019 Draft NSDF EIS.</p> <p>CNL clarified that for the Post-Closure Safety Assessment, a conservative hunter/gatherer self-sufficient Indigenous receptor was included. CNL indicated that through the Contribution Agreement with CNL, AOPFN conducted a Culture and Rights Study and a Harvest and Diet Study for NSDF. CNL committed to reporting the study results within future revisions of the IER which will be submitted to the CNSC as supplemental documentation prior to the commission hearing. CNL confirmed that the study results will also inform the NSDF Project's EAFMP and verify that the assumptions in consumption habits within the Post Closure Safety Assessment were conservative for the NSDF (i.e., modelling of the self-sufficient Indigenous receptor).</p> <p>While CNL maintains that human health has been conservatively assessed for Indigenous Nations and communities within the Final EIS, CNL acknowledges that the AOPFN disagrees on the basis that there are other determinants of health important to the AOPFN including the avoidance of consuming traditional foods. CNL and AOPFN developed a mutually agreed upon list of commitments that CNL</p>	<p>CNSC staff worked collaboratively with AOPFN as part of the consultation ToR and collaborative RIA process to assess, understand and address the issues and concerns raised by AOPFN in relation to the proposed Project, including concerns regarding potential psycho-social and/or mental health impacts. CNSC staff also collaborated with AOPFN to ensure AOPFN’s concerns and views regarding potential human health effects from radiological exposure pathways were documented and considered in the EA report. CNSC staff have reviewed the proponent’s assessment the potential effects on human radiological health as part of CNSC staff’s EA report, which was shared with AOPFN for review. CNSC staff have verified CNL’s assessment, and taking into account the implementation of mitigation measures and recommended follow-up program measures described in the EIS and the views expressed by Indigenous Nations and communities, including AOPFN, concluded that the Project is not likely to cause significant adverse effects on human health as a result of nuclear and hazardous substances.</p> <p>CNSC staff confirmed that CNL worked with AOPFN to better understand and address their concerns regarding CNL’s health assessment, and that CNL provided additional support for an AOPFN Harvest and Diet study to ensure that CNL can better understand AOPFN’s land and resource use in the vicinity of the NSDF project and CRL site. CNSC staff are supportive of the mutually</p>	<p>CNSC staff are of the view that AOPFN’s Project-specific concerns related to the health assessment have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p> <p>AOPFN is of the view that this issue remains ongoing while CNL’s Project-specific commitments and mitigation initiatives are implemented and as AOPFN continues to engage with AECL and CNL to mitigate AOPFN’s high level of fear and stigma associated with the CRL site and any proposed and existing projects within it.</p>

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme	Proponent response	Crown response	Status of issue/concern
			<p>will undertake to mitigate AOPFN’s concerns. CNL committed to:</p> <ul style="list-style-type: none">- develop an Indigenous-driven Risk Communication Strategy for the NSDF Project- continue LTRA discussions with AOPFN, which can facilitate the implementation of an Indigenous-driven country foods monitoring program for the CRL site, with seed funding provided in 2021 for AOPFN to start developing this program and the risk communication strategy- work with AOPFN to develop a practical and meaningful role for AOPFN in the NSDF monitoring program, and support Indigenous knowledge monitoring in relation to the Project, including financial <p>support from CNL for the development and implementation of an AOPFN Guardian Program, as it relates to the NSDF project</p> <ul style="list-style-type: none">- include AOPFN in the development of the NSDF EAFMP, including identifying species of importance, characterizing impacts on AOPFN traditional land and resource use in proximity to the NSDF project, and refining mitigation and monitoring measures for the Project	<p>agreeable commitments that AOPFN and CNL identified to mitigate AOPFN’s concerns. As per REGDOC 3.2.2, Indigenous Engagement, CNSC staff expect CNL to document and report on how CNL has or plans to address the concerns raised by AOPFN, in their EIS and/or IER for the proposed NSDF project.</p>	
AOPFN20	<p>Planning, monitoring and oversight</p> <p>AOPFN continues to request that CNL consult with them to discuss CNL’s site monitoring systems, project planning and design decisions (e.g., construction timing, adaptive management responses to monitoring), closure objectives and criteria, and follow-up programs. AOPFN would like CNL to engage with AOPFN so the Nation can clarify its expectations for the above-noted parts of the Project, including AOPFN’s role and the need to characterize impacts on AOPFN traditional land and resource use in the project-area and CRL</p>	<p>Environmental monitoring</p>	<p>CNL engaged with AOPFN to better understand and mitigate AOPFN’s concerns about planning, monitoring and oversight for the NSDF project through regular working group discussions and iterations of written responses to AOPFN’s Comments on the 2019 Draft NSDF EIS. CNL and AOPFN also developed a mutually agreed upon list of commitments that CNL will undertake to address or lessen AOPFN’s concerns.</p> <p>CNL provided additional information to AOPFN to clarify the conceptual monitoring and follow up program for the NSDF project and indicated that Environmental monitoring throughout all phases of the NSDF Project will be conducted as part of the</p>	<p>As Canada’s nuclear regulator, the CNSC has independent oversight of nuclear activities on behalf of Canadians, including the regulatory oversight of the CRL site and the implementation of the NSDF Project, should the project proceed. This includes regulatory requirements to develop, implement and maintain an environmental monitoring program to demonstrate that the public and the environment are protected from emissions related to the facility’s nuclear activities. CNSC staff communicated to AOPFN that while the CNSC is supportive of an independent Indigenous advisory body for this project/site, setting up this initiative falls outside of the CNSC’s purview and authority as the regulator, and encouraged AOPFN to continue discussing with</p>	<p>CNSC staff are of the view that AOPFN’s Project-specific concerns related to monitoring and oversight have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p> <p>AOPFN is of the view that this issue remains ongoing while CNL’s Project-specific commitments and mitigation initiatives are implemented and as AOPFN continues to engage with AECL, CNL and CNSC to address this issue at the broader CRL site level.</p>

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme	Proponent response	Crown response	Status of issue/concern
	<p>site. AOPFN expects the Proponent to report to the CNSC on AOPFN’s expectations and the Proponent’s associated commitments related to Project monitoring. AOPFN has further clarified that it is seeking engagement with AECL and CNL to establish a long-term data collection system for Traditional Knowledge in relation to the CRL site, including CNL’s support and funding for an independent, Indigenous-led Guardian Program to inform project and CRL site level management systems.</p> <p>AOPFN also requests that CNSC consult directly with AOPFN about establishing an independent Indigenous watchdog body at the Chalk River site.</p> <p>AOPFN would also like to work with CNSC staff on drafting appropriate Certificate Conditions related to monitoring and oversight.</p>		<p>EAFMP, which will be finalized after the CNSC EA decision. CNL is willing to involve all Indigenous communities who have interest in the NSDF Project environmental monitoring and have shared the draft EAFMP with the AOPFN for technical review. CNL committed to develop with the AOPFN a practical, meaningful role for the AOPFN in the NSDF monitoring program, and support Indigenous knowledge monitoring in relation to the NSDF Project. This includes financial support from CNL for the development and implementation of an AOPFN Guardian Program, as it relates to the NSDF Project. CNL will also provide the AOPFN with a co-development role in identifying adaptive management triggers/thresholds and responses in relation to VC elated to the AOPFN rights and interests, which would be built into the EAFMP.</p> <p>CNL explained that the existing condition of restricted access to the CRL site would continue into the institutional control period for the NSDF Footprint and that an initial Closure Plan has been developed. CNL committed to engaging the AOPFN in future planning for the closure of NSDF, including input on restoration or rehabilitation of the facility footprint. CNL will also engage the AOPFN to co-develop updates to the NSDF Closure Plan which will occurs every 5 years.</p> <p>CNL indicated that although it is outside the scope of the NSDF project, CNL is establishing the Land Use Program to determine next land uses and end state objectives for all CNL managed sites in Canada. Indigenous peoples will be engaged in the development of this program. CNL also communicated to AOPFN that CRL is putting together an Overview Decommissioning and Cleanup Plan (ODCP) for the CRL site and intends to engage Indigenous Nations and communities, including AOPFN, as it is developed. Although it is not project-specific, CNL project representatives offered to facilitate a future meeting with AOPFN and the CNL Land Use Program on this topic.</p> <p>CNL also confirmed that the Government of Canada has provided the financial guarantee required under REGDOC 3.3.1, to ensure sufficient financial</p>	<p>CNL and AECL, AOPFN’s interest in being involved in ongoing monitoring and follow-up activities, including the possibility of establishing an independent Indigenous advisory body for this project/site.</p> <p>CNSC staff are committed to building a long-term collaborative relationship with AOPFN, including collaboration on the CNSC’s Independent Environmental Monitoring Program (IEMP) and the development of a long-term engagement ToR.</p> <p>CNSC confirmed that CNL provided written responses to this concern in CNL’s iterations of responses to AOPFN’s comments on the 2019 draft EIS and that CNL met with AOPFN through regular working group meetings to develop a mutually agreeable list of commitments to address AOPFN’s concerns related to monitoring and oversight. CNSC staff are satisfied with CNL’s responses and are supportive of the mutually agreeable commitments identified by CNL and the AOPFN to address AOPFN’s concerns regarding environmental monitoring. CNSC staff encourage AOPFN to continue discussions with CNL to ensure that relevant information, knowledge and requests can be reflected in follow-up and environmental monitoring programs. As per REGDOC 3.2.2: Indigenous Engagement and REGDOC 3.2.1: Public Information and Disclosure Program, CNSC staff will continue to monitor CNL’s Indigenous engagement activities, including with regards to monitoring and follow-up measures.</p>	

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme	Proponent response	Crown response	Status of issue/concern
			<p>resources are available to fund all approved decommissioning activities should CNL be unable to fulfill its obligation.</p> <p>CNL clarified that there is no specific Indigenous-led monitoring program at the CRL site and that AOPFN involvement in the CRL site environmental monitoring program is a CRL site level concern that can be discussed as part of the ongoing LTRA discussions that CNL is committed to pursuing with AOPFN.</p>		
AOPFN21	<p><i>Funding and capacity</i></p> <p>AOPFN expressed concerns to the CNSC and CNL about the need for adequate funding to ensure AOPFN has the capacity to meaningfully participate in the EA processes for the remaining phase of the project, including undertaking a Rights Impact Assessment, participating in EA report development and negotiating and implementing a ToR. Should the project proceed, AOPFN requests CNL to ensure that the Working Group and AAC are adequately resourced to continue their work, including participating in Project-specific planning activities.</p>	Indigenous consultation	<p>CNL (and the CNSC) awarded funding to AOPFN to support the development of AOPFN’s AKLUS, as well as funding support for ongoing engagement and consultation activities.</p> <p>The AOPFN and CNL have also signed a Contribution Agreement and have agreed to a mutually beneficial, on-going working relationship and to provide a process to which CNL can engage with the AOPFN community to better understand any AOPFN rights and interests that may be impacted in the general and surrounding areas the NSDF Project. The contribution agreement includes funding for AOPFN-led studies as well as for meetings/discussions on AOPFN’s</p> <p>AKLUS, and review of NSDF Project documents and engagements leading up to the CNSC Commission Hearing on the NSDF Project. Revisions to the contribution agreement were agreed to between AOPFN and CNL in December 2020 to accommodate additional capacity for the review of the 2019 revised Draft EIS.</p> <p>CNL also worked with AOPFN to develop a mutually agreed upon list of commitments, which includes CNL’s commitment to provide funding to continue the Working Group and AAC until a site-wide arrangement is established. CNL will continue to work collaboratively with AOPFN on the current workplan and commits to continued direct engagement with the AOPFN in their areas of</p>	<p>As an agent of the Government of Canada and as Canada’s nuclear regulator, the CNSC recognizes its responsibility to uphold the honour of the Crown and meet its duty to consult with and, where appropriate, accommodate the interests of AOPFN when its decisions could potentially affect AOPFN’s rights and interests. The CNSC has communicated to AOPFN that it remains committed to supporting this responsibility by making funding available, where possible, to support AOPFN’s participation in the EA process for the proposed project through the CNSC Participant Funding Program (PFP). The CNSC has awarded funding through the PFP to AOPFN on multiple occasions including for participation in the EA process and completion of the collaborative RIA process for the NSDF project. CNSC staff are also committed to developing a long-term relationship ToR for engagement with AOPFN, which can identify specific areas for further capacity and funding support and where AOPFN and CNSC staff can further collaborate.</p>	<p>Addressed. AOPFN is of the view that in 2020 and 2021, AOPFN has received adequate funding to meaningfully engage with both CNL and CNSC.</p>

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme	Proponent response	Crown response	Status of issue/concern
			expressed concern and interest with respect to the NSDF Project.		

Issue and Concern Summary Table for Métis Nation of Ontario
with respect to the Proposed CNL Near Surface Disposal Facility

Table C-2 MNO concerns and issues table

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme (see guidance for drop-down list)	Proponent response	Crown response	Status of issue/concern
MNO001	MNO has indicated that MNO harvesters hold perceptions that water bodies, including Perch Lake and the Ottawa River, wildlife and vegetation contain contamination from the CNL site and that the proposed NSDF would further entrench these fears and perceptions. These perceived effects on Métis harvesters could lead to avoidance behaviors, including MNO citizens further avoiding conducting hunting, trapping, fishing, gathering, ceremonies and other traditional activities in the vicinity of the CRL/NSDF site for the long-term.	Fear and avoidance	<p>Based on the analysis and information in CNL’s EIS, there would not be any negative impact on traditional uses by Indigenous peoples as a result of the construction, operation or long-term monitoring of the proposed NSDF.</p> <p>CNL has been engaging with MNO since 2016 with regard to the NSDF. Included in these discussions is the establishment of a work plan/MOU and opportunities to collaborate on monitoring, site visits, information sharing and other measures to address concerns with regard to fear and avoidance.</p> <p>In CNL’s commitments table, CNL committed to continue working with MNO citizens on better communicating the low level of risks to traditional uses adjacent to the Chalk River site, and will involve all interested Indigenous Nations and communities in its monitoring and follow-up programs.</p>	<p>The CNSC is committed to meaningfully addressing the concerns raised by the MNO with regard to fear and avoidance behaviours. In addition to the measures and responses provided by CNL, CNSC staff propose the following measures to work with the MNO to address these concerns:</p> <ul style="list-style-type: none">- Continue to monitor progress towards a MNO-CNL Long Term Relationship Agreement which supports long term project monitoring as well as communication of those results to MNO citizens.- Incorporate appropriate information, concerns and perspectives identified by MNO in the CNSC’s EA report, including MNO’s Traditional Knowledge Land Use Study (TKLUS).- Collaborate with MNO on the development of RIA Report to be appended to the CNSC’s EA report.- On-going collaboration with the MNO on the CNSC’s monitoring and follow-up activities in relation to the Chalk River site.- On-going information sharing and collaboration including regular meetings between CNSC staff and MNO representatives from Regions 5 and 6 as part of the CNSC-MNO Long-Term Engagement ToR and region specific engagement plans, which was established in 2019. <p>CNSC staff look forward to working with MNO to confirm if these proposed measures adequately address the concerns raised, or if MNO has any recommendations for any further actions that can be taken in collaboration with the CNSC and/or CNL.</p>	<p>CNSC staff are of the view that MNO’s concerns related to fear and avoidance have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for fear and avoidance behaviours and agreed to work with CNL to ensure it is implemented in a suitable manner.</p>

MNO002	<p>MNO raised concerns related to the aquatic environment including chemical suppressant interaction with surface water runoff and resulting specific effects, in particular to fish and fish habitat.</p> <p>Additional information requested from CNL on the use of fixatives, specifically how dust control methods will not lead to increased effects on fish and fish habitat and details on the Surface Water management Plan.</p> <p>MNO requests that CNL work with them to develop and implement education strategies in order to communicate the aquatic biodiversity of Perch lake to MNO citizens and describe the current state and capacity of waterbodies/watersheds associated with CRL.</p>	Aquatic Environment	<p>CNL have provided MNO with responses to concerns raised with regards to the aquatic environment as indicated in the final EIS and IER. CNL also indicated that mitigation measures and environmental design features will be implemented to mitigate effects on the aquatic environment, and stated that the residual effects from the Project on aquatic biodiversity are not predicted to be significant.</p> <p>In CNL's commitments table, CNL remains committed to ongoing engagement with the MNO, including future discussions with MNO citizens on aquatic biodiversity at the CRL site. CNL is also committed to seeking input from MNO for additional mitigation measures to include within the NSDF Project EPP, which include dust management, erosion and sediment control and surface water management plans.</p>	<p>CNSC staff have confirmed that CNL has responded to the concern raised and are satisfied with the response. As per REGDOC 3.2.2: Indigenous engagement, CNSC staff will continue to monitor CNL Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to MNO's concerns and comments.</p> <p>CNSC staff concluded that the Project is not likely to cause significant adverse effects on the aquatic environment, and will continue to monitor the proponent's Indigenous engagement activities, including with regards to monitoring and follow-up measures, to make sure they are responsive and provide adequate answers to Indigenous Nations and communities' concerns and comments.</p>	<p>CNSC staff are of the view that MNO's concerns related to aquatic environment have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC's compliance activities.</p> <p>CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for aquatic environment and agreed to work with CNL to ensure it is implemented in a suitable manner.</p>
MNO003	<p>MNO citizens raised concerns that there is no more speckled trout due to a previous spill from nuclear operations at CRL.</p> <p>Concern regarding the potential for an increase in the amount of water being taken from the Ottawa River for construction water which could potentially affect the impingement rates for Sturgeon.</p>	Fish and Fish Habitat	<p>CNL have provided MNO with responses to concerns raised with regards to fish and fish habitat as indicated in the final EIS and IER. CNL has also indicated in its commitment list that input from the public and Indigenous peoples will be sought on the EA Follow Up Monitoring Program. CNL is committed to working with MNO to discuss MNO's input and ideas for follow-up monitoring, including MNO's involvement in this program. In the final EIS, CNL indicated that mitigation measures and environmental design features would be implemented to mitigate effects on the aquatic environment, and stated that the residual effects from the Project on aquatic biodiversity are not predicted to be significant.</p>	<p>CNSC staff have confirmed that CNL has responded to the concerns raised and are satisfied with the response. As per REGDOC 3.2.2: Indigenous engagement, CNSC staff will continue to monitor CNL Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to MNO's concerns and comments.</p> <p>CNSC staff concluded that the Project is not likely to cause significant adverse effects on the aquatic environment, and will continue to monitor the proponent's Indigenous engagement activities, including with regards to monitoring and follow-up measures, to make sure they are responsive and provide adequate answers to Indigenous Nations and communities' concerns and comments.</p>	<p>CNSC staff are of the view that MNO's concerns related to fish and fish habitat have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC's compliance activities.</p> <p>CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for fish and fish habitat and agreed to work with CNL to ensure it is implemented in a suitable manner.</p>
MNO004	<p>MNO raised concerns about potential impacts to groundwater, including what CNL will do to mitigate the potential attenuation of groundwater contaminants between the ECM and Perch Creek.</p>	Groundwater (quality and quantity)	<p>CNL have provided MNO with responses to concerns raised with regards to groundwater as indicated in the final EIS and IER. CNL has also indicated in its commitment list that input from the public and Indigenous peoples will be sought on the EA Follow Up Monitoring Program. CNL is committed to working with MNO to discuss MNO's input and ideas for follow-up monitoring,</p>	<p>CNSC staff have confirmed that CNL has responded to the concern raised and are satisfied with the response. As per REGDOC 3.2.2: Indigenous engagement, CNSC staff will continue to monitor CNL Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to MNO's concerns and comments.</p>	<p>CNSC staff are of the view that MNO's concerns related to groundwater have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC's compliance activities.</p>

			including MNO's involvement in this program.		CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for groundwater (quality and quantity) and agreed to work with CNL to ensure it is implemented in a suitable manner.
MNO005	<p>MNO is concerned with environmental contamination and the potential for radioactive leakages from NSDF. In the event of an accident or malfunction, MNO wants to ensure that Métis harvesters in the region are notified as quickly and effectively as possible. To this effect, MNO requests that CNL notify them should unexpected events occur.</p> <p>MNO has indicated that there is a lack of clarity with respect to radiological dose estimates in the assessment of accidents and malfunctions and whether the estimated dose for accidents and malfunctions was specifically calculated for Indigenous peoples, who tend to rely more on traditional foods than members of the public.</p>	Accidents and Malfunctions	In the final EIS and IER, CNL indicated that they have provided MNO with responses to concerns raised with regards to accidents and malfunctions. CNL has also indicated in its commitment list that input from the public and Indigenous peoples will be sought on the EA Follow Up Monitoring Program. CNL is committed to working with MNO to discuss MNO's input and ideas for follow-up monitoring, including MNO's involvement in this program.	CNSC staff have confirmed that CNL has responded to the concern raised and are satisfied with the response. As per REGDOC 3.2.2: Indigenous engagement, CNSC staff will continue to monitor CNL Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to MNO's concerns and comments.	<p>CNSC staff are of the view that MNO's concerns related to accidents and malfunctions have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC's compliance activities.</p> <p>CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for accidents and malfunctions and agreed to work with CNL to ensure it is implemented in a suitable manner.</p>
MNO006	The MNO requests that CNL engage them in ongoing discussions related effects of the environment on the project including seismic events as well as climate change, in particular rainfall events, which have a recurrence interval of 100 years. The MNO wants CNL to fully inform them of their contingencies and associated plans or measures throughout the project lifecycle.	Effects of the Environment on the Project	In the final EIS and IER, CNL indicated that they have provided MNO with responses to concerns raised with regards to effects of the environment on the project. CNL has also indicated that they will continue to provide MNO with requested documents, including being committed to obtaining MNO review and input on the EA Follow Up Monitoring Program. CNL and MNO also continue to have discussions on the development of a Long Term Relationship Agreement.	CNSC staff have confirmed that CNL has responded to the concern raised and are satisfied with the response. As per REGDOC 3.2.2: Indigenous engagement, CNSC staff will continue to monitor CNL's Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to MNO's concerns and comments.	<p>CNSC staff are of the view that MNO's concerns related to effects of the environment on the Project have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC's compliance activities.</p> <p>CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for effects of the environment on the Project and agreed to work with CNL to ensure it is implemented in a suitable manner.</p>
MNO007	MNO is concerned with the assessment of impacts to the atmospheric environment including baseline air quality data collection and emissions calculations for all phases of the project including the potential effects of dust generation at the local and regional levels, i.e., beyond the facility footprint.	Atmospheric Environment	In the final EIS and IER, CNL indicated that they have provided MNO with responses to concerns raised with regards to the atmospheric environment. CNL has also indicated in its commitment list that input from the public and Indigenous peoples will be sought on the EA Follow Up Monitoring Program. CNL is committed to working with MNO to discuss MNO's input and	CNSC staff have confirmed that CNL has responded to the concern raised and are satisfied with the response. As per REGDOC 3.2.2: Indigenous engagement, CNSC staff will continue to monitor CNL's Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to MNO's concerns and comments.	CNSC staff are of the view that MNO's concerns related to atmospheric environment have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC's compliance activities.

			ideas for follow-up monitoring, including MNO’s involvement in this program.		CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for atmospheric environment and agreed to work with CNL to ensure it is implemented in a suitable manner.
MNO008	MNO has concerns regarding maintaining existing forests within their traditional territories and MNO would like to be part of the advisory committee related to the SFMP for CRL.	Terrestrial Environment	<p>In the final EIS and IER, CNL indicated that they have provided MNO with responses to concerns raised with regards to the terrestrial environment.</p> <p>CNL is committed to seeking input from MNO for additional mitigation measures to include within the EA Follow Up Monitoring Program. CNL will seek MNO’s inputs prior to finalizing the NSDF Project construction work control documents.</p>	CNSC staff have confirmed that CNL has responded to the concern raised and are satisfied with the response. As per REGDOC 3.2.2: Indigenous engagement, CNSC staff will continue to monitor CNL Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to MNO’s concerns and comments.	<p>CNSC staff are of the view that MNO’s concerns related to terrestrial environment have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for terrestrial environment and agreed to work with CNL to ensure it is implemented in a suitable manner.</p>
MNO009	MNO recommended that ongoing monitoring of terrestrial animals for baseline data collection as well as ongoing monitoring post Project approval should be conducted. Every effort should be made to identify active nests (migratory birds), apply setbacks (whether overlapping or not) and schedule clearing accordingly.	Wildlife, wildlife habitat and SAR	<p>In the final EIS and IER, CNL indicated that they have provided MNO with responses to concerns raised with regards to wildlife and wildlife habitat, including species at risk. CNL has also indicated in its commitment list that input from the public and Indigenous peoples will be sought on the EA Follow Up Monitoring Program. CNL is committed to working with MNO to discuss MNO’s input and ideas for follow-up monitoring, including MNO’s involvement in this program.</p> <p>CNL has acknowledged the importance of VC and environmental monitoring activities to the MNO and discussions will continue on both.</p>	CNSC staff have confirmed that CNL has responded to the concern raised and are satisfied with the response. As per REGDOC 3.2.2: Indigenous engagement, CNSC staff will continue to monitor CNL Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to MNO’s concerns and comments.	<p>CNSC staff are of the view that MNO’s concerns related to wildlife, wildlife habitat and SAR have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for wildlife, wildlife habitat and SAR and agreed to work with CNL to ensure it is implemented in a suitable manner.</p>
MNO010	<p>MNO raised several issues and concerns with respect to CNL’s approach to defining and selecting spatial boundaries (or study areas) for the assessment of potential effects.</p> <p>MNO generally disagrees with how CNL established the Site Study Area (SSA), Local Study Area (LSA) and Regional Study Area (RSA). By collecting data before defining the</p>	Environmental Assessment Methodology(Spatial Boundaries)	<p>CNL has updated the EIS as suggested by the MNO reviewer:</p> <p>“The Regional Study Area was expanded to include reach of the Ottawa River extending 8 km downstream from CNL in response to comments received from Indigenous Nations and communities and the public.”</p>	CNSC staff have confirmed that CNL has responded to the concern raised and are satisfied with the response. As per REGDOC 3.2.2: Indigenous engagement, CNSC staff will continue to monitor CNL Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to MNO’s concerns and comments.	CNSC staff are of the view that MNO’s concerns related to EA methodology have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.

	spatial boundaries, CNL is limiting the scope of the assessment. Moreover, CNL notes that the definition of the LSA (also in section 5.1.3.1) does not conform to the EIS Generic Guidelines. This is a concern for MNO given that it results in the LSA not being wide enough to encompass all potential project effects that could occur outside of the Chalk River Laboratories property (e.g., particulate matter and combustion gases occurring on roads that feed the property).				CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for EA methodology and agreed to work with CNL to ensure it is implemented in a suitable manner.
MNO011	MNO has raised issues and concerns with respect to CNL's selection of VCs. There is a lack of explanation or relationship between the selected VCs and their traditional, cultural and heritage importance to Indigenous peoples, Indigenous Rights and Interests, and Métis Rights and interests. For example, MNO questioned why were larger mammals such as the black bear, eastern wolf and white-tailed deer only considered in the Ambient Radioactivity and Ecological Health Volume. By doing so, it removes critical considerations of these species from further study, including habitat connectivity, availability, distribution and reproduction. MNO recommended that CNL should support the completion of an MNO TKLUS Study and include all species identified in the TKLUS in their assessment.	EA Methodology (VC)	<p>How CNL incorporated VCs identified in the MNO TKLUS was discussed with the MNO at a meeting with MNO Councilors in April and October 2019 April.</p> <p>CNL indicated that they provided funding for the MNO to complete a VC workshop. Findings from this workshop and from the MNO TKLUS have been incorporated into the final EIS.</p>	CNSC and CNL provided funding and support to the MNO to complete an MNO TKLUS for the NSDF project. Through its technical review of the EIS and associated documents, CNSC has confirmed that CNL has been working with the MNO to ensure the appropriate VCs identified in the MNO TKLUS have been captured correctly in the EIS. CNSC will work with the MNO to ensure that these VCs and information from the MNO TKLUS are also considered and addressed in the CNSC staff's EA report.	<p>CNSC staff are of the view that MNO's concerns related to EA methodology have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC's compliance activities.</p> <p>CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for EA methodology and agreed to work with CNL to ensure it is implemented in a suitable manner.</p>
MNO012	<p>MNO disagrees with CNL's assessment methodology because it only relies on biophysical components to characterize effects to Métis rights – as shown by the Indigenous VCs selected for the land and resource use assessment, for example. By failing to consider intangible aspects of Métis rights, such as Métis attitudes and perceptions (e.g., avoidance behaviour). Similarly, this assessment based on pathway analyses is flawed as it only accounts for effects that are known, well understood and for which standard environmental design features or mitigations are known to be effective.</p> <p>In MNO's opinion, this methodology has resulted in a lack of assessment of potential effects to Métis rights and interests. MNO recommends that CNL work with them to develop an appropriate methodology that would allow for a full</p>	EA methodology (Effects assessment / Pathway analysis)	The MNO TKLUS study has been completed and incorporated into the final EIS and IER along with the findings of the MNO VC workshop. CNL has indicated that they will continue to work closely with MNO to address outstanding issues.	<p>CNSC staff will continue to work with MNO to identify potential effects of the proposed Project, including those on current use of lands and resources for traditional purposes and MNO's potential or established rights, and ensure that options for avoiding, mitigating, or accommodating adverse impacts are considered.</p> <p>CNSC staff and MNO have agreed on a formal arrangement for consultation through a ToR, which includes a proposed approach and methodology for assessing the proposed Project's potential impacts on the rights of MNO community members. CNSC would like to collaboratively develop sections of the draft EA report specific to MNO such as Traditional Knowledge and Land Use information, potential impacts of the proposed Project on MNO rights and traditional uses, and concerns expressed. This will include the collaborative development</p>	CNSC staff and the MNO are of the view that MNO's concerns related to EA methodology have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC's compliance activities.

	consideration of MNO rights and interests, at least for CNL’s future projects.			and implementation of a Rights Impact Assessment process.	
MNO013	<p>MNO raised concerns as to why magnitude, duration and geographic extent were the only criteria used to determine effects significance. MNO notes that other assessments conducted by the CNSC or the Impact Assessment Agency have used the full list of EIS Significance Criteria, including timing, frequency, probability of occurrence, reversibility, and ecological context.</p>	<p>EA methodology</p> <p>(Effects significance)</p>	<p>CNL indicated that a response regarding effects significance was provided to MNO in May 2020. In a letter CNL received from MNO in August 2020, MNO indicated that they had no further comment on this.</p>	<p>The assessment approach is in accordance with the EA framework Canadian Environmental Assessment Agency Operational Policy Statement for determining whether a Designated Project is likely to cause significant adverse environmental effects under CEAA 2012. The assessment approach for this EIS includes all five stages of the framework; however, some of the stages have been broken out into multiple steps in the EIS (the EIS approach for the generally assessment consists of 8 Steps verses the 5 Steps identified in the Framework). Therefore, CNSC staff are satisfied with CNL’s approach to effects significance determination. CNSC recommends that MNO discuss the approach and methodology used by CNL to ensure that the questions and concerns raised are appropriately addressed.</p>	<p>CNSC staff and the MNO are of the view that MNO’s concerns related to EA methodology have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p>
MNO014	<p>MNO raised concerns regarding potential negative impacts that the Project may have on the Métis traditional and way of life.</p> <p>The MNO indicated that they feel that CNL requires a greater understanding of Métis rights and interests, including components of the right that may be economic, or governance related.</p> <p>The MNO indicated that they have recognized rights in the vicinity of the project, not just an assertion of those rights. The rights are recognized and affirmed as part of the MNO-MNR harvesting agreement. Further, the MNO indicated that there should be a description of the MNO’s Mattawa Research that clearly identifies the Project as being located within the rights-bearing Mattawa/Lake Nipissing Traditional Territory of the Métis Nation of Ontario.</p> <p>In addition, the MNO raised the concern that CNL’s approach of developing mitigation measures prior to a comprehensive assessment of effects is inappropriate in the assessment of impacts to Métis rights. MNO’s position is that there has been no assessment of impact to Métis rights to date completed by CNL. Many Projects do not even consider this criterion and instead rely on traditional uses as a comprehensive</p>	<p>Indigenous and/or Treaty Rights</p>	<p>The MNO TKLUS study has been completed and incorporated into the final EIS and IER. CNL has indicated that they will continue to work closely with MNO to address outstanding issues. CNL indicated that they do not restrict access to Pointe au Baptême and is available for Métis Citizens to use. CNL has also indicated that they continue to have discussions with the MNO on a Long Term Relationship Agreement and the aspects of such an agreement.</p>	<p>An MNO TKLUS Study was completed by MNO and submitted to CNSC and CNL in early 2019. Results of the MNO TKLUS have been incorporated into the final EIS. CNSC will continue to work collaboratively with MNO to ensure that the findings of the TKLUS are incorporated into the rest of the EA process, including the CNSC’s EA report. CNSC staff will also ensure that CNL reflects the information provided in the TKLUS in their IER and work collaboratively with MNO to ensure that relevant information and knowledge can be reflected in follow-up monitoring programs, where appropriate.</p> <p>CNSC staff and MNO have agreed on a formal arrangement for consultation through a ToR, which includes a proposed approach and methodology for assessing the proposed Project’s potential impacts on the rights of MNO community members.</p> <p>The EA report will include the outcomes of collaborative Rights Impact Assessment process that MNO and CNSC completed and any recommendations will be presented to the Commission. CNSC staff will continue to work with MNO to identify potential effects of the proposed Project, including those on current use</p>	<p>CNSC staff are of the view that MNO’s concerns related to impacts on Métis rights and interests have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for MNO’s Indigenous Rights and agreed to work with CNL to ensure it is implemented in a suitable manner.</p>

	indicator. MNO indicated that as there is no traditional land use on the Project site, using this as the VC for Métis rights is not appropriate.			of lands and resources for traditional purposes and MNO’s potential or established rights, and ensure that options for avoiding, mitigating, or accommodating adverse impacts are considered.	
MNO015	MNO identified concerns regarding a lack of transparency in the existing consultation process; from MNO’s perspective, CNL did not consult early enough in the process. The language used throughout the EIS does not account for the Duty to Consult requirements for a Designated Project under CEAA 2012. The term ‘engagement’ refers to a less comprehensive process than consultation. Indigenous activities should be characterized as consultation to reflect the Duty to Consult that is owed.	Indigenous Consultation	<p>CNL indicated that since the signing of an MOU and a funding agreement between CNL and MNO, CNL and MNO have come to an agreement with regards to engagement for the proposed NSDF project.</p> <p>In CNL’s commitments list, CNL indicates that they are committed to organizational transparency, ensuring that Indigenous communities, the general public, local communities, elected and appointed government officials and other industry stakeholders are properly informed about activities carried out at Canadian Nuclear Laboratories sites.</p>	<p>The CNSC understands the importance of building a strong and ongoing relationship with MNO and ensuring that the consultation process is meaningful and addresses the concerns raised by MNO. CNSC staff and MNO are working on a formal ToR to outline objectives and roles and responsibilities for consultation for the NSDF, NPD and the MMR Project. The ToR also sets out the basis for collaborative drafting of EA reports and the RIAs. CNSC staff are also committed to developing a long-term relationship ToR for engagement with MNO, which can identify specific areas where MNO and CNSC staff can further collaborate.</p> <p>In addition, as per CNSC REGDOC 3.2.2: Indigenous engagement, the CNSC as an Agent of the Crown, has the responsibility to discharge the Duty to Consult, while proponents, such as CNL can contribute to supporting CNSC’s consultation responsibilities by conducting engagement activities and building long-term relationships with interested Indigenous communities. This distinction is important to ensure there is no confusion on where the Duty to Consult and associated responsibilities rest.</p>	CNSC staff and the MNO are of the view that MNO’s concerns related to Indigenous consultation have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.
MNO016	MNO raised that the original expropriation of land for construction of the CRL site did not require consultation with MNO or other Indigenous Nations and communities. In MNO’s opinion, this construction and operation caused displacement of MNO citizens from the area which has resulted in limited exercise of rights in the Project area today; this can be illustrated through the findings of the TKLUS. The MNO feels that they should not be penalized through regulatory mechanisms for past wrongs of the Crown. Instead, the CNSC and Canada should acknowledge this displacement and begin discussions about accommodation related to the long-altered landscape in the spirit of reconciliation. Regulatory processes with nations can sometimes adopt a quasi-transactional nature; whereby there are impacts to rights identified and nations can negotiate compensation for those	Indigenous Consultation (Historic harms)	CNL has indicated that they have engaged in and continue to have discussions with the MNO on a Long Term Relationship Agreement and the aspects of such an agreement.	<p>Pursuant to subsection 19(1)(a) of CEAA 2012, the EA of the proposed project will take into account “any cumulative environmental effects that are likely to result from the designated project in combination with the environmental effects of other physical activities that have been or will be carried out”. The EIS for the proposed project will also provide a description of the existing baseline and environmental trends at the site, including past projects and activities within the project area.</p> <p>The CNSC will continue collaboration with MNO to ensure that the appropriate historical context from MNO’s perspective is documented and reflected as part of the Rights Impact Assessment approach and is reflected in the CNSC’s EA report. CNSC staff encourage MNO to continue working with CNL and AECL to</p>	CNSC staff and the MNO are of the view that MNO’s concerns related to Indigenous consultation have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.

	impacts. Where the rights have been displaced for over 75 years, there is no opportunity for the exercise of those rights, thereby removing the opportunity for this negotiation. This has disadvantaged the MNO and should be remedied by the CNSC and Canada.			address concerns about historic and ongoing operations in MNO territory, including the development of an LTRA with CNL and AECL.	
MNO017	<p>MNO has indicated it is inappropriate to rely on an existing Public Information Program as the vehicle for consultation for a specific project; particularly as the Métis Nation of Ontario has developed an Interim Statement of Principles on Consultation and has negotiated and executed nine Regional Consultation Protocols.</p> <p>It is recommended that CNL prepare a brief, plain language document that summarizes the information in the revised EIS document for provision to the Métis Nation of Ontario for dissemination to their citizens as much of this information can be related specifically to VC's described under the Economic Pillar (KNOW History 2019, 16.1 appendix A: VC Workshop Report.</p>	Indigenous Consultation	CNL developed a plain language document summarizing the information in the EIS and shared the document with a public focus group, and feedback and recommendations have been taken into consideration. CNL will continue to share information with MNO and the public friendly EIS executive summary will be available once the final EIS is submitted to the CNSC.	<p>As per REGDOC 3.2.2, CNSC staff expect CNL to document and report on how CNL has or plans to address the concerns raised by MNO in their EIS and/or IER for the NSDF project.</p> <p>Note: this response will be updated once CNL's responses to MNO are received.</p>	<p>MNO's concerns related to Indigenous consultation have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC's compliance activities.</p> <p>CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for Indigenous consultation and agreed to work with CNL to ensure it is implemented in a suitable manner.</p>
MNO018	MNO requested that CNL involve the MNO in all archaeological work completed for this project to allow for Métis input into identification of unanticipated archaeological resources and implementation of adaptive management for those resources. At minimum, the MNO requires notification of archaeological work and a summary of identified archaeological sites.	Indigenous Consultation	<p>Section 5.9.4.2 of the Final EIS describes archaeological environment, and more specifically Section 5.9.4.2.2 summarizes the four stage archaeological assessment that was completed on the NSDF Project site.</p> <p>CNL indicated that they have provided MNO with site visits to all archaeological sites and have also provided MNO with all of the archaeological reports for the project and that they have not received any specific comments on these reports from MNO to date.</p>	CNSC technical experts have reviewed the proponent's assessment of the project's potential effects to physical and cultural heritage including archaeology and agree with the conclusions. Given the proposed mitigation measures identified in the EIS, the CNSC does not anticipate any significant adverse effects to archaeology sites from the project. CNSC staff and MNO are continuing to develop and implement a formal arrangement for consultation through a ToR , which includes a proposed approach and methodology for assessing the proposed Project's potential impacts on the rights of MNO community members, including any potential concerns regarding potential Metis archaeological resources.	<p>MNO's concerns related to Indigenous consultation have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC's compliance activities.</p> <p>CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for Indigenous consultation and agreed to work with CNL to ensure it is implemented in a suitable manner.</p>
MNO019	The MNO has requested involvement in and consultation on the development of CNL's Blasting Plan and also request additional information on the setbacks proposed. Without this information, the effect should not have been deemed as having no linkage. This is premature as the setback has not been defined and the	Fish and Fish Habitat	CNL will seek MNO's inputs prior to finalizing the NSDF Project construction work control documents, including the Dust Management Plan (DMP) and Blasting Plan. CNL is committed to discussing with MNO specific measures related to blasting the	CNSC staff have confirmed that CNL has responded to the concern raised and are satisfied with the response. As per REGDOC 3.2.2: Indigenous engagement, CNSC staff will continue to monitor CNL Indigenous engagement activities to make sure CNL is	MNO's concerns related to Fish and Fish Habitat have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the

	distance required to ensure pressure changes and vibrations do not affect fish mortality and reproduction are unknown.		NSDF project that could help address MNO's issues and concerns.	responsive and provides adequate answers to MNO's concerns and comments	<p>CNSC through the EA Follow-up and Monitoring Plan and CNSC's compliance activities.</p> <p>CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for fish and fish habitat and agreed to work with CNL to ensure it is implemented in a suitable manner.</p>
MNO020	MNO identified concerns regarding transportation noise and traffic volumes having the potential to interfere with traditional Land use. MNO recommended that the EIS should specify that transportation will be scheduled to reduce noise and traffic volumes and limit inconvenience to Métis harvesters who may be exercising their rights in the vicinity.	Traditional Land Use	In the final EIS, CNL have provided MNO with responses to concerns raised with regards to the atmospheric environment, including noise and traffic. In CNL's commitments list, CNL committed to seeking input from the MNO on additional mitigation measures to include within the NSDF Project EPP, which includes the dust management, erosion and sediment control and surface water management plans. CNL will seek MNO's input prior to finalizing the NSDF Project construction work control documents.	<p>Through its technical review of the EIS and associated documents, CNSC has confirmed that CNL has been working with the MNO to ensure the appropriate VCs identified in the MNO TKLUS have been captured correctly in the EIS. CNSC will work with the MNO to ensure that these VCs and information from the MNO TKLUS are also considered and addressed in the CNSC staff's EA report.</p> <p>In addition, CNSC staff and MNO are continuing to develop and implement a formal arrangement for consultation through a ToR , which includes a proposed approach and methodology for assessing the proposed Project's potential impacts on the rights of MNO community members, including any potential concerns regarding potential impacts of noise and traffic on Metis rights and interests.</p> <p>CNSC staff have confirmed that CNL has responded to the concern raised and are satisfied with the response. As per REGDOC 3.2.2: Indigenous engagement, CNSC staff will continue to monitor CNL Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to MNO's concerns and comments</p>	<p>MNO's concerns related to traditional land use have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC's compliance activities.</p> <p>CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for traditional land use and agreed to work with CNL to ensure it is implemented in a suitable manner.</p>
MNO021	MNO requested that a Métis specific traditional land use study be completed to provide CNL insight into the Métis perspective on all components of potential impacts from the proposed project, including socio-economic, terrestrial environment, aquatic environment, atmospheric environment, concerns with ecological health, human health, areas of significance to Métis cultural resources, Métis specific VC, consumption rates of country foods. The base case must reflect the effects existing on	Traditional Land Use Indigenous Treaty Rights	CNL indicated that the MNO TKLUS study has been completed and incorporated into the final EIS. CNL has indicated that they will continue to work closely with MNO on understanding that there are no risks adjacent to the Chalk River site and no impact to traditional uses as a result of the Project. CNL recognizes the importance of the inclusion of MNO's information and input and will continue to work with their harvesters in the future. CNL has also indicated that it is willing to involve MNO	<p>An MNO TKLUS Study was completed by MNO and submitted to CNSC and CNL in early 2019.</p> <p>CNSC will continue to work collaboratively with MNO to ensure that the findings of the TKLUS are incorporated into the rest of the EA process, including the CNSC's EA report. The EA report will also include the outcomes of collaborative Rights Impact Assessment process that MNO and CNSC are committed to</p>	<p>MNO's concerns related to traditional land use have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC's compliance activities.</p> <p>CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation</p>

	<p>traditional land use including existing effects from CRL facilities and operations.</p> <p>The MNO indicated that the use of existing studies and reports and information from the AOO is not sufficient to characterize the traditional land use activities of the MNO.</p>		<p>in its future monitoring programs both for NSDF and more broadly related to the CRL site.</p>	<p>completing and any recommendations will be presented to the Commission.</p> <p>CNSC staff will also ensure that CNL reflects the information provided in the Traditional Land Use Study in their IER and work collaboratively with MNO to ensure that relevant information and knowledge can be reflected in follow-up monitoring programs, where appropriate.</p> <p>CNSC staff will work with MNO to ensure that the timelines for completion of different phases of the EA and regulatory process, including the eventual Commission hearing dates, allow a reasonable amount of time for MNO to be meaningfully involved.</p> <p>CNSC staff will also continue to monitor progress towards a MNO-CNL the Long Term Relationship Agreement which supports long term project monitoring as well as communication of those results to MNO citizens.</p>	<p>for traditional land use and agreed to work with CNL to ensure it is implemented in a suitable manner.</p>
MNO022	<p>Concern for potential effects from nuclear contamination (potential effects to harvesters and the consumption of country foods and consumption rates) and the health of future generations</p>	<p>Human Health</p>	<p>Based on the analysis and information in CNL’s EIS there would not be any negative impact on traditional uses by Indigenous peoples as a result of the construction, operation or long-term monitoring of the proposed NSDF. CNL indicated that the Project design is such that potential releases of nuclear substance to the environment remain below the target of 1 % of the Derived Release Limit (DRL) for the Chalk River Site. CNL anticipates negligible residual effects expected on human health from radioactivity associated with the Project during the operations and closure phases, and no residual effects were identified for human health from non-radiological contaminants during the operations and closure phases.</p> <p>Measures would be implemented to mitigate radiological exposures to workers and the public, including implementing a DMP, implementing a procedure for Management and Monitoring of Emissions, and only accepting Low Level Waste and types of waste to be disposed in the ECM in order to limit the magnitude of potential changes to</p>	<p>CNSC staff verified the proponent’s assessment of human health risks resulting from exposure to hazardous and nuclear substances released from the Project, and concluded that there are no residual impacts expected on human health from radiological or non-radiological COPCs at all phases of the proposed project.</p> <p>An MNO TKLUS Study was completed by MNO and submitted to CNSC and CNL in early 2019.</p> <p>CNSC will continue to work collaboratively with MNO to ensure that the findings of the TKLUS are incorporated into the rest of the EA process, including the CNSC’s EA report. The EA report will also include the outcomes of collaborative Rights Impact Assessment process that MNO and CNSC are committed to completing and any recommendations will be presented to the Commission.</p> <p>CNSC staff will also ensure that CNL reflects the information provided in the Traditional Land Use Study in their IER and work collaboratively with MNO to ensure that relevant information</p>	<p>MNO’s concerns related to human health have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for human health and agreed to work with CNL to ensure it is implemented in a suitable manner.</p>

			<p>surface water and groundwater quality. CNL also committed to implementing follow-up monitoring for air, Waste Water Treatment Plant (WWTP) treated effluent and groundwater to detect potential contaminant releases.</p> <p>CNL indicated that the MNO TKLUS study has been completed and incorporated into the 2021 final EIS. CNL has indicated that they will continue to work closely with MNO to address outstanding issues.</p>	<p>and knowledge can be reflected in follow-up monitoring programs, where appropriate.</p> <p>CNSC staff will work with MNO to ensure that the timelines for completion of different phases of the EA and regulatory process, including the eventual Commission hearing dates, allow a reasonable amount of time for MNO to be meaningfully involved.</p> <p>CNSC staff will also continue to monitor progress towards a MNO-CNL the Long Term Relationship Agreement which supports long term project monitoring as well as communication of those results to MNO citizens.</p>	
MNO023	<p>The MNO requested that they have input into the EPP to ensure Métis rights and interests are adequately addressed. The MNO and CNL should continue discussions related to inclusion of the MNO in the EPP through processes outlined in the MOU.</p>	Indigenous Consultation	<p>CNL committed to seeking input from MNO for additional mitigation measures to include within the NSDF Project EPP, which includes the dust management, erosion and sediment control and surface water management plans. CNL will seek MNO's input prior to finalizing the NSDF Project construction work control documents.</p> <p>The MNO and CNL have signed an MOU. Together the two organizations have agreed to a mutually beneficial, on-going working relationship and to provide a process to which CNL can engage with Métis Citizens at the local and regional levels in order to better understand any Métis Rights and Interests that may be impacted in the general and surrounding areas around CNL projects and sites.</p>	<p>CNSC staff recognize the importance of ongoing collaboration and engagement with affected Indigenous Nations and communities with regards to environmental and project monitoring. CNSC staff encourages MNO to continue to work with CNL to ensure that relevant information, knowledge and requests can be reflected in follow-up and environmental monitoring programs, including the potential involvement of MNO representatives, where appropriate. As per REGDOC 3.2.2, CNSC staff expects CNL to document and report on how CNL has or plans to address the concerns and requests raised by MNO, in their EIS and/or IER for the NSDF project.</p> <p>In addition, CNSC staff are committed to developing a long-term relationship ToR for engagement with MNO, which can identify specific areas where MNO and CNSC staff can further collaborate. These activities can include collaborative environmental monitoring activities, regular meetings and information sharing, among other topic areas of interest to MNO. CNSC staff look forward to further enhancing the relationship between the CNSC and MNO moving forward.</p>	<p>MNO's concerns related to impacts on MNO rights have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC's compliance activities.</p> <p>CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for MNO's Indigenous Rights and agreed to work with CNL to ensure it is implemented in a suitable manner.</p>
MNO024	<p>MNO raised that it is concerned that the EIS fails to adequately consider the alternative of constructing a GWMF. It only includes a pre-chosen set of alternative means. It does not document the rationale for the alternative means</p>	Alternatives Assessment	<p>In the final EIS and IER submitted in May 2021, CNL indicated that it provided information on the alternative means assessment through an NSDF project webinar in June 2020, and that MNO was informed and participated in the webinar.</p>	<p>As per the requirements of CEAA 2012 and CNSC REGDOC 3.2.2, it is the proponent's role to engage interested parties and conduct robust engagement on topics such as the alternative means assessment, throughout the lifespan of a project, including in preparation of the EIS. An</p>	<p>MNO's concerns related to alternative assessment have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the</p>

	retained for consideration in the EA of the project.		<p>Section 2.5 of the final EIS provides the assessment of the alternatives, and includes technical and economic criteria consistent with the CNSC Generic Guidelines for the Preparation of an EIS and CEAA 2012.</p>	<p>alternative means assessment for a project is performed by the proponent and must be reported as part of the submitted EIS.</p> <p>As per guidance under CEAA 2012, “the approach and level of effort applied to addressing alternative means is established on a project-by-project basis taking into consideration:</p> <ul style="list-style-type: none">• the characteristics of the project• the environmental effects associated with the potential alternative means• the health or status of VCs that may be impacted by the alternative means• the potential for mitigation and the extent to which mitigation measures may address potential environmental effects• the level of concern expressed by Indigenous Nations and communities or the public <p>EA documentation must clearly explain and justify the methodologies that have been used to address alternative means. At any step during the alternative means analysis, the proponent may consider community knowledge and Aboriginal traditional knowledge.”</p> <p>The alternative means assessment is meant to identify and consider the effects of alternative means of carrying out the project that are technically and economically feasible. Effects identified include environmental effects, potential adverse impacts on human health and Indigenous or Treaty Rights and related interests. The analysis and the rationale for the choice of preferred means as a result of the analysis should be explained from the perspective of the proponent, and be documented in the EIS in sufficient detail to provide context for public and technical comment periods during the proposed project EA, and ultimately to allow the decision maker to understand the choice.</p> <p>As part of the technical review of the draft EIS, CNSC has reviewed and has accepted CNL’s alterative means assessment.</p>	<p>CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for alternative assessment and agreed to work with CNL to ensure it is implemented in a suitable manner.</p>
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MNO025	<p>MNO raised concerns regarding project timelines and schedule.</p> <p>MNO has concerns the proponent has a mandate to find a quick solution for nuclear waste disposal at Chalk River Nuclear Facilities, and that a fast and cheap solution was of primary concern as opposed to long-term safety.</p>	Other	<p>CNL is committed to organizational transparency, ensuring that Indigenous communities, the general public, local communities, elected and appointed government officials and other industry stakeholders are properly informed about activities carried out at Canadian Nuclear Laboratories sites.</p> <p>The MNO and CNL have signed a MOU. Together the two organizations have agreed to a mutually beneficial, on-going working relationship and to provide a process to which CNL can engage with Métis Citizens at the local and regional levels in order to better understand any Métis Rights and Interests that may be impacted in the general and surrounding areas around CNL projects and sites. CNL has indicated that they are also working with the MNO towards developing a Long Term Relationship Agreement.</p>	<p>Although CEAA 2012 does not set regulated timelines for EAs conducted by the CNSC (because it was recognized that the CNSC’s timelines are covered under its respective statute), the CNSC has committed to completing all EA processes within the 24-month federal timeline for a licensing decision (pursuant to the Class I Nuclear Facilities Regulations and the Uranium Mines and Mills Regulations). Adherence to this schedule depends on the completeness of information received from applicants. Insufficient and incomplete information may prolong the timeline. CNSC staff will ensure that the requirements of the NSCA and CEAA 2012 are met for this proposed project within this regulatory review time frame. The EA process for the NSDF, which started in 2016, has been thorough, transparent and fair. Multiple opportunities have provided to the public and Indigenous Nations and communities to participate in the EA and regulatory review process, with additional steps to come, including review of CNSC staff’s EA report, interventions to the Commission and participation in the Commission hearing.</p> <p>CNSC staff will never compromise safety and require sufficient information to make scientifically defensible recommendations which inform evidence-based Commission decisions to ensure the protection of the environment and health and safety of persons.</p>	<p>MNO’s concerns related to project timelines and schedule have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>CNSC staff and MNO have worked together on a RIA for the Project. MNO accepted the commitments from CNL regarding the mitigation for timelines and schedule and agreed to work with CNL to ensure it is implemented in a suitable manner.</p>

				<p>The robustness and rigor of the CNSC’s EA and licensing review process will not be diminished. All key steps in the EA process – such as public participation opportunities – have been and will continue to be carried out.</p> <p>CNSC staff will continue to work with MNO to ensure that the consultation process is meaningful and that timelines for completion of different phases of the EA and regulatory process, including the eventual Commission hearing dates, allow a reasonable amount of time for MNO to be meaningfully involved.</p>	
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Issue and Concern Summary Table for the **Algonquins of Ontario (AOO)**
with respect to the Proposed **Canadian Nuclear Laboratories (CNL) Near Surface Disposal Facility (NSDF)**

Table C-3 AOO concerns and issues table

ID	Issue/ Concern (including potential impacts to Aboriginal or Treaty Rights)	Theme	Proponent Response	Crown Response	Status of Issue/Concern
AOO 01	<p><i>Consultation and Engagement</i></p> <p>The AOO assert that the Chalk River Laboratories (CRL) site is located within the unceded AOO Settlement Area. Given the strength of the AOO’s asserted Aboriginal Rights and interests, including Aboriginal title in this area, the AOO wish to be deeply consulted on the Project. The AOO expressed concerns about their capacity to participate in simultaneous Government of Canada engagement and consultation initiatives and recommend federal agencies work with the AOO to develop a one-window approach to consultation and engagement.</p> <p>The AOO raised concerns about a lack of involvement and consultation in the EA process for the Project, including concerns about the level of information they have been provided regarding the Project. The AOO indicated that they require greater involvement in the revised Environmental Impact Statement (EIS) process and request to be involved in all CNL activities within the unceded AOO Settlement Area. The AOO would also like a formal consultation plan with the CNSC.</p>	Indigenous Consultation	<p>In the final EIS, CNL acknowledges that the CRL property is located within unceded AOO Settlement Area CNL states that beginning in 2016, CNL has carried out extensive engagement with the AOO, implemented a Memorandum of Understanding (MOU), provided sufficient capacity support and is continuing to carry out engagement activities and LTRA discussions with the AOO. CNL (and the CNSC) has also supported the gathering of the AOO’s Algonquin Knowledge and Land Use information and collaborated with the AOO to incorporate summaries of that information and knowledge into Section 6.4 of the Final EIS and supporting documentation, including the IER.</p> <p>CNL collaborated with the AOO through workshops and meetings to better understand and address concerns raised by the AOO. In advance of submitted the Final EIS, the AOO and CNL developed mutually agreeable commitments to mitigate the AOO’s concerns. Any issues that are in progress or not resolved are captured within Section 6.2.4.2.3 of the Final EIS. CNL notes that the IER will be a living document that will include any updates related to the progress of the outstanding issues prior to the Commission hearing process.</p> <p>In CNL’s Project Commitments Report, CNL committed to continuing to share information and involve the AOO in project planning, mitigation and monitoring initiatives, in addition to developing an LTRA with the AOO to identify opportunities to enhance the relationship between the AOO, AECL and CNL.</p>	<p>The CNSC understands the importance of building a strong and ongoing relationship with the AOO and ensuring that the consultation process is meaningful and addresses the concerns raised by the AOO. Starting in 2016 and throughout the EA process, CNSC staff have continued to meet regularly with the AOO to discuss the Project, their concerns and the EA process.</p> <p>Through ongoing dialogue and collaboration the AOO and CNSC staff negotiated a mutually agreeable approach for collaboratively-drafting a Rights Impact Assessment (RIA) as part of the EA report, and to provide the AOO with opportunities to review the EA report prior to finalization.</p> <p>The CNSC remains committed to continue developing the ongoing collaborative relationship with the AOO and are open to exploring opportunities to enhance and formalize the engagement relationship, such as working with other federal agencies, to enable and outline meaningful, agreed upon consultation and engagement processes where appropriate, including the development of a long-term engagement agreement and work-plan.</p> <p>CNSC confirmed that CNL provided additional capacity for the AOO to review the Project EIS and worked closely with the AOO to address and document their concerns in the Final EIS and supporting documentation, including CNL’s IER and Project Commitments Report. It is CNSC staff’s understanding that CNL committed to providing the AOO with additional capacity support for further collaboration as the EA and licensing processes continue. CNSC staff will continue to monitor CNL’s Indigenous engagement activities to ensure CNL is</p>	<p>CNSC staff are of the view that AOO’s concerns related to meaningful engagement have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>The AOO are of the view that this is an ongoing concern and continue to express that the AOO require greater involvement in consultation processes conducted by both the CNSC and CNL and management of the CRL site.</p>

				responsive and provides adequate answers to the AOO’s concerns and requests.	
AOO 02	<p><i>Water Quality and Aquatic Environment</i></p> <p>The AOO are concerned about the close proximity of the Project to the Kichi-Sibì¹ (Ottawa River) and its tributaries. The AOO expressed concerns about the potential for radiological and non-radiological contaminants (including high concentrations of tritium from the waste deposited in the ECM to leak into the Kichi-Sibì, bioaccumulate in fish species and sediments, and impact the people and wildlife that depend on the Kichi-Sibì and surrounding waterways. The AOO expect CNL and CNSC to demonstrate that the aquatic ecosystem is not contaminated and expects CNL to use highly conservative trigger values for radiation doses and non-radiological contaminants in receiving water bodies, sediment and fish. The AOO also expressed concerns about the potential effects of the Project construction and operations on groundwater flows and quality.</p> <p>The AOO recommend that CNL make commitments to address the AOO’s concerns related to water quality and the aquatic environment, including: completing a comprehensive assessment of impacts to fish that captures species of importance to the AOO, and implementing management and monitoring programs for contaminants in fish tissue, surface water, and sediment quality with opportunities for the AOO to participate. The AOO specifically request that the long-term fish tissue contaminant monitoring would be conducted during the operation phase and would include a special focus on brown bullhead. The AOO also request specific historical data from the Proponent documenting radionuclide concentrations observed in samples of pike and perch. As well, the AOO request that annual reports from the management and monitoring programs for fish tissue,</p>	Aquatic Environment	<p>In the Final EIS, CNL acknowledges the AOO’s connection to the Kichi-Sibì (Ottawa River) and their concerns about potential Project impacts to the river and its tributaries. CNL indicates they have engaged and shared technical information with the AOO through multiple workshops, meetings and site tours to provide clarification and evidence to support CNL’s conclusions that the NSDF will improve the current environmental conditions at the CRL site and protect the Ottawa River.</p> <p>CNL also extended the RSA in the Final EIS for surface water, aquatic environment, land and resource use, ecological health and human health to capture 8 km of the Ottawa River downstream of the CRL site. The Final EIS concludes residual effects on Ottawa River water quality are determined to be negligible during operations and post-closure phases and may result in a net benefit due to remediation of legacy waste storage areas at the CRL site.</p> <p>CNL acknowledges that from the AOO’s perspective, there remain outstanding information requests and reviews with respect to the protection of Kichi-Sibì (Ottawa River) and fish and fish habitat, which are currently in progress.</p> <p>In CNL’s Project Commitments Report, CNL committed to involving the AOO in the NSDF EAFMP, including incorporating all Algonquin VCs of importance and providing the AOO with a co-development role in identifying adaptive management triggers/thresholds and responses that will be incorporated in the EAFMP. CNL will also include new technology developed during the life of the Project which removes tritium from effluent.</p>	<p>CNSC staff have reviewed CNL’s assessment outlined in the EIS and determined that the CNL’s identification, proposed mitigation, and proposed follow-up program measures are adequate for residual effects to the surface water environment. CNSC staff concludes the project is not likely to cause significant adverse effects to the surface water environment as the magnitude of effects are expected to be negligible.</p> <p>CNSC staff collaborated with the AOO to ensure that the importance of the Kichi-Sibì from the AOO’s perspective is documented and reflected in the CNSC’s EA report, including the RIA. The AOO’s views expressed related to water quality and the aquatic environment were taken into consideration by CNSC subject matter experts in making their conclusion on potential effects for the EA report, which was shared with the AOO for review prior to finalization.</p> <p>CNSC confirmed that CNL worked closely with the AOO to better understand and address the AOO’s concerns regarding water quality and the aquatic environment, including incorporating and responding to the AOO’s related recommendations identified in the AOO’s AKLUS and EIS Technical review, and developing a mutually agreed upon list of commitments with the AOO to address their concerns. CNSC staff is encouraged by CNL’s commitment to continue engaging with the AOO on these issues, including on the EAFMP, and will continue to monitor CNL’s Indigenous engagement activities, including with regards to monitoring and follow-up measures.</p>	<p>CNSC staff are of the view that AOO’s project specific concerns related to water quality and the aquatic environment have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA. CNSC staff note that CNL has committed to continue to engage and provide additional documentation to the AOO related to the broader issues the AOO view as outstanding or in progress. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>The AOO are of the view that this concern cannot be considered addressed until the documentation requests and reviews have been completed, and proposed commitments are implemented and their effectiveness demonstrated.</p>

¹ The Ottawa River, otherwise known as the Big River, has also been referred to in the Algonquin language as “Kichi- Sibì”, “Kichissippi”, “Kitchissippi” and “Kichissippi”.

	surface water, and sediment quality be shared with them for review and comment.				
AOO 03	<p><i>Traditional Land and Resource Use</i></p> <p>The AOO raised concerns about the location of the NSDF project site within the unceded AOO Settlement Area and the associated real and perceived impacts that may impact Algonquin community members’ traditional land and resource use. The AOO are concerned about both physical (e.g., access limitations) and psycho-social (e.g., fear and avoidance behaviors, quality of experience) impacts of the project on Algonquin community members’ ability to use and connect with nearby lands and waters that are important for ancestral values, way of life, culture, health, well-being and exercising the AOO’s Aboriginal Rights and interests. The AOO expects these concerns to be addressed through the EA process.</p> <p>The AOO are concerned about the safety of harvesting and consuming foods from areas surrounding the Project and expects CNL to work with the AOO to monitor all harvested species for contamination, including through a follow-up project for an Algonquin Country Foods Survey and Long-Term Monitoring Program. The AOO also identified site-specific recommendations they expect CNL to implement to ensure the AOO can access travel routes and ensure the project does not interfere with access to harvesting or other land use areas.</p>	Indigenous and/or Treaty Rights	<p>CNL (and the CNSC) provided support to the AOO to gather Algonquin Knowledge and Land Use information. CNL collaborated with the AOO through multiple meetings and workshops to incorporate this information into the Final EIS and supporting documentation, including the IER, which includes a traditional use and effects assessment section.</p> <p>CNL indicated that the Final EIS assumes traditional uses do occur adjacent and near to the CRL site, whether on the Ottawa River or on accessible private lands outside the restricted/fenced area or provincial crown land outside the restricted/fenced area. CNL concluded that the NSDF Project is not expected to affect the traditional land and resource uses because the NSDF Project is located on CRL property on federal lands that are inaccessible to the public where traditional use is not permitted. CNL does not anticipate any off-site effects from the NSDF Project that would affect traditional land use and resource VCs.</p> <p>CNL worked closely with the AOO to better understand and address the AOO’s concerns regarding traditional land and resource use, including incorporating and responding to the AOO’s related recommendations identified in the AOO’s AKLUS and EIS Technical review, and developing a mutually agreed upon list of commitments with the AOO to address their concerns.</p> <p>In CNL’s Project Commitments Report, CNL committed to:</p> <ul style="list-style-type: none">- providing capacity to the AOO to undertake a country foods survey and for CNL to utilize the results of the country foods study to verify project assumptions;- involving the AOO in the NSDF EAFMP, including incorporating all Algonquin VCs of importance;- developing an LTRA with the AOO, which can further engagement and communication opportunities with Algonquins.	<p>CNSC staff collaborated with the AOO to ensure that the AOO’s Indigenous Knowledge and Land Use information and associated concerns related to potential impacts on land and resource access and use are documented and reflected in the EA process, including the CNSC’s EA report and the RIA process, and that options for avoiding, mitigating, or accommodating adverse impacts were considered. Taking into account CNL’s commitments, proposed mitigation and follow-up program measures, as well as relevant mitigation measures for related biophysical effects, CNSC staff concludes that the Project is not likely to cause significant adverse effects on access and quality and quantity of harvesting, fishing, trapping and gathering activities, or effects on access to cultural sites.</p> <p>CNSC staff are committed to long-term engagement with the AOO and have offered to discuss the development of a ToR for Long-Term Engagement to assist in building a collaborative relationship and trust with the AOO. CNSC staff have also raised the AOO’s broader concerns regarding the CRL site and other activities and stressors in the unceded AOO Settlement Area, to the attention of AECL and CIRNAC.</p> <p>CNSC staff confirmed that CNL incorporated the AOO’s Algonquin Knowledge and Land Use information into their Final EIS and supporting documentation and that CNL worked collaboratively with the AOO to ensure that relevant information and knowledge is reflected in follow-up monitoring programs, where appropriate. CNSC staff are of the view that the mitigation and follow-up measures proposed by CNL will address project specific effects of the project however, CNSC staff continue to encourage the AOO to work with CNL with respect their concerns regarding the CRL site.</p> <p>CNSC staff confirmed that the AOO are not in agreement with CNL’s conclusions in the Final EIS regarding traditional land and resource use and strongly encourage CNL to continue working with the AOO to address these concerns, including through LTRA discussions.</p>	<p>CNSC staff are of the view that AOO’s concerns related to traditional land and resource use have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>The AOO are of the view that this concern cannot be considered addressed until the proposed commitments are implemented and their effectiveness demonstrated.</p>

AOO 04	<p><i>Archaeological, historic and cultural sites</i></p> <p>The AOO expressed concerns about impacts to important archaeological, historic, spiritual and cultural resources located near the project, including Oiseau Rock and Pointe au Baptême. The AOO are also concerned about permanent and irreversible loss of culturally and spiritually significant geological and landscape features, including rare and sensitive bedrock formations near the Kichi-Sibi² (Ottawa River) as a result of blasting and soil movement expected during Project construction.</p> <p>The AOO are concerned that the Proponent has inadequately recognized the cultural significance of the geological environment to the AOO in the EIS and proposed several recommended revisions to the archaeological resources section of the EIS. The AOO expressed concerns about ensuring physical access to these sites, as well as ensuring the sites are protected and maintained to support the visual quality and experience of Algonquin community members. The AOO expects CNL to collaborate with the AOO to implement measures to address these potential impacts and ensure the AOO’s continued access, use and connection to the cultural landscape, including: a contingency plan for artifact discovery and work stoppage; development of an archaeological and social sciences research program in partnership with the CNSC; developing a cultural heritage protection plan informed by Algonquin Knowledge and values; training and hiring Algonquin community members as monitors to support cultural heritage monitoring activities; and, establishing an environmental and cultural monitoring committee with the AOO’s direct involvement.</p>	Archaeology; Geological Environment	<p>CNL worked closely with the AOO through multiple meetings and workshops to better understand and address the AOO’s concerns and recommendations regarding potential impacts to archaeological, historic, spiritual and cultural sites located near the project. CNL (and the CNSC) provided support to the AOO to gather Algonquin Knowledge and Land Use information and collaborated with the AOO to incorporate relevant information pertaining to archaeological, historical and cultural sites into the Final EIS.</p> <p>In CNL’s May 2021 responses in the AOO’s AKLUS and EIS Technical review comment table and the Final EIS, CNL clarified that while CNL recognizes the importance that Algonquin peoples place on certain sites of significance, specifically Pointe Au Baptême and Oiseau Rock, neither sites are within the NSDF Project footprint nor the CRL site boundary thus CNL does not restrict access to these historically significant sites. CNL confirmed that more than one Algonquin community member participated in the Stage 1, 2, 3 and 4 archaeological assessment field studies and committed to sharing its Archaeological Master Plan and CRM program with the AOO.</p> <p>CNL worked with the AOO to develop a mutually agreed upon list of commitments that CNL will undertake to mitigate or lessen the AOO’s concerns. In CNL’s Project Commitments Report, CNL committed to:</p> <ul style="list-style-type: none">- co-developing a project specific CHPP with the AOO prior to finalizing the NSDF Project construction work control documents;- assisting with the logistics for a location-specific commemoration and/or cultural recognition activities with respect to the NSDF Project, prior to construction;- contacting the AOO consultation office should artifacts be discovered;- suspending construction immediately and engaging a licenced consultant to carry out archaeological fieldwork, in compliance with Sec. 48 (1), should previously undocumented archaeological resources be discovered on the NSDF project site;	<p>CNSC staff collaborated with the AOO to ensure that the AOO’s knowledge and concerns about potential impacts to archaeological, historic and cultural sites that are important for Algonquin culture and Aboriginal Rights were documented and considered as part of the RIA process and the CNSC’s EA report and to ensure options for avoiding, mitigating, or accommodating adverse impacts were considered.</p> <p>Through the collaborative RIA process, CNSC staff confirmed that the mitigation measures identified in CNL’s EIS are adequate to address potential impacts to archeological, historic and cultural sites that are important for Algonquin culture and Aboriginal Rights from the Project.</p> <p>CNSC staff confirmed that CNL worked closely with the AOO to better understand and mitigate the AOO’s concerns regarding potential Project impacts to archaeological, historic and cultural sites of importance. CNSC staff understand that CNL collaborated with the AOO to incorporate Algonquin Knowledge and Land Use information into the Final EIS and develop mutually agreeable commitments to mitigate the AOO’s concerns. CNSC staff are also aware that CNL and the AOO are also in the process of developing an LTRA that will help to enhance the relationship and foster greater collaboration and inclusion of the AOO in CNL’s projects and operations within the unceded AOO Settlement Area.</p> <p>Although the development of an archeological and social sciences research program in partnership with the CNSC is out of scope for the Project, CNSC staff are committed to long-term engagement with the AOO and have offered to discuss the development of a ToR for Long-Term Engagement to assist in building a collaborative relationship and trust with the AOO.</p>	<p>CNSC staff are of the view that AOO’s concerns related to Project-specific effects on archaeological and heritage resources have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>The AOO are of the view that this concern cannot be considered addressed until the proposed commitments are implemented and their effectiveness demonstrated. Specifically, the AOO expects that the LTRA agreement will allow for the establishment of an environmental and cultural monitoring committee with the AOO’s direct involvement.</p>
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² The Ottawa River, otherwise known as the Big River, has also been referred to in the Algonquin language as “Kichi- Sibi”, “Kichissippi”, “Kitchissippi” and “Kichsippi”.

			<div>- developing an LTRA with the AOO, which can identify enhanced cultural heritage monitoring and stewardship opportunities.</div>		
AOO 05	<p><i>Species at Risk</i></p> <p>The AOO expressed concerns about potential impacts to the health and population of culturally important aquatic Species at Risk close to the Project site, including Lake Sturgeon and American Eel. The AOO also raised concerns about the potential for five-lined skinks to be present in the area surrounding the Project, and recommends that CNL work with the AOO to assess habitat viability for this species, and implement mitigation measures if critical habitat is determined to be present. The AOO are also concerned that there may be critical habitat for Canada warbler (listed as a threatened species on Schedule 1 of SARA) present on the SSA that is at risk of being lost. The AOO are seeking an opportunity to review all Species at Risk permit documentation required for the Project (e.g., for Blanding’s turtle habitat) and be involved in related discussions with Environment Canada and the Canadian Wildlife Service for future CNL-led projects.</p>	General Environment	<p>CNL worked closely with the AOO to better understand and address the AOO’s concerns and recommendations regarding species at risk that were identified in the AOO AKLUS and AOO EIS Technical review. In CNL’s May 2021 responses in the AOO’s AKLUS and EIS Technical review comment table, CNL provided additional information to clarify the species at risk assessment in the EIS, CNL’s proposed mitigation and monitoring measures for the protection of SARA species such as Canada Warbler, and CNL’s communications with the Canadian Wildlife Service regarding updated on the identification of critical habitat for Canada warbler. In CNL’s May 2021 responses to the AOO’s AKLUS and EIS Technical review comment table, CNL also acknowledged the importance of Traditional Knowledge as a source of information to inform and support the collection of baseline data, with specific reference to five-lined skink.</p> <p>In the EIS, CNL indicated that mitigation and follow-up measures would be implemented to mitigate effects on species at risk habitat loss, including installing a treeline buffer from all property lines on the NSDF site, installing artificial nesting habitat for SARA listed bats, and implementing a Species at Risk monitoring program.</p> <p>CNL worked with the AOO to develop a mutually agreed upon list of commitments that CNL will undertake to mitigate or lessen the AOO’s concerns. In CNL’s Project Commitments Report, CNL committed to involving and providing capacity to the AOO to participate in the technical review of the NSDF EAFMP, which includes mitigation measures developed specifically for the protection of the Canada Warbler. CNL also committed to further investigating the potential presence of five-lined skink by collaboratively conducting ground truthing exercises using Indigenous Knowledge and Land Use Study methods. CNL also committed to developing an LTRA with the AOO, which can further engagement and communication opportunities with Algonquins.</p>	<p>CNSC staff have reviewed CNL’s EIS and conducted an independent assessment of the project’s effects to species at risk as part of CNSC staff’s EA report, which was shared with the AOO for review prior to finalization. The AOO’s views were taken into consideration by CNSC subject matter experts in making their conclusion on potential effects. CNSC staff concluded that with the proposed mitigation measures and follow-up programs, the project is not likely to cause significant adverse effects to SARA species. CNSC staff added that additional monitoring and adaptive management will help protect and conserve the SARA species that may be affected by habitat loss and/or fragmentation due to the NSDF project.</p> <p>As per REGDOC 3.2.2, CNSC staff expect CNL to document and report on how CNL has or plans to address the concerns raised by the AOO, in their EIS and/or IER for the NSDF project. CNSC staff are of the understanding that CNL worked closely with the AOO through multiple meetings and workshops to better understand and address the AOO’s concerns and recommendations regarding species at risk that were identified in the AOO’s AKLUS and EIS Technical Review. CNSC staff will continue to monitor the CNL’s Indigenous engagement activities, including with regards to monitoring and follow-up measures for protecting species at risk. CNSC staff have communicated to the Canadian Wildlife Service (CWS), the AOO’s request to review the Species at Risk documentation for the Project and be involved in related discussions with the CWS for future CNL-led project.</p>	<p>CNSC staff are of the view that AOO’s concerns related to Species at Risk have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>The AOO are of the view that this concern cannot be considered addressed until the proposed commitments are implemented and their effectiveness demonstrated.</p>

AOO 06	<p><i>Risk communication and emergency preparedness</i></p> <p>The AOO are concerned about the timely and transparent flow of information from CNL to the AOO regarding the project, particularly during emergency incidents. The AOO are concerned about their lack of capacity to respond to potential nuclear accidents at the Chalk River Site and feels that the proponent should take responsibility for ensuring emergency preparedness.</p>	Communication and Emergency Preparedness	<p>In the EIS, CNL indicates that they have an emergency preparedness program in place to address requirements for immediate response and post-event clean-up or remediation if an accident or malfunction situation occurs. Emergency response procedures for the NSDF Project will be prepared to address any potential emergencies from accidents and malfunctions. CNL also indicated that it is committed to collaborating with interested Indigenous Nations and communities on monitoring programs and follow-up measures for accidents and malfunctions.</p> <p>CNL worked with the AOO to develop a mutually agreed upon list of commitments that CNL will undertake to mitigate or lessen the AOO's concerns. In CNL's Project Commitments Report, CNL committed to developing an LTRA with the AOO, which can include provisions on communication protocols in relation to CNL's activities and projects within the unceded AOO Settlement Area. CNL is continuing to carry out LTRA discussions with the AOO.</p>	<p>CNSC staff have reviewed CNL's EIS and verified that the proposed mitigation measures and the emergency preparedness program are adequate to reduce the accident rates, and prevent and minimize their effects.</p> <p>CNSC staff encourages CNL to continue working directly with the AOO to develop an appropriate and mutually acceptable communication and collaboration protocol that takes into account the AOO's unique Aboriginal Rights and interests. CNSC staff will continue to monitor CNL's Indigenous engagement activities to ensure CNL is responsive and provides adequate answers to the AOO's concerns. CNSC staff also remains open to exploring opportunities to developing a long-term relationship ToR for engagement with the AOO, which can identify specific areas where the AOO and CNSC staff can further collaborate, such as meaningful communication, education and information sharing on the risks of radiation and radioactive materials, as well as regulatory oversight activities and CNSC processes in relation to facilities and projects within the unceded AOO Settlement Area.</p>	<p>CNSC staff are of the view that AOO's concerns related to risk communication and emergency preparedness have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC's mandate under the NSCA. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC's compliance activities.</p> <p>The AOO are of the view that this concern cannot be considered addressed until the proposed commitments are implemented and their effectiveness demonstrated.</p>
AOO 07	<p><i>Impacts to the terrestrial environment</i></p> <p>The AOO are concerned that the terrestrial environment VC does not adequately capture the potential impacts of the Project on species of importance to the AOO. The AOO expressed concerns about potential impacts to the integrity of the terrestrial environment on and around the Project site, including potential impacts to the mature forest and unique ecosystem that provide habitat for culturally important vegetation and wildlife species and support the exercise of the AOO's Aboriginal Rights and interests. The AOO also expressed concerns about the potential introduction and/or spread of invasive species in the local area as a result of Project activities. The AOO expects CNL to implement the AOO's recommended measures to protect wildlife and vegetation species of importance within or near the Project site during project construction and ensure sufficient habitat for these species throughout all phases of the project. This includes implementing conservative</p>	General Environment	<p>CNL worked closely with the AOO to better understand and address the AOO's concerns and recommendations regarding the terrestrial environment that were identified in the AOO AKLUS and the AOO EIS Technical review. CNL has documented Algonquin VCs identified in the AKLUS and the AOO EIS Technical Review within the Final EIS, and committed to incorporating all Algonquin VCs of importance into the EAFMP. CNL indicated that mitigation measures and follow-up programs would be implemented to mitigate effects to terrestrial vegetation and wildlife species, including wildlife-vehicle collision monitoring, designing the SSA to avoid wetlands and limit disturbance to the natural environment, establishing buffers along identified wetlands near the SSA, avoiding activities with the highest levels of noise and habitat disturbance during most sensitive life history phase, implementing a comprehensive SFMP, and installing wildlife exclusion fencing around the NSDF EMR footprint.</p> <p>CNL worked with the AOO to develop a mutually agreed upon list of commitments that CNL will undertake to mitigate or lessen the AOO's concerns.</p>	<p>CNSC staff collaborated with the AOO to ensure that the AOO's concerns related to project impacts on wildlife and habitats that are important for the AOO's culture, Aboriginal Rights and interests are documented and considered as part of the RIA process and is reflected in the CNSC's EA report, and that options for avoiding, mitigating, or accommodating adverse impacts were considered.</p> <p>CNSC staff have reviewed CNL's EIS and conducted an independent assessment of the project's potential effects to the terrestrial environment as part of CNSC staff's EA report, which was provided to the AOO for review prior to finalization. CNSC staff concluded that the residual effects to the terrestrial vegetation and wildlife species are not expected to result in significant adverse impacts due to a very low magnitude of impacts at the regional scale when taking into consideration of the proposed mitigation measures and follow-up monitoring programs.</p> <p>CNSC staff are of the understanding that CNL collaborated with the AOO through multiple</p>	<p>CNSC staff are of the view that AOO's concerns related to impacts to the terrestrial environments have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC's mandate under the NSCA. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC's compliance activities.</p> <p>The AOO are of the view that this concern cannot be considered addressed until the proposed commitments are implemented and their effectiveness demonstrated.</p>

	<p>mitigation and management measures for wildlife and plant species of importance to the AOO (e.g., raptors, upland game birds, large mammals and furbearers), implementing a wildlife-vehicle collision mitigation and monitoring plan, and providing the AOO with detailed wildlife management and mitigation plans for review (e.g., Invasive Species Management Plan, Blasting Plan, wildlife exclusion fencing design).</p> <p>The AOO would also like advance notice of any vegetation clearing or disturbance and access to conduct pre-clearing site visits to survey areas for (and if necessary, harvest) plants of importance to the AOO.</p>		<p>In CNL’s Project Commitments Report, CNL committed to:</p> <p>providing capacity to the AOO to review CNL’s current mitigation plans, including those specifically related to recommendations from the AOO’s AKLUS (e.g., blasting plan, invasive species management plan);</p> <ul style="list-style-type: none">- engaging the AOO in the co-development of the SFMP for the CRL property, including the opportunity to identify additional AOO VCs- allowing Algonquins to conduct pre-clearing site visits to inspect for certain plant species and harvest opportunities- developing an LTRA with the AOO, which can identify enhanced environmental monitoring and stewardship opportunities and clarify the AOO’s involvement in site wide landscaping and vegetation initiatives- engaging with the AOO to consider additional mitigation measures as part of the NSDF Project EPP- exploring ways to advance the reconciliation of Algonquin ecological knowledge where it may contradict the western science approach to identifying VCs- providing the AOO with annual updates on wildlife mortality/conflict issues and wildlife-related concerns- involving and providing capacity to the AOO to participate in the technical review of the NSDF EAFMP- providing the AOO with the results of the 2021 bat- telemetry field study and stand-level habitat suitability modeling and mapping when publicly available	<p>meetings and workshops to incorporate Algonquin Knowledge and Land Use information into the final EIS and develop mutually agreeable commitments to mitigate the AOO’s concerns regarding the terrestrial environment. CNSC staff will continue to monitor CNL’s Indigenous engagement activities, including with regards to monitoring and follow-up measures.</p>	
AOO 08	<p><i>Leaks and contamination</i></p> <p>The AOO expressed concerns about the safety of the proposed Project, including potential accidents and leaks from the NSDF site releasing radiological and non-radiological contaminants into the surrounding lands and waters. The AOO are also concerned about the corresponding impacts on wildlife and humans who may access or come into contact with contaminated areas. The AOO expects</p>	General Environment	<p>CNL worked closely with the AOO to better understand and address the AOO’s concerns and recommendations regarding leaks and contamination. In CNL’s May 2021 responses in the AOO’s AKLUS and EIS Technical review comment table, CNL provided the additional information the AOO requested regarding the planned leak detection system.</p> <p>In the EIS, CNL indicated that they assessed pathways of exposure to the public and the environment and determined that normal operations</p>	<p>CNSC staff have reviewed CNL’s EIS and conducted an assessment of the project’s potential effects of accidents and malfunctions as part of CNSC staff’s EA report, which was shared with the AOO for review prior to finalization. CNSC staff collaborated with the AOO to ensure the AOO’s concerns regarding potential leaks and contamination were documented and considered in the EA report and as part of the RIA process. Taking into account the implementation of mitigation measures and emergency response procedures, and the views and concerns expressed</p>	<p>CNSC staff are of the view that AOO’s concerns related to leaks and contamination have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>The AOO are of the view that this concern cannot be considered addressed until the proposed commitments</p>

	controls to be established for all contaminant pathways and for the Proponent to provide additional details on the planned leak detection system.		<p>as well as any residual effects from potential scenarios with accidents and malfunctions at the ECM and WWTP are negligible. CNL also indicated that secondary containment, leak detection and active drain system measures would be implemented to mitigate potential spills and leaks.</p> <p>In CNL's Project Commitments Report, CNL committed to:</p> <ul style="list-style-type: none"> - engaging with the AOO to consider additional mitigation measures as part of the NSDF Project EPP - involving and providing capacity to the AOO to participate in the technical review and implementation of the NSDF EAFMP - developing an LTRA with the AOO, which can identify enhanced environmental monitoring and stewardship opportunities 	<p>by Indigenous Nations and communities, including the AOO, CNSC staff concluded that accidents and malfunctions associated with the project is not likely to cause significant adverse effects on health, safety of workers and the public, and on the environment.</p> <p>CNSC staff confirmed that CNL collaborated with the AOO to better understand the AOO's concerns about potential accidents and leaks from the NSDF and developed mutually agreeable commitments to mitigate the AOO's concerns. As per REGDOC 3.2.2: Indigenous Engagement, CNSC staff will continue to monitor CNL's Indigenous engagement activities, including with regards to monitoring and follow-up measures.</p>	are implemented and their effectiveness demonstrated.
AOO 09	<p><i>Socioeconomic and human health values</i></p> <p>The AOO raised concerns about the Proponent's representation of radiological exposure pathways for Indigenous Nations and communities being insufficient, indicating that it does not include the appropriate plants or animal tissues consumed by Indigenous Nations and communities and fails to recognize the important connection between their ability to access and use land and resources and Algonquin socio-economic and health values. The AOO recommends CNL update the EIS to more accurately reflect the interconnected nature of effect pathways and impacts between VCs in the socio-economic, current land and resource use and Indigenous interests sections. The AOO also recommends CNL adjust the human health risk assessment assumptions to include all possible exposure risks for the self-sufficient Indigenous group during the post-closure phase of the Project.</p> <p>The AOO expressed concerns about the need for a holistic, Algonquin-specific follow-up program approach to monitoring that recognizes the interdependencies between ecological, socio-economic, community and cultural health including the need for CNL to provide funding to</p>	EA methodology	<p>Throughout the EA process, CNL worked closely with the AOO to better understand and address the AOO's concerns and questions regarding the human health risk assessment in the EIS. CNL (and the CNSC) provided support to the AOO for gathering Indigenous Knowledge and Land Use information to support a better understanding of the AOO's land and resource use in the vicinity of the NSDF project and CRL site. CNL collaborated with the AOO to incorporate this information into the final EIS and supporting documentation, including relevant follow-up monitoring programs and activities.</p> <p>In the Final EIS, CNL acknowledges the AOO's concerns about gaps in the socio-economic VCs and the associated socio-economic assessment in Section 6.2 (Engagement) of the Final EIS. CNL is of the opinion it has assessed accurately all of the pathways associated with the NSDF Project compliant with CEAA 2012. CNL states that since there were no off-site ecological effects predicted as a result of the NSDF Project, there are no pathway linkages to socio-economic VCs and thus further assessment is not required.</p> <p>CNL indicated that as there were no off-site ecological effects predicted as a result of the NSDF Project (e.g., as in the case for terrestrial and aquatic environment as well as ambient radioactivity) there are then no pathway linkages to socio-economic VCs and thus further assessment is not required.</p>	<p>CNSC staff have reviewed CNL's assessment of the potential effects on human radiological health as part of CNSC staff's EA report, which was shared with the AOO for review. CNSC staff collaborated with the AOO to ensure the AOO's concerns and views regarding potential human health effects from radiological exposure pathways were documented and considered in the EA report and as part of the RIA process. CNSC staff have verified CNL's assessment, and taking into account the implementation of mitigation measures and recommended follow-up program measures described in the EIS, concluded that the Project is not likely to cause significant adverse effects on human health as a result of nuclear and hazardous substances.</p> <p>CNSC staff confirmed that CNL worked with the AOO to better understand the AOO's concerns about potential impacts to Algonquin socio-economic and health values and that CNL provided additional information and developed mutually agreeable commitments to mitigate the AOO's concerns. As per REGDOC 3.2.2: Indigenous Engagement, CNSC staff will continue to monitor CNL's Indigenous engagement activities, including with regards to monitoring and follow-up measures.</p>	<p>CNSC staff are of the view that AOO's concerns related to socioeconomic and human health values have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC's mandate under the NSCA.</p> <p>The AOO are of the view that this concern is outstanding as the AOO's position is that the socioeconomic effects assessment undertaken in accordance with CEAA, 2012 requirements does not provide an inter-dependent, or holistic analysis of impacts to the health and wellbeing of Algonquins. As a result, the AOO asserts that the socioeconomic effects assessment does not adequately convey the full range and depth of impacts to AOO's Aboriginal Rights and interests, including Aboriginal title.</p>

	support the expansion of the Kichi-Sibi Guardians environmental monitoring program.		<p>In CNL’s May 2021 responses in the AOO’s AKLUS and EIS Technical review comment table, CNL provided additional information to clarify the exposure pathways and modelled doses to a self-sufficient Indigenous receptor in the EIS. CNL indicated that in all cases, the doses calculated to the self-sufficient Indigenous receptor groups are well below the public dose limit of 1 mSv/y.</p> <p>CNL worked with the AOO to develop a mutually agreed upon list of commitments that CNL will undertake to mitigate or lessen the AOO’s concerns. In CNL’s Project Commitments Report, CNL committed to:</p> <ul style="list-style-type: none">- providing capacity to the AOO to undertake a country foods survey and for CNL to utilize the results of the country foods study to verify project assumptions- involving the AOO in the NSDF EAFMP, including incorporating all Algonquin VCs of importance- developing an LTRA with the AOO, which can further opportunities for enhanced involvement with the CRL site environmental monitoring program.		
AOO 10	<p><i>Monitoring and Oversight</i></p> <p>The AOO expressed concerns about the need for CNL to engage the AOO and include Algonquin knowledge in developing and implementing ongoing and intensive environmental and aquatic monitoring programs throughout all project phases using an adaptive management approach, including the AOO Guardians. The AOO recommend CNL commit to implementing specific programs to manage and monitor aquatic and terrestrial tritium concentrations, surface water quality, long-term fish tissue contaminant and sediment quality.</p> <p>The AOO raised concerns about the need for independent oversight to ensure the project is constructed and operates as designed. The AOO recommend CNL commit to establishing an independent engineering review board to ensure adequate ECM construction, oversee the</p>	Environmental Monitoring	<p>Throughout the EA process, CNL worked closely with the AOO to better understand and address the AOO’s concerns and questions regarding the monitoring and oversight for NSDF. CNL (and the CNSC) provided support to the AOO to gather Algonquin Knowledge and Land Use information and collaborated with the AOO to incorporate the information into the Final EIS and supporting documentation, including relevant follow-up monitoring programs and activities.</p> <p>In CNL’s May 2021 responses in the AOO’s AKLUS and EIS Technical review comment table, CNL provided additional information to clarify the conceptual monitoring and follow up program for the NSDF project that is described in section 11 of the Final EIS, including the EAFMP.</p> <p>CNL worked with the AOO to develop a mutually agreed upon list of commitments that CNL will undertake to mitigate or lessen the AOO’s concerns. In CNL’s Project Commitments Report, CNL committed to:</p>	<p>As Canada’s nuclear regulator, the CNSC has independent oversight of nuclear activities on behalf of Canadians, including the regulatory oversight of the CRL site, and the implementation of the NSDF Project, should the project proceed. This includes regulatory requirements to develop, implement and maintain an environmental monitoring program to demonstrate that the public and the environment are protected from emissions related to the facility’s nuclear activities.</p> <p>CNSC staff are committed to building a long-term collaborative relationship with the AOO, including collaboration on the CNSC’s Independent Environmental Monitoring Program (IEMP) and the development of a long-term engagement ToR , should the AOO wish to do so.</p> <p>CNSC staff confirmed that CNL worked with the AOO to better understand the AOO’s concerns about monitoring and oversight and that CNL provided written responses and developed mutually agreeable commitments to mitigate the AOO’s concerns. CNSC staff encourages the</p>	<p>CNSC staff are of the view that AOO’s project-specific concerns related to monitoring and oversight have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA. CNSC staff note that CNL has committed to continue engaging the AOO and has provided additional documentation requested by the AOO for review. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>The AOO are of the view that this concern cannot be considered addressed as there are reviews that are in progress or yet to be started. As well, the AOO are of the view that this concern cannot be considered addressed until the reviews have been completed, and proposed commitments are implemented and their effectiveness demonstrated.</p>

	<p>operations, and complete follow up inspections to verify compliance.</p> <p>The AOO also request that CNL ensure that all baseline values used in their risk assessments are determined using appropriate sampling size.</p> <p>The AOO would like opportunities to be engaged in mitigation planning and the development of follow-up and monitoring programs to ensure they include elements that are specific to protecting the AOO's Aboriginal Rights and interests. The AOO also recommend CNL include specific traditional foods (e.g., specific animal parts) and medicines consumed by Algonquin community members into baseline data collection, sampling programs and monitoring programs.</p>		<ul style="list-style-type: none"> - providing capacity to support the AOO's involvement in the implementation and technical review of the NSDF EAFMP, including incorporating Algonquin VCs into the monitoring where appropriate - providing capacity for the AOO to co-develop adaptive management triggers/thresholds and responses that will be incorporated in the EAFMP - providing capacity to the AOO to undertake a country foods survey and for CNL to utilize the results of the country foods study to verify project assumptions - providing capacity for the AOO to co-develop avoidance and mitigation measures to inform NSDF mitigation plans and the NSDF Project Environmental Project Plan - engaging the AOO in future planning for the closure of NSDF, including input on monitoring activities - developing an LTRA with the AOO, which can further opportunities for greater involvement in the CRL site environmental monitoring program <p>Also see related responses pertaining to Water Quality and Aquatic Environment [AOO 02]</p>	<p>AOO to continue discussions with CNL to ensure that relevant information, knowledge and expectations can be reflected in follow-up and environmental monitoring programs. CNSC staff also encourages the AOO to continue to discuss with CNL, the AOO's expectations for being involved in monitoring and follow-up activities, including follow-up program elements for construction monitoring that are specific to protecting the AOO's Aboriginal Rights and interests. As per REGDOC 3.2.2: Indigenous Engagement, CNSC staff will continue to monitor CNL's Indigenous engagement activities, including with regards to monitoring and follow-up measures.</p>	
AOO 11	<p><i>Socioeconomic Impacts and Accommodation</i></p> <p>CNL acknowledges that except for the Algonquins of Pikwagnagan First Nation, there is little in the way of labour market information for all Algonquin communities. CNL has repeatedly asked for this information from the AOO, but this information is not as readily available given how Algonquin communities were historically recognized by the Crown. The AOO would value an opportunity and the capacity to better understand the socio-economic composition of the AOO communities to provide this information to inform a more accurate socio-economic baseline assessment.</p> <p>The AOO expressed concerns about potential impacts of the project on the socioeconomic environment and identified the need for the Project to provide benefits to Algonquin community members and businesses through training, capacity</p>	Indigenous Consultation and Accommodation	<p>CNL worked closely with the AOO to better understand and address the AOO's concerns and recommendations regarding socio-economic impacts and benefits identified in the AOO's AKLUS and EIS Technical Review. In CNL's May 2021 responses in the AOO's AKLUS and EIS Technical review comment table and the Final EIS, CNL provided clarity regarding the socio-economic assessment in the EIS and IER. CNL indicated that the AOO's requests regarding economic benefits are beyond the scope of CEAA 2012. However, as per discussions with the AOO, CNL included the Indigenous socioeconomic assessment in Sections 3 and 7 of the IER and committed to:</p> <ul style="list-style-type: none"> - provide economic opportunities to the AOO, Algonquin businesses and Algonquin community members, specifically employment and/or contracting associated with the NSDF Project - implement select activities to encourage economic opportunities for the AOO in relation to the NSDF Project (e.g., capacity for communication to the AOO membership inviting Algonquin community members to contact CNL regarding employment opportunities) 	<p>CNSC staff collaborated with the AOO to better understand the AOO's concerns regarding potential impacts of the Project on the socio-economic environment. CNSC staff communicated to the AOO that their requests regarding socio-economic effects mitigation such as training and employment are outside of the scope of CEAA, 2012 and the NSCA, and thus cannot be considered as part of the CNSC's EA or RIA. However, CNSC staff collaborated with the AOO to ensure that their views regarding potential socio-economic impacts were summarized and presented as 'the AOO's views' through the collaborative RIA process.</p> <p>As per REGDOC 3.2.2, CNSC staff expect CNL to document and report on how CNL has or plans to address the concerns raised by the AOO, in their EIS and/or IER for the NSDF project. CNSC staff are encouraged by CNL's commitment to continue discussions with the AOO regarding an LTRA and to provide the AOO, AOO community members and businesses economic opportunities through the NSDF Project. CNSC staff encourage the AOO to continue discussions with CNL</p>	<p>CNSC staff are of the view that AOO's concerns related to socioeconomic impacts and accommodation have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC's mandate under the NSCA. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC's compliance activities.</p> <p>The AOO are of the view that Section 35 of the Constitution Act, 1982 and the corresponding duty to consult and accommodate supersedes the limited scope of CEAA, 2012. From the AOO's perspective, this concern cannot be considered addressed until the proposed commitments are implemented and their effectiveness demonstrated.</p>

	<p>building, supporting Algonquin business development, employment and contract opportunities at CNL and AECL and by enabling the AOO to have access to financial benefits from CNL projects and initiatives.</p> <p>The AOO indicated that CNL should provide socio-economic accommodation measures and develop a socio-economic accommodation and monitoring plan to address cumulative effects and unavoidable impacts on Algonquin ecological and cultural species and sites of importance, including enabling the AOO to have access to financial benefits from CNL projects and establishing for recreation and cultural learning.</p>		<ul style="list-style-type: none">- developing an LTRA with the AOO, which will explore ways for the AOO and its membership to obtain more economic benefits from CNL operations through employment, training, contracting and other measures	<p>related to potential socio-economic impacts and opportunities for the AOO. CNSC staff will continue to monitor CNL’s Indigenous engagement to make sure CNL is responsive and provides adequate answers to the AOO regarding socio-economic impacts and concerns.</p>	
AOO 12	<p><i>Indigenous knowledge and land use information</i></p> <p>The AOO requested that the following be included as VCs in the EIS and EA report:</p> <p>Fish: walleye/pickereel, muskellunge, American eel, lake sturgeon, brook trout (speckled trout), catfish (channel catfish, brown bullhead/mudpout)</p> <p>Mammals: marten, fisher, otter, beaver, muskrat, moose, white-tailed deer, black bear</p> <p>Birds: bald eagle, owls, hawk and falcons, ducks, geese, partridge, wild turkey</p> <p>Vegetation: dry woodland ecosystems, including bearberry (kinnikinic) and pipsissewa; moist hardwood forest ecosystems, including wild leek, Indian cucumber, maidenhair fern, and jack-in-the-pulpit; mature white birch stands and trees; yellow birch stands and trees; oak stands and trees; sugar maple stands and trees; northern white cedar stands and trees; fire-dependent berries, including blueberries, blackberries, and strawberries.</p> <p>The AOO expressed concerns about potential impacts to these species that were not included in the EIS and are of</p>	<p>Indigenous knowledge and land Use information</p>	<p>CNL (and the CNSC) provided support to the AOO to gather Algonquin Knowledge and Land Use information, including VCs of Algonquin importance. CNL provided the AOO additional capacity to complete a technical review of the EIS. CNL worked closely with the AOO during the review and finalization of the EIS to incorporate the AOO’s AKLUS information and ensure the Final EIS reflects the VCs identified by the AOO (Table 6.3.2-1 of the NSDF final EIS).</p> <p>In CNL’s May 2021 responses in the AOO’s AKLUS and EIS Technical review comment table, CNL indicated that they have provided the AOO multiple opportunities to collaborate on the NSDF Project VCs during the development of the NSDF EIS, including through direct requests for information as well as opportunities for workshops and meetings. CNL clarified that while opportunities to collaborate with the AOO on VC scoping on future projects on unceded AOO Settlement Area are outside of the scope of the NSDF project, CNL is willing to discuss this as part of the LTRA discussions.</p> <p>In CNL’s Project Commitments Report, CNL committed to:</p> <ul style="list-style-type: none">- providing capacity to support the AOO’s involvement in the implementation and technical review of the NSDF EAFMP, including incorporating Algonquin VCs into the EAFMP	<p>While carrying out their technical review of the CNL EIS, CNSC staff ensured that the VCs of importance identified in the AOO AKLUS and the AOO EIS Technical Review, have been either included in CNL’s assessment directly, or represented by an appropriate indicator species by CNL. This information was also documented and taken into consideration as part of the collaborative RIA process, and by CNSC subject matter experts in making their conclusion on potential effects for the CEAA 2012 EA report, which was shared with the AOO for review prior to finalization.</p> <p>CNSC staff confirmed that CNL provided the AOO with additional capacity support and collaborated with the AOO to ensure the VCs requested by the AOO were captured in the Final EIS. CNSC staff is supportive of the mutually agreeable commitments identified by CNL and the AOO to incorporate Algonquin VCs into the EAFMP and SFMP. As per REGDOC 3.2.2: Indigenous Engagement, CNSC staff will continue to monitor CNL’s Indigenous engagement activities, including with regards to the incorporation of VCs and Indigenous Knowledge, to make sure they are responsive and provide adequate answers to the AOO’s concerns and comments.</p>	<p>CNSC staff are of the view that AOO’s project-specific concerns related to Indigenous knowledge and land use information have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA. CNSC staff note that CNL has committed to continue engaging the AOO and has provided additional documentation requested by the AOO for review. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>The AOO are of the view that this concern cannot be considered addressed as there are reviews that are in progress or yet to be started. As a result, the AOO are of the view that this concern cannot be considered addressed until the reviews have been completed, and proposed commitments are implemented and their effectiveness demonstrated.</p>

	importance culturally and for practice of the AOO's Aboriginal Rights and interests. The AOO expects CNL to meet with the AOO to undertake a collaborative VC gap analysis of the intersection between AKLUS findings and recommendations and revised draft EIS content, and to provide the AOO with additional capacity funding to support this initiative before the Final EIS is submitted.		<ul style="list-style-type: none"> - exploring ways to advance the reconciliation of Algonquin ecological knowledge where it may contradict the western science approach to identifying VCs - collaborating with the AOO to identify additional AOO VCs as featured species in the SFMP 		
AOO 13	<p><i>Indigenous knowledge and land use information</i></p> <p>The AOO requires that Algonquin Knowledge and Land Use information be used to assess potential project impacts to the AOO's Aboriginal Rights and interests. The AOO expect that CNL will meet with the AOO to discuss how the AOO's Algonquin Knowledge and Land Use information and recommendations can be effectively incorporated into subsequent revisions of the EIS, and the Project construction, operations, closure and post-closure phases.</p>	Indigenous Consultation	<p>CNL (and the CNSC) provided support to the AOO for gathering the AOO's Algonquin Knowledge and Land Use information. CNL collaborated with the AOO to integrate the valuable information and knowledge into the Final EIS and supporting documentation, including CNL's IER. The findings of the AOO AKLUS are summarized in Section 6.4 of the Final EIS. CNL also worked closely with the AOO through multiple meetings and workshops to better understand the AOO's recommendations identified in the AOO AKLUS and EIS Technical Review and develop mutually agreeable commitments to mitigate the AOO's concerns.</p> <ul style="list-style-type: none"> - in CNL's Project Commitments Report, CNL committed to: exploring ways to advance the reconciliation of Algonquin ecological knowledge where it may contradict the western science approach to identifying VCs - engaging the AOO in future planning for the closure of NSDF - providing capacity to the AOO to undertake a country foods survey and for CNL to utilize the results of the country foods study to verify project assumptions - participating and providing capacity for a dedicated recommendations and mitigation workshop with the AOO, to co-develop and collaborate on avoidance and mitigation measures - involving the AOO in the NSDF EAFMP, including incorporating all Algonquin VCs of importance - developing an LTRA with the AOO, which can further engagement and communication opportunities with Algonquin community members 	<p>CNSC (and CNL) provided support to the AOO for gathering the AOO's Algonquin Knowledge and Land Use information. CNSC staff collaborated with the AOO to ensure that AOO's Indigenous Knowledge and Land Use information is incorporated into the EA process, including the CNSC's CEAA 2012 EA report and the associated collaborative RIA process.</p> <p>CNSC staff confirmed that CNL collaborated with the AOO to incorporate Algonquin Knowledge and Land Use information into the final EIS and to inform the development of mutually agreeable commitments to mitigate the AOO's Project-related concerns. CNSC staff is supportive of the mutually agreeable commitments identified by CNL and the AOO and will continue to monitor CNL's Indigenous engagement activities, including with regards to the incorporation of Algonquin Knowledge in the EA process and related follow-up and monitoring programs.</p>	<p>CNSC staff are of the view that AOO's concerns related to Indigenous knowledge and land use information have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC's mandate under the NSCA. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC's compliance activities.</p> <p>The AOO are of the view that this concern cannot be considered addressed until the proposed commitments are implemented, such as the involving the AOO in the NSDF EAFMP, and their effectiveness demonstrated.</p>
AOO 14	<i>Impacts on rights</i>	Indigenous and/or Treaty Rights	In the Final EIS, CNL acknowledges that the CRL property is located within unceded AOO Settlement Area where Algonquin community members exercise	CNSC staff have clarified that the NSDF Project has been subject to an EA that was started under CEAA 2012 on May 5th, 2016. As per the	CNSC staff are of the view that AOO's concerns related to impacts on rights have been addressed to the extent possible within the scope of the Project-

	<p>The AOO assert that the Chalk River Laboratories (CRL) site is located within the unceded AOO Settlement Area where Algonquins from various communities exercise Aboriginal Rights and interests, including Aboriginal title that have never been ceded or surrendered to the Crown. The AOO raised concerns about the potential impacts of the Project on the AOO’s ability to exercise their Aboriginal Rights and interest. The AOO are concerned that in order to be adequate, the assessment of potential impacts on the AOO’s Aboriginal Rights and interests, including Aboriginal title must consider the strength of the AOO’s Aboriginal Rights and interests, including Aboriginal title and the degree to which Algonquin community members will be able to continue their current use of lands and resources around the Project. The assessment must also have a broad spatial and temporal scope to capture potential impacts on Aboriginal Rights and interests, including Aboriginal title in the local and RSA. The AOO also assert that the consideration of impacts to Aboriginal Rights and interests, including Aboriginal title supersedes the scope of CEAA 2012’s socio-economic assessment.</p>		<p>Aboriginal Rights and interests, including Aboriginal title.</p> <p>In CNL’s discussions with the AOO and May 2021 responses in the AOO’s AKLUS and EIS Technical review comment table, CNL communicated to the AOO that because CNL is of the opinion that there are no traditional land uses determined to be affected by project, CNL is of the view that the AOO’s Aboriginal Rights will not be impacted by the NSDF Project activities. CNL acknowledged the AOO disagree with this conclusion and that the AOO are of the view that there are project specific activities that may directly impact traditional land uses and Aboriginal Rights and interests beyond the CRL site. CNL indicated that determination as to whether the proposed project has impacts on Aboriginal and Treaty Rights remains with the CNSC as the representative of the Crown. However, CNL stated that where there are differences of opinion or concerns that need to be addressed, CNL is committed to continuing to explore mitigation measures and formulate commitments with the AOO with the intention of trying to remove or lessen the concern.</p>	<p>transition provision described in subsection 182 of the IAA, the CNSC is respecting and adhering to the applicable regulatory regime under CEAA 2012 and the interim principles that the Government of Canada announced in 2016 for major project reviews.</p> <p>CNSC staff collaborated with the AOO to ensure that consultation for the proposed Project is meaningful, addresses the AOO’s concerns, and upholds the honour of the Crown. CNSC staff and the AOO are assessing potential impacts from the NSDF project on the AOO’s Aboriginal Rights and interests through a collaboratively-drafted RIA. CNSC staff communicated to the AOO that the federal EA process is not a rights determining process and that the RIA focuses on rights that are practiced in and around the project and the potential impacts on those rights.</p> <p>In the RIA, CNSC staff state that the CNSC staff are of the view that with the mitigation and follow-up measures proposed by CNL, AECL and CNSC staff, all identified impacts and concerns can be adequately managed and addressed in relation to the Project. Therefore, CNSC staff conclude that there are no residual impacts expected to the AOO’s Aboriginal Rights in relation to the Project. All parties involved, including the AOO, CNL, AECL and the CNSC are committed to ongoing engagement and dialogue to work towards addressing concerns raised by the AOO and enhancing the relationships through collaboration in relation to the NSDF Project and CRL site in general.</p> <p>CNSC staff have also raised the AOO’s broader concerns regarding the CRL site and other activities and stressors in the unceded AOO Settlement Area, to the attention of AECL, as well as CIRNAC, who is leading the negotiation of the AOO comprehensive land claim agreement on behalf of the Government of Canada negotiations to ensure they are aware of these issues.</p>	<p>specific CEAA 2012 EA and the CNSC’s mandate under the NSCA. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>The AOO are of the view that this concern is not addressed as the proponent’s assessment did not use the requested spatial and temporal scope.</p> <p>The AOO disagrees with the CNL’s and CNSC’s assessment that are no residual impacts expected to the AOO’s rights in relation to the project based on the inadequacy and narrow scope of the cumulative effects and socio-economic impact assessments under CEAA 2012. The NSDF Project is a single project within a landscape that has been significantly impacted by nuclear research and development. With both Chalk River and the Nuclear Power Demonstration (NPD) sites subject to assessments for projects that are at varying stages of the impact assessment process (e.g., NSDF, Global First Power’s Micro-Modular Reactor, and CNL’s decommissioning of NPD), the cumulative impacts of historic, ongoing and future nuclear activities is of concern to the AOO. The AOO are steadfast in its interest to move beyond compliance and ensure that the full range of impacts on the AOO’s Aboriginal Rights and interests are understood, assessed, properly mitigated, and monitored over the lifecycle of the Project.</p>
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AOO 15	<p><i>Cumulative impacts</i></p> <p>The AOO raised concerns about historic and future cumulative impacts from development along the Kichi-Sibi³ (Ottawa River), including the establishment of CRL and future SMRs, and the associated impacts on Algonquin community members’ access and exercise Aboriginal Rights and interests across the unceded AOO Settlement Area. The AOO recommends that cumulative impacts be considered as part of the NSDF Project assessment, including the Rights Impact Assessment, and addressed through formal Project commitments and conditions. The AOO disagrees with the approach that considers present-day environmental conditions to reflect historic harms and cumulative effects.</p>	<p>Cumulative effects assessment;</p> <p>Indigenous and/or Treaty Rights</p>	<p>CNL worked closely with the AOO to better understand and address the AOO’s concerns and recommendations regarding cumulative impacts identified in the AOO’s AKLUS and EIS Technical Review. In CNL’s written responses in the May 2021 AOO AKLUS and EIS Technical review comment table, CNL communicated to the AOO that a cumulative effects assessment has been included by environmental component in Section 8 of the Final EIS. CNL clarified that the results of the EIS indicate that there are no significant residual effects as a result of the NSDF project, thus there are also no cumulative effects. CNL also stated that the possible siting, construction, and operation of an SMR on the CRL site is not specific to the NSDF project as the Reasonable Foreseeable Development (RFD) assessment concludes that there are no residual cumulative effects from the addition of an SMR to the CRL site.</p> <p>CNL acknowledged the AOO’s concern about the historical cumulative effects of the CRL site in the Final EIS. However, in discussions with the AOO and through written responses in the May 2021 AOO AKLUS and EIS Technical review comment table, CNL clarified that this concern regarding historical impacts is related to overall CRL site operations and is outside of the scope of the NSDF Project. CNL stated that CNL’s methodology and approach for developing the EIS is consistent with CEAA 2012 as well as the CNSC’s Generic Guidelines for the Preparation of an EIS. CNL confirmed that as the landowner, AECL is engaging with Indigenous Nations and communities alongside CNSC and CNL to build meaningful and productive relationships.</p> <p>In CNL’s Project Commitments Report, CNL committed to continuing discussions with AECL and CNL to develop an LTRA with the AOO, which identifies enhanced opportunities for consultation, and environmental and cultural heritage monitoring and stewardship.</p>	<p>Throughout discussions with the AOO as part of the collaborative RIA process, CNSC staff communicated to the AOO that due to the bounds of the CNSC’s regulatory process under CEAA 2012 and the NSCA, the scope of this RIA is limited to the NSDF’s specific contributions to impacts on the AOO’s Aboriginal Rights. CNSC staff clarified that the AOO’s concerns with respect historic and cumulative impacts of the larger CRL site and related activities are outside of the scope of the decision for the NSDF Project. However, CNSC staff collaborated with the AOO to ensure that the appropriate historical context from the AOO’s perspective and associated potential impacts to the AOO’s Aboriginal Rights are documented and reflected as part of the RIA and is reflected in the CNSC’s EA report.</p> <p>CNSC staff are encouraged by CNL and AECL’s commitment to discussions with the AOO to develop an LTRA which can help to address the AOO’s concerns about historic/cumulative impacts related to the CRL site. CNSC staff clarified that CNL’s commitment list will inform the CNSC’s list of recommended EA conditions as well as the LCH, that provides compliance verification criteria and non-mandatory recommendations and guidance.</p>	<p>CNSC staff are of the view that AOO’s concerns related to cumulative impacts have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p> <p>The AOO are of the view that this concern is outstanding as the AOO does not agree with the methodology, approach and scope of the cumulative effects assessment for the project.</p> <p>The AOO disagrees with the CNL’s and CNSC’s assessment that are no residual impacts expected to the AOO’s rights in relation to the project based on the inadequacy and narrow scope of the cumulative effects and socio-economic impact assessments under CEAA 2012. The NSDF Project is a single project within a landscape that has been significantly impacted by nuclear research and development. With both Chalk River and the Nuclear Power Demonstration (NPD) sites subject to assessments for projects that are at varying stages of the impact assessment process (e.g., NSDF, Global First Power’s Micro-Modular Reactor, and CNL’s decommissioning of NPD), the cumulative impacts of historic, ongoing and future nuclear activities is of concern to the AOO. The AOO are steadfast in its interest to move beyond compliance and ensure that the full range of impacts on the AOO’s Aboriginal Rights and interests are understood, assessed, properly mitigated, and monitored over the lifecycle of the Project.</p>
AOO 16	<p><i>Mitigation measures</i></p> <p>The AOO expressed concerns about the proposed mitigation and avoidance measures only being effective if they the facility operates as predicted in the final EIS. The AOO would like opportunities to</p>	EA Methodology	<p>CNL worked closely with the AOO to better understand their concerns and explore mitigation measures and formulate commitments with the AOO to remove or lessen the concern. For example, the AOO suggested and CNL agreed to (as well as provided capacity for) an Issues and Resolution Workshop in April 2021, which was an integrated</p>	<p>As per the CNSC’s request, CNSC staff confirm that CNL has provided a Commitments Report as part of its final EIS documentation that includes all of the mitigation measures, follow-up program measures and commitments that CNL has made, including commitments CNL made in collaboration with the AOO. CNSC staff are of</p>	<p>CNSC staff are of the view that AOO’s concerns related to mitigation measures have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA. Effectiveness of the mitigation measures/commitments will be verified by the CNSC</p>

³ The Ottawa River, otherwise known as the Big River, has also been referred to in the Algonquin language as “Kichi- Sibi”, “Kichissippi”, “Kitchissippi” and “Kichissippi”.

	<p>review mitigation plans and be engaged in a mitigation and recommendation workshop with the proponent to ensure follow-up and monitoring programs for the Project include elements that are specific to protecting the AOO’s Aboriginal Rights and interests.</p> <p>As part of the EA process, the AOO expect site- and project-specific actions and commitments to be made in order to avoid, mitigate and accommodate potential impacts. The AOO would like to work with the CNSC to include the AOO’s recommendations in the conditions for this Project.</p>		<p>discussion of the outstanding issues and concerns from both the AOO technical review of the 2020 Final EIS and the comments and recommendations which had accompanied the AOO AKLUS.</p> <p>In CNL’s May 2021 responses in the AOO’s AKLUS and EIS Technical review comment table, CNL provided a summary of the resolution and next steps agreed to by CNL and the AOO during the workshop. CNL provided additional information in response to the AOO’s request for clarity on specific mitigation measures and stated that while CNL is of the opinion that the NSDF Project is based on solid engineering, industry best practices and is environmentally responsible, CNL is open to suggestions on mitigation measures or modifications of those already identified.</p> <p>In CNL’s Project Commitments Report, CNL committed to:</p> <ul style="list-style-type: none">- providing the AOO with CNL’s current mitigation plans including those specifically related to recommendations from the AOO AKLUS, in order to demonstrate alignment with best industry practices and to invite and incorporate feedback from the AOO- providing capacity for a dedicated recommendations and mitigation workshop with the AOO, to co-develop and collaborate on avoidance and mitigation measures- engaging with the AOO and considering additional mitigation measures to include within the NSDF Project EPP- involving the AOO in the NSDF EAFMP- developing an LTRA with the AOO, which can further engagement and communication opportunities with Algonquin community members	<p>the understanding that relevant sections of this report were verified by the AOO prior to CNL submitting the Final EIS to the CNSC.</p> <p>CNSC staff facilitated a discussion with the AOO, CNL, AECL and CNSC staff to discuss CNL’s proposed mitigation measures and commitments to address potential impacts to the AOO’s Aboriginal Rights as identified in the RIA. CNSC confirmed that progress on commitments will be tracked through the IER and that CNL’s Commitment Report will inform the CNSC’s list of recommended EA conditions as well as the LCH that provides compliance verification criteria and non-mandatory recommendations and guidance. Additionally, CNL’s ongoing engagement with the AOO will be reported through CNL’s Public Information and Disclosure Program as part of their Annual Compliance Reports.</p> <p>CNL’s Commitments Report and proposed mitigation measures identified in the EIS are also taken into consideration by CNSC subject matter experts in making their conclusion on potential effects for the CEAA 2012 EA report as well as CNSC staff’s analysis and conclusions in the RIA.</p>	<p>through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>The AOO are of the view that this concern cannot be considered addressed until the proposed commitments are implemented and their effectiveness demonstrated.</p>
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AOO 17	<p>Waste verification</p> <p>The AOO raised concerns about potential impacts and risks from transporting and storing nuclear waste at the CRL site. The AOO are of the view that the unceded AOO Settlement Area, which includes the CRL site, should not be used to dispose of nuclear waste from other facilities. The AOO raised concerns about the Proponent’s plans for inspecting and packaging waste and recommend the development of a comprehensive waste acceptability program to inventory and ensure independent oversight and monitoring of the waste being accepted for the NSDF facility. The AOO are of the view that a visual inspection of waste and waste packaging is insufficient.</p>	General environment	<p>CNL worked closely with the AOO to understand and address the AOO’s concerns and recommendations regarding waste verification identified in the AOO’s AKLUS and EIS Technical Review. In CNL’s May 2021 responses in the AOO’s AKLUS and EIS Technical review comment table, CNL provided additional information to clarify that only low level radioactive waste will be accepted at the NSDF, and that offsite waste streams at the NSDF will be limited to 5% commercial sources and 5% other AECL sites. CNL provided additional information regarding the NSDF Waste Acceptance Criteria and CRL’s Waste Management Program.</p> <p>In CNL’s Project Commitments Report, CNL committed to:</p> <ul style="list-style-type: none">- not exceeding the amount of offsite waste streams as described in the NSDF Final EIS- seeking early engagement and support from the AOO prior to pursuing regulatory approvals, should NSDF contemplate the receipt of a new waste stream- providing the AOO with ongoing communication and engagement regarding the types of off-site waste that will be placed in the NSDF- providing the AOO opportunities for review and engagement with respect to CNL’s waste verification process- developing an LTRA with the AOO, which can identify enhanced environmental monitoring and stewardship opportunities- engaging with the AOO to consider additional mitigation measures as part of the NSDF Project EPP- involving and providing capacity to the AOO to participate in the technical review of the NSDF EAFMP	<p>As per REGDOC 3.2.2, CNSC staff expect CNL to document and report on how CNL has or plans to address the concerns raised by the AOO, in their EIS and/or IER for the NSDF project. CNSC staff are of the understanding that CNL worked closely with the AOO to better understand and mitigate their concerns and recommendations regarding waste acceptance and verification. CNSC staff understand that CNL collaborated with the AOO to develop mutually agreeable commitments to address the AOO’s concerns related to waste.</p> <p>Under CNSC licence, CNL would also have to comply with the CNSC waste characterization requirements as outlined in CNSC Regulatory Document, REGDOC-2.1.1.1, volume 1. Additionally, CNL’s ongoing engagement with the AOO will be reported through CNL’s Public Information and Disclosure Program as part of their Annual Compliance Reports. CNSC staff will continue to monitor the CNL’s Indigenous engagement activities, including with regards to monitoring and follow-up measures.</p>	<p>CNSC staff are of the view that AOO’s concerns related to waste verification have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>The AOO are of the view that this concern cannot considered addressed until the proposed commitments are implemented and their effectiveness demonstrated. The AOO are of the view that the unceded AOO Settlement Area, which includes the CRL site, should not be used to dispose of nuclear waste from other facilities.</p>
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Issue and Concern Summary Table for **Curve Lake First Nation (CLFN)**
with respect to the Proposed **Near Surface Disposal Facility (NSDF)**

Table C-4 CLFN concerns and issues table

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme (see guidance for drop-down list)	Proponent response	Crown response	Status of issue/concern and Recommendations (including any additional mitigation, commitments, follow-up or accommodations, as appropriate)
CLFN01	<i>Protection of the Environment</i> CLFN raised concerns regarding the protection of natural resources in and surrounding the Chalk River Laboratories (CRL) site in relation to potential impacts from the proposed NSDF project for all future generations.	General Environment	<p>In the Final EIS, CNL acknowledges CLFN’s concerns about potential Project impacts to natural resources. CNL indicates they have engaged and shared technical information with CLFN through webinars and meetings to provide clarification and evidence to support CNL’s conclusions that the NSDF will improve the current environmental conditions at the CRL site.</p> <p>CNL provided webinars on the NSDF project in regards to measures to protect the environment, such as the NSDF baseliner system and responsible water management, Responsible Water Management video to Curve Lake, and follow up letter on the NSDF revised EIS and IER for discussion, verification, and invitation to meet for discussions.</p> <p>In CNL’s Project Commitments List, CNL committed to:</p> <ul style="list-style-type: none">continuing discussions with CLFN on the next steps towards a contribution agreement that supports meaningful participation of CLFN on the NSDF <p>Project.</p> <ul style="list-style-type: none">Input from the public and Indigenous peoples will be sought on the Environmental Assessment Follow Up Monitoring Programcontinue to provide notifications of project activities to all WTFN communities unless otherwise instructed	<p>CNSC staff confirmed that CNL worked closely with CLFN to better understand and mitigate the CLFN’s concerns regarding potential Project impacts to the environment. CNSC staff are also aware that CNL and CLFN are also in the process of developing a contribution agreement that will help to enhance the relationship and foster greater collaboration and inclusion of CLFN in CNL’s projects and operations.</p> <p>The CNSC has confirmed that CNL has responded to the concern raised and are satisfied with the response. As per REGDOC 3.2.2: Indigenous engagement, CNSC staff will continue to monitor CNL’s Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to CLFN’s concerns and comments regarding archeological findings.</p>	<p>CNSC staff are of the view that CLFN’s concerns related to the general environment have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>CLFN is of the view that the commitments made by CNL and the CNSC including the mitigation proposed will address the concerns related to the general environment and will continue to be involved in discussions with CNL and CNSC regarding the project.</p>
CLFN02	<i>Archeological Findings</i> CLFN raised concerns around burial, ceremonial and/or archaeological sites. CLFN has requested to be notified if excavation unearths bones, remains or other such evidence of a	Indigenous Culture and Heritage	CNL worked closely with CLFN through meetings and workshops to better understand and address CLFN’s concerns and recommendations regarding potential impacts to burial, ceremonial and/or archaeological sites located near the project. CNL also provided the archeological report to CLFN in December 2016 and May 2020.	CNSC staff confirmed that CNL worked closely with CLFN to better understand and mitigate the CLFN’s concerns regarding potential Project impacts to burial, ceremonial and/or archaeological sites. CNSC staff are also aware that CNL and CLFN are also in the process of developing a contribution agreement that will help to enhance the relationship and foster greater	CNSC staff are of the view that CLFN’s concerns related to Indigenous Culture and Heritage have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme (see guidance for drop-down list)	Proponent response	Crown response	Status of issue/concern and Recommendations (including any additional mitigation, commitments, follow-up or accommodations, as appropriate)
	burial site or any archaeological findings.		<p>In CNL’s Project Commitments Report, CNL committed to:</p> <ul style="list-style-type: none">continuing discussions with CLFN on the next steps towards a contribution agreement that supports meaningful participation of CLFN on the NSDF <p>Project.</p> <ul style="list-style-type: none">continue to provide notifications of project activities to all WTFN communities unless otherwise instructed	<p>collaboration and inclusion of CLFN in CNL’s projects and operations.</p> <p>The CNSC has confirmed that CNL has responded to the concern raised and are satisfied with the response. As per REGDOC 3.2.2: Indigenous engagement, CNSC staff will continue to monitor CNL’s Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to CLFN’s concerns and comments regarding archeological findings.</p>	<p>CLFN is of the view that the commitments made by CNL and the CNSC including the mitigation proposed will address the concerns related to the archeological findings and will continue to be involved in discussions with CNL and CNSC regarding the project.</p>
CLFN04	<p><i>Water Quality and Aquatic Environment</i></p> <p>CLFN raised concerns about the proximity of the proposed NSDF project to the Ottawa river, Perch Lake and Perch Creek (and the drainage into the Ottawa River).</p>	Aquatic Environment	<p>In the Final EIS, CNL acknowledges CLFN’s concerns about potential Project impacts to the river and its tributaries. CNL indicates they have engaged and shared technical information with CLFN through webinars and meetings to provide clarification and evidence to support CNL’s conclusions that the NSDF will improve the current environmental conditions at the CRL site and protect the Ottawa River.</p> <p>The Final EIS concludes residual effects on Ottawa River water quality are determined to be negligible during operations and post-closure phases and may result in a net benefit due to remediation of legacy waste storage areas at the CRL site.</p> <p>In CNL’s Project Commitments List, CNL committed to involving CLFN in the NSDF EAFMP.</p>	<p>CNSC staff have reviewed CNL’s assessment outlined in the EIS and determined that the CNL’s identification, proposed mitigation, and proposed follow-up program measures are adequate for residual effects to the surface water environment. CNSC staff concludes the project is not likely to cause significant adverse effects to the surface water environment as the magnitude of effects are expected to be negligible.</p> <p>The CLFN views expressed related to water quality and the aquatic environment were taken into consideration by CNSC subject matter experts in making their conclusion on potential effects for the EA report.</p> <p>CNSC staff is encouraged by CNL’s commitment to continue engaging with CLFN on these issues, including on the EAFMP, and will continue to monitor CNL’s Indigenous engagement activities, including with regards to monitoring and follow-up measures.</p>	<p>CNSC staff are of the view that CLFN’s concerns related to surface water have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>CLFN is of the view that the commitments made by CNL and the CNSC including the mitigation proposed will address the concerns related to water quality and aquatic environment and will continue to be involved in discussions with CNL and CNSC regarding the project.</p>

Issue and Concern Summary Table for **Hiawatha First Nation (HFN)**
with respect to the Proposed **Near Surface Disposal Facility (NSDF)**

Table C-5 HFN concerns and issues table (e-doc 6626253)

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme (see guidance for drop-down list)	Proponent response	Crown response	Status of issue/concern and recommendations (including any additional mitigation, commitments, follow-up or accommodations, as appropriate)
HFN01	<i>Protection of the environment</i> Hiawatha First Nation (HFN) raised concerns regarding protection of wildlife, habitat, and water tributaries from contamination for 7 generations.	General Environment	<p>In the Final EIS, CNL acknowledges HFN’s concerns about potential Project impacts to natural resources. CNL indicates they have engaged and shared technical information with HFN through webinars and meetings to provide clarification and evidence to support CNL’s conclusions that the NSDF will improve the current environmental conditions at the CRL site.</p> <p>CNL provided webinars on the NSDF project in regards to measures to protect the environment, such as the NSDF baseliner system and responsible water management, Responsible Water Management video to HFN, and follow up letter on the NSDF revised EIS and IER for discussion, verification, and invitation to meet for discussions.</p>	<p>CNSC staff have reviewed CNL’s EIS and concluded that with the proposed mitigation measures and follow-up programs, the project is not likely to cause significant adverse effects to the general environment.</p> <p>CNSC staff confirmed that CNL worked closely with HFN to better understand and mitigate the CLFN’s concerns regarding potential Project impacts to the environment.</p> <p>The CNSC has confirmed that CNL has responded to the concern raised and are satisfied with the response. As per REGDOC 3.2.2: Indigenous engagement, CNSC staff will continue to monitor CNL’s Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to HFN’s concerns and comments regarding the protection of the environment.</p>	<p>CNSC staff are of the view that HFN’s concerns related to the general environment have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p> <p>HFN is of the view that the commitments made by CNL and the CNSC including the mitigation proposed will address the concerns related to the protection of the environment and will continue to be involved in discussions with CNL and CNSC regarding the project.</p>
HFN02	<i>Indigenous and/or Treaty Rights</i> HFN is concerned that this project by its very nature has the potential to bring about momentous and long-lasting impacts on the natural environment, and that at such any infringement on Treaty Rights must be justified by the Crown.	Indigenous and/or Treaty Rights	<p>CNL indicated that determination as to whether the proposed project has impacts on Aboriginal and Treaty Rights remains with the CNSC as the representative of the Crown. However, CNL stated that where there are differences of opinion or concerns that need to be addressed, CNL is committed to continuing to explore mitigation measures and formulate commitments with HFN with the intention of trying to remove or lessen the concern.</p>	<p>CNSC staff have clarified that the NSDF Project has been subject to an EA that was started under CEAA 2012 on May 5th, 2016. As per the transition provision described in subsection 182 of the IAA, the CNSC is respecting and adhering to the applicable regulatory regime under CEAA 2012 and the interim principles that the Government of Canada announced in 2016 for major project reviews.</p> <p>CNSC staff collaborated with HFN to ensure that consultation for the proposed Project is meaningful, addresses HFN’s concerns, and upholds the honour of the Crown.</p> <p>CNSC staff are of the view that with the mitigation and follow-up measures proposed by CNL, AECL and CNSC staff, all identified impacts and concerns can be adequately managed and addressed in relation to the Project. Therefore, CNSC staff conclude that there are</p>	<p>CNSC staff are of the view that HFN’s concerns related to impacts on rights have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>HFN is of the view that the commitments made by CNL and the CNSC including the mitigation proposed will address the concerns related to Indigenous and/or Treaty Rights and will continue to be involved in discussions with CNL and CNSC regarding the project.</p>

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme (see guidance for drop-down list)	Proponent response	Crown response	Status of issue/concern and recommendations <i>(including any additional mitigation, commitments, follow-up or accommodations, as appropriate)</i>
				no residual impacts expected to HFN’s Aboriginal Rights in relation to the Project.	

Issue and Concern Summary Table for **Algonquins Anishinabeg Nation Tribal Council (AANTC), Kitigan Zibi Anishinabeg First Nation (KZAFN) and Kebaowek First Nation (KFN)**
with respect to the Proposed CNL’s Near Surface Disposal Facility

Table C-6 AANTC concerns and issues table

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme (see guidance for drop-down list)	Proponent response	Crown response	Status of issue/concern and recommendations (including any additional mitigation, commitments, follow-up or accommodations, as appropriate)
AANTC001	<p><i>Indigenous consultation and participant funding</i></p> <p>AANTC and KFN raised concerns about funding awarded for the technical review of the EIS, and lack of consultation done by the CNSC.</p>	Indigenous Consultation	<p>CNL initiated engagement with AANTC with regards to the project starting in 2016. In May 2020 CNL offered to AANTC to work together to establish a NSDF Project specific contribution agreement to ensure support of the AANTC’s ongoing participation in the EA process. Although CNL attempted further correspondence on the concern with the AANTC through July and August 2020, in September 2020, the AANTC informed CNL that they would not be willing to meet again until the their letter sent to the Minister of Natural Resources received a response and requests are met.</p> <p>In CNL’s Project Commitments Report, CNL mentioned that AANTC, KZAFN and KFN will be involved in contribution agreement meetings. AANTC and KZAFN have also indicated an interest about procurement and contracting opportunities. CNL has provided information and is willing to follow-up further with the AANTC and KZAFN at their request.</p> <p>CNL will continue to follow-up with the AANTC, KZAFN and KFN on provision of capacity through a contribution agreement, should there be interest.</p>	<p>The CNSC understands the importance of building a strong and ongoing relationship with the AANTC, KZAFN and KFN and ensuring that the consultation process is meaningful and addresses their concerns. Starting in 2016 and throughout the EA process, the CNSC remained open to exploring opportunities to enhance and formalize the engagement relationship to enable and outline meaningful, agreed upon consultation and engagement processes where appropriate, including the development of a long-term engagement agreement and work-plan.</p> <p>The CNSC has also provided AANTC, KZAFN and KFN with funding through the PFP to support the consultations underway on multiple occasions throughout the EA process, which allowed AANTC and KZAFN to provide comments on the draft EIS and the revised EIS. All of their comments were addressed by CNL.</p> <p>CNSC staff met with AANTC, KZAFN and KFN leadership and representatives on multiple occasions from 2016 until early 2020. In 2019, CNSC staff contacted and offered to all First Nation communities represented by AANTC for CNSC staff to travel to their communities to provide information on the project, answer their questions and continue the consultation process. CNSC staff did not receive any confirmation of interest in these offers or consultation opportunities.</p> <p>Starting in early 2020 AANTC and KFN indicated that they did not want to meet with the CNSC directly with regards to the project and preferred to work directly with Natural Resources Canada and the Minister of Natural Resources on a consultation framework. The</p>	<p>CNSC staff are of the view that the concern raised by AANTC, KZAFN and KFN related to consultation and funding have and will continue to be addressed through the responses and commitments of CNSC staff, as described in the response columns.</p> <p>CNSC staff sent the issues and concerns tables and followed up with AANTC, KFN and KZAFN but did not receive a response to date. Therefore, CNSC staff were unable to verify the issues and concerns and their status directly with AANTC, KFN and KZAFN. CNSC staff will continue to follow-up with AANTC, KFN and KZAFN with regards to their concerns in relation to the Project.</p>

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme (see guidance for drop-down list)	Proponent response	Crown response	Status of issue/concern and recommendations (including any additional mitigation, commitments, follow-up or accommodations, as appropriate)
				<p>Minister has responded on multiple occasions to AANTC and KFN indicating that for any project specific consultation to work directly with the CNSC through the EA and regulatory process.</p> <p>CNSC staff continues to offer funding and opportunities to meet to find a mutually agreeable path forward in relation to the NSDF project.</p>	
AANTC002	<p><i>Potential impacts of leakage into the Ottawa River</i></p> <p>AANTC and KZAFN raised concerns about the contamination of water and groundwater. AANT.</p>	Groundwater (quality and quantity)	<p>In the Final EIS, CNL indicates they have engaged and shared technical information with the AANTC and KZAFN to provide clarification and evidence to support CNL’s conclusions that the NSDF will improve the current environmental conditions at the CRL site and protect the Ottawa River.</p> <p>CNL also extended the RSA in the Final EIS for surface water, aquatic environment, land and resource use, ecological health and human health to capture 8 km of the Ottawa River downstream of the CRL site. The Final EIS concludes residual effects on Ottawa River water quality are determined to be negligible during operations and post-closure phases and may result in a net benefit due to remediation of legacy waste storage areas at the CRL site.</p> <p>In CNL’s Project Commitments Report, CNL committed to involving AANTC, KZAFN and KFN in the NSDF EAFMP.</p>	<p>CNSC staff have reviewed CNL’s assessment outlined in the EIS and determined that the CNL’s identification, proposed mitigation, and proposed follow-up program measures are adequate for addressing potential residual effects to the surface water environment. CNSC staff concludes the project is not likely to cause significant adverse effects to the surface water environment as the magnitude of effects are expected to be negligible.</p> <p>AANTC and KZFN views expressed related to water quality and the aquatic environment were taken into consideration by CNSC subject matter experts in making their conclusion on potential effects for the EA report.</p> <p>CNSC staff will continue to monitor CNL’s Indigenous engagement activities, including with regards to monitoring and follow-up measures.</p>	<p>CNSC staff are of the view that AANTC, KZAFN and KFN’s concerns related to water quality and the aquatic environment have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p> <p>CNSC staff sent the issues and concerns tables and followed up with AANTC, KFN and KZAFN but did not receive a response to date. Therefore, CNSC staff were unable to verify the issues and concerns and their status directly with AANTC, KFN and KZAFN. CNSC staff will continue to follow-up with AANTC, KFN and KZAFN with regards to their concerns in relation to the Project.</p>
AANTC003	<p><i>Aquatic environment</i></p> <p>AANTC raised concerns about aquatic biota. AANTC feels that the EIS is incomplete and lacks information with regards to the contamination to water/aquatic life and aquatic ecosystem health and monitoring. KZAFN representatives expressed concerns with potential impacts to biota, specifically Blanding’s Turtles.</p>	Aquatic Environment	<p>CNL have provided AANTC and KZAFN with responses to concerns raised with regards to the aquatic environment as indicated in the final EIS and IER. CNL also indicated that mitigation measures and environmental design features will be implemented to mitigate effects on the aquatic environment, and stated that the residual effects from the Project on aquatic biodiversity are not predicted to be significant.</p> <p>The final EIS demonstrated that with the mitigation measures committed to by CNL, effects from the NSDF Project will not</p>	<p>CNSC staff have confirmed that CNL has responded to the concern raised and are satisfied with the response. As per REGDOC 3.2.2: Indigenous engagement, CNSC staff will continue to monitor CNL Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to AANTC and KZAFN’s concerns and comments.</p> <p>CNSC staff concluded that the Project is not likely to cause significant adverse effects on the aquatic environment, and will continue to</p>	<p>CNSC staff are of the view that AANTC and KZAFN’s concerns related to aquatic environment have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns.</p> <p>CNSC staff sent the issues and concerns tables and followed up with AANTC and KZAFN but did not receive a response to date. Therefore, CNSC staff were unable to verify the issues and concerns and their status directly with AANTC, KFN and KZAFN. CNSC staff will continue to follow-up with AANTC,</p>

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme (see guidance for drop-down list)	Proponent response	Crown response	Status of issue/concern and recommendations (including any additional mitigation, commitments, follow-up or accommodations, as appropriate)
			<p>jeopardize the survival of the Blanding’s turtle population within the region of the Project.</p> <p>In CNL’s commitments table, CNL remains committed to ongoing engagement and technical discussions with the AANTC and KZAFN. As outlined in Section 6 of the final EIS, CNL is willing to involve all interested Indigenous communities in the NSDF EAFMP and would be pleased to discuss the issue further.</p>	<p>monitor the proponent’s Indigenous engagement activities, including with regards to monitoring and follow-up measures, to make sure they are responsive and provide adequate answers to Indigenous Nations and communities’ concerns and comments.</p>	<p>KFN and KZAFN with regards to their concerns in relation to the Project.</p>
AANTC004	<p><i>Legacy of radioactive waste and contamination at the Chalk River site.</i></p> <p>AANTC raised concerns about current contamination problems at CRLincluding radioactive contamination of Perch Lake and Perch Creek, especially regarding existing levels of Tritium and Strontium in the Perch Lake basin.</p>	<p>Historical/legacy impacts</p>	<p>In the final EIS and IER submitted in May 2021, CNL indicated that the remediation of contaminated lands at CRL is not within the scope of the NSDF Project. However, the NSDF Project is rooted in the requirements established by Atomic Energy of Canada Limited, on behalf of the Government of Canada, to substantially reduce the risks associated with the CRL legacy wastes, liabilities, and to create the conditions for the revitalization of the CRL property.</p> <p>Section 2.3 of the final EIS provides further discussion on the role of NSDF in environmental restoration of the CRL site. The NSDF is required in order for environmental remediation of the Chalk River Laboratories (CRL) site to proceed (Section 2.3 of EIS).</p> <p>CNL has offered to meet with AANTC and their consultants to understand and discuss remediation of contaminated areas.</p> <p>In CNL’s Project Commitments Report, CNL committed to involving all interested Indigenous communities including the AANTC, KFN and KZAFN in the NSDF Environmental Assessment Follow-up Monitoring Program (EAFMP). CNL will also include new technology developed during the life of the Project which removes tritium from effluent.</p>	<p>CNSC staff confirmed that CNL’s EIS addressed S. 19(1) of CEAA 2012 by conducting an assessment of “any cumulative environmental effects that are likely to result from the designated project in combination with the environmental effects of other physical activities that have been or will be carried out”. The EIS for the proposed project also provides a description of the existing baseline and environmental trends at the site, including past projects and activities within the project area.</p> <p>The CNSC will continue to offer to engage with AANTC, KFN and KZAFN regarding their concerns related to historical contamination and the state of the environment at the CRL site. CNSC staff encourage AANTC, KFN and KZAFN to engage directly with CNL and AECL to address their concerns about historic and ongoing operations in AANTC territory.</p>	<p>CNSC staff are of the view that AANTC’s concerns related to historic/legacy impacts have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns.</p> <p>CNSC staff sent the issues and concerns tables and followed up with AANTC but did not receive a response to date. Therefore, CNSC staff were unable to verify the issues and concerns and their status, directly with AANTC, KFN and KZAFN. CNSC staff will continue to follow-up with AANTC, KFN and KZAFN with regards to their concerns in relation to the Project.</p>
AANTC005	<p><i>Alternative assessment</i></p> <p>AANTC raised concerns with regards to the alternatives means assessment.</p>	<p>Alternatives Assessment</p>	<p>In the final EIS and IER submitted in May 2021, CNL indicated that it provided information on the alternative means assessment through an</p>	<p>As per the requirements of CEAA 2012 and CNSC REGDOC 3.2.2, it is the proponent’s role to engage interested parties and conduct robust engagement on topics such as the alternative means assessment, throughout the</p>	<p>CNSC staff are of the view that AANTC’s concerns related to alternative means assessment have and will continue to be addressed through the responses and</p>

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme (see guidance for drop-down list)	Proponent response	Crown response	Status of issue/concern and recommendations <i>(including any additional mitigation, commitments, follow-up or accommodations, as appropriate)</i>
			<p>NSDF project webinar in June 2020, and that AANTC was informed.</p> <p>Section 2.5 of the final EIS provides the assessment of the alternatives, and includes technical and economic criteria consistent with the CNSC Generic Guidelines for the Preparation of an EIS and CEAA 2012.</p> <p>CNL has offered to meet with AANTC and their consultants to understand and discuss alternative means for the NSDF Project.</p> <p>In CNL’s Project Commitments Report, CNL indicated that they are interested in meaningful engagement with the AANTC, KFN and KZAFN on the NSDF Project, in order to build a relationship and address their concerns, should there be interest.</p>	<p>lifespan of a project, including in preparation of the EIS. An alternative means assessment for a project is performed by the proponent and must be reported as part of the submitted EIS.</p> <p>As part of the technical review of the draft EIS, CNSC has reviewed and has accepted CNL’s alterative means assessment.</p> <p>CNSC encourages CNL to continue to have discussions with AANTC to clarify the alternative means assessment and selection of the proposed alternative for the proposed NSDF project.</p>	<p>commitments of CNL and CNSC staff, as described in the response columns.</p> <p>CNSC staff sent the issues and concerns tables and followed up with AANTC but did not receive a response to date. Therefore, CNSC staff were unable to verify the issues and concerns and their status directly with AANTC, KFN and KZAFN. CNSC staff will continue to follow-up with AANTC, KFN and KZAFN with regards to their concerns in relation to the Project.</p>
AANTC006	<p><i>Intermediate level waste</i></p> <p>AANTC raised concerns about Intermediate level waste</p>	Project Design/construction materials/safety	<p>CNL provided additional information to clarify that only low level radioactive waste will be accepted at the NSDF, and that offsite waste streams at the NSDF will be limited to 5% commercial sources and 5% other AECL sites. CNL provided additional information regarding the NSDF Waste Acceptance Criteria and CRL’s Waste Management Program.</p> <p>In CNL’s Project Commitments Report, CNL committed to:</p> <ul style="list-style-type: none">involve the AANTC in the NSDF EAFMPcontinue discussions on a contribution agreement <p>CNL will continue to follow-up with the AANTC on engagement opportunities and about any outstanding interests and concerns.</p>	<p>As per REGDOC 3.2.2, CNSC staff expect CNL to document and report on how CNL has or plans to address the concerns raised by the AANTC, KZAFN and KFN, in their EIS and/or IER for the NSDF project.</p> <p>Under a CNSC licence for the NSDF, CNL would also have to comply with the CNSC waste characterization requirements as outlined in CNSC Regulatory Document, REGDOC-2.1.1.1, volume 1. Additionally, CNL’s ongoing engagement with the AANTC will be reported through CNL’s Public Information and Disclosure Program as part of their Annual Compliance Reports. CNSC staff will continue to monitor the CNL’s Indigenous engagement activities, including with regards to monitoring and follow-up measures.</p>	<p>CNSC staff are of the view that AANTC’s concerns related to waste verification have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>CNSC staff sent the issues and concerns tables and followed up with AANTC but did not receive a response to date. Therefore, CNSC staff were unable to verify the issues and concerns and their status directly with AANTC, KFN and KZAFN. CNSC staff will continue to follow-up with AANTC, KFN and KZAFN with regards to their concerns in relation to the Project.</p>
AANTC007	<p><i>Facility’s integrity and design</i></p> <p>AANTC requested to have more information in the EIS on the engineered containment mound.</p>	Project Design/construction materials/safety	<p>In the Final EIS, CNL indicates they have shared technical information with AANTC and have offered to meet with AANTC and their consultants to understand and discuss the NSDF facility and design.</p>	<p>CNSC staff have confirmed that CNL has responded to the concerns raised and are satisfied with the response. As per REGDOC 3.2.2: Indigenous engagement, CNSC staff will continue to monitor CNL Indigenous</p>	<p>CNSC staff are of the view that AANTC’s concerns related to the project design and construction safety have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p>

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme (see guidance for drop-down list)	Proponent response	Crown response	Status of issue/concern and recommendations (including any additional mitigation, commitments, follow-up or accommodations, as appropriate)
			<p>Section 3.1.1.1 of the final EIS contains a description of the design of the baseliner of the NSDF. Additional details with respect to the overall design of the Engineered Containment Mound have been added to the EIS, including the base liner system (see Section 3.4.1.4 of the final EIS). Table 4.3.2-1 (which discusses how key public issues were addressed in the final EIS), under Design Engineering, of the final EIS discusses the Construction Quality Assurance that will be applied.</p> <p>In CNL’s Project Commitments Report, CNL committed to ongoing engagement with AANTC and the First Nations communities they represent, and to provide notifications and updates on project activities.</p>	<p>engagement activities to make sure CNL is responsive and provides adequate answers to AANTC’s concerns and comments.</p>	<p>CNSC staff sent the issues and concerns tables and followed up with AANTC but did not receive a response to date. Therefore, CNSC staff were unable to verify the issues and concerns and their status directly with AANTC, KFN and KZAFN. CNSC staff will continue to follow-up with AANTC, KFN and KZAFN with regards to their concerns in relation to the Project.</p>
AANTC008	<p><i>Traditional land use</i></p> <p>AANTC raised concerns about potential adverse impacts of the NDSF specific to Indigenous peoples’ use of surrounding lands and waters.</p> <p>AANTC raised concerns that the assessment lacks consideration of potential adverse impacts of the NSDF relative to Indigenous peoples’ interests, concerns, and conceptions.</p>	Traditional Land Use	<p>The final EIS contains section 6.0 – Indigenous Interests that consolidates and summarizes the major areas of assessment relevant to Indigenous peoples. CNL has incorporated direct feedback and traditional knowledge when it has been provided by Indigenous Nations and communities.</p> <p>Indigenous interests have been incorporated into the selection of final VCs for the NSDF Project.</p> <p>CNL remains committed to have ongoing discussions related to VCs and the link to VCs identified by AANTC.</p>	<p>CNSC staff are of the view that the mitigation and follow-up measures proposed by CNL will address project specific effects of the project, however, CNSC staff continue to encourage AANTC to work with CNL with respect their concerns regarding the CRL site. CNSC staff are satisfied with the level of information an assessment regarding traditional land use, Indigenous knowledge and the perspectives of Indigenous peoples included in the EIS.</p> <p>Taking into account CNL’s commitments, proposed mitigation and follow-up program measures, as well as relevant mitigation measures for related biophysical effects, CNSC staff concludes that the Project is not likely to cause significant adverse effects on the use of surrounding lands and waters.</p> <p>At this time, the CNSC has not received information from AANTC or CNL that identifies potential impacts of the proposed project on Indigenous people’s use of surrounding lands and waterways. CNSC staff will continue to monitor CNL’s Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to AANTC with regards to potential impacts of</p>	<p>CNSC staff are of the view that AANTC’s concerns related to traditional land and resource use have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA. Effectiveness of the mitigation measures/commitments will be verified by the CNSC through the EA Follow-up and Monitoring Plan and CNSC’s compliance activities.</p> <p>CNSC staff sent the issues and concerns tables and followed up with AANTC but did not receive a response to date. Therefore, CNSC staff were unable to verify the issues and concerns and their status directly with AANTC, KFN and KZAFN. CNSC staff will continue to follow-up with AANTC, KFN and KZAFN with regards to their concerns in relation to the Project.</p>

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme (see guidance for drop-down list)	Proponent response	Crown response	Status of issue/concern and recommendations (including any additional mitigation, commitments, follow-up or accommodations, as appropriate)
				the NSDF project on Indigenous peoples’ traditional uses of lands and waters.	
AANTC009	<p><i>Consideration of cumulative impacts</i></p> <p>AANTC raised concerns regarding cumulative impacts of decommissioning and remediating activities at the site being considered along with NSDF construction and operation activities.</p>	Cumulative Effects	<p>CNL acknowledged the AANTC’s concern about the historical cumulative effects of the CRL site in the Final EIS. A cumulative effects assessment has been included by environmental component in Section 8 of the Final EIS. CNL clarified that the results of the EIS indicate that there are no significant residual effects as a result of the NSDF project, thus there are also no cumulative effects. CNL also stated that the possible siting, construction, and operation of an SMR on the CRL site is not specific to the NSDF project as the Reasonable Foreseeable Development (RFD) assessment concludes that there are no residual cumulative effects from the addition of an SMR to the CRL site.</p> <p>CNL clarified that this concern regarding historical impacts is related to overall CRL site operations and is outside of the scope of the NSDF Project. CNL stated that CNL’s methodology and approach for developing the EIS is consistent with CEAA 2012 as well as the CNSC’s Generic Guidelines for the Preparation of an EIS. CNL confirmed that as the landowner, AECL is engaging with Indigenous Nations and communities alongside CNSC and CNL to build meaningful and productive relationships.</p> <p>In CNL’s Project Commitments Report, CNL committed to continuing to follow-up with AANTC, KZAFN and KFN on engagement opportunities and about any outstanding interests and concerns.</p>	<p>AANTC’s concerns with respect historic and cumulative impacts of the larger CRL site and related activities are outside of the scope of the decision for the NSDF Project. However, CNSC staff ensured that associated potential impacts to the AANTC’s Aboriginal Rights are documented and reflected as part in the CNSC’s EA report. CNSC staff are satisfied with how CNL addressed cumulative effects in their EIS as per the requirements of CEAA 2012.</p>	<p>CNSC staff are of the view that AANTC’s concerns related to cumulative impacts have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p> <p>CNSC staff sent the issues and concerns tables and followed up with AANTC but did not receive a response, to date. Therefore, CNSC staff were unable to verify the issues and concerns and their status directly with AANTC, KFN and KZAFN. CNSC staff will continue to follow-up with AANTC, KFN and KZAFN with regards to their concerns in relation to the Project.</p>
AANTC010	<p><i>Extreme environmental events</i></p> <p>AANTC raised concerns about extreme environmental events on the NSDF.</p>	Effects of the Environment on the Project	<p>Section 10 of the final EIS describes the adverse effects of extreme environmental events on the NSDF. The EIS describes and assesses the magnitude and severity of natural hazards such as extreme weather, flooding, tornados, forest fires, seismic events and glaciation.</p> <p>CNL has offered to meet with AANTC and their consultants to understand and discuss the</p>	<p>The CNSC has confirmed that CNL has responded to the concern raised and are satisfied with how CNL addressed extreme environmental events in their EIS as per the requirements of CEAA 2012. CNSC staff will continue to monitor CNL’s Indigenous engagement activities to make sure that CNL is responsive and provides adequate answers to</p>	<p>CNSC staff are of the view that AANTC’s concerns related to extreme environmental events have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p> <p>CNSC staff sent the issues and concerns tables and followed up with AANTC but did not receive a response, to date. Therefore, CNSC staff were unable</p>

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme (see guidance for drop-down list)	Proponent response	Crown response	Status of issue/concern and recommendations <i>(including any additional mitigation, commitments, follow-up or accommodations, as appropriate)</i>
			assessment of effects and remains committee to ongoing engagement with the AANTC with regards to extreme environmental events.	AANTC with regards to potential consequences of extreme weather events.	to verify the issues and concerns and their status directly with AANTC, KFN and KZAFN. CNSC staff will continue to follow-up with AANTC, KFN and KZAFN with regards to their concerns in relation to the Project.
AANTC011	Language AANTC requested that the EIS be available in both official languages.	Other	<p>CNL has provided the 2017 draft EIS, 2019 draft EIS, and 2020 final EIS in French for public review, including to AANTC.</p> <p>In CNL’s commitment table, CNL committed that the final EIS, federal and provincial comments, and public comments that were made in French along with their subsequent responses be made available in both official languages, as outlined in Appendix A to the CNL-CNSC Administrative Protocol for the Near Surface Disposal Facility Project at Chalk River Laboratories (step 31).</p> <p>CNL hosted webinars in English and French, which is a more accessible approach to disseminate information to individuals from all regions as well as the opportunity for their questions to be answered. CNL has also offered simultaneous interpretation to accommodate meetings with AANTC.</p>	<p>CNSC staff have confirmed that CNL has responded to the concerns raised and are satisfied with the response. As per REGDOC 3.2.2: Indigenous engagement, CNSC staff will continue to monitor CNL Indigenous engagement activities to make sure CNL is responsive and provides adequate answers to AANTC’s concerns and comments.</p> <p>In addition, the Final EIS will be posted in both English and French, and will be available for review to Indigenous Nations and communities and the public for at least 90 days prior to a commission hearing. Key CNSC documents such as the Commission Member Document and the CEAA 2012 EA report will also be available in both English and French for public review.</p>	<p>CNSC staff are of the view that AANTC’s concerns related to language have and will continue to be addressed through the responses and commitments of CNL and CNSC staff, as described in the response columns.</p> <p>CNSC staff sent the issues and concerns tables and followed up with AANTC but did not receive a response to date. Therefore, CNSC staff were unable to verify the issues and concerns and their status directly with AANTC, KFN and KZAFN. CNSC staff will continue to follow-up with AANTC, KFN and KZAFN with regards to their concerns in relation to the Project.</p>
AANTC012	Future involvement in monitoring AANTC expressed interest in better understanding the environmental program and monitoring at the site and future involvement.	Other	<p>In CNL’s IER, CNL mentioned that it has provided AANTC and their consultants with the NSDF Draft EAFMP for input along with an offer to meet and discuss the draft EAFMP.</p> <p>As outlined in Section 6 of the final EIS and in CNL Commitments List, CNL is willing to involve all interested Indigenous communities including the AANTC and the First Nations communities they represent, in the NSDF EAFMP.</p>	<p>CNSC staff recognize the importance of ongoing collaboration and engagement with affected Indigenous Nations and communities with regards to environmental and project monitoring. CNSC staff encourages AANTC to continue to work with CNL to ensure that relevant information, knowledge and requests can be reflected in follow-up and environmental monitoring programs, including the potential involvement of AANTC representatives, where appropriate. CNSC staff is encouraged by CNL’s commitment to continue engaging with AANTC on the EAFMP, and will continue to monitor CNL’s monitoring and follow-up measures.</p> <p>In addition, CNSC staff are committed to collaborating with AANTC and its member First Nations communities, in ongoing follow-</p>	<p>CNSC staff are of the view that AANTC’s concerns related to involvement in environmental monitoring have been addressed to the extent possible within the scope of the Project-specific CEAA 2012 EA and the CNSC’s mandate under the NSCA.</p> <p>CNSC staff sent the issues and concerns tables and followed up with AANTC but did not receive a response, to date. Therefore, CNSC staff were unable to verify the issues and concerns and their status directly with AANTC, KFN and KZAFN. CNSC staff will continue to follow-up with AANTC, KFN and KZAFN with regards to their concerns in relation to the Project.</p>

ID	Issue or concern (including potential impacts to Indigenous or Treaty Rights)	Theme (see guidance for drop-down list)	Proponent response	Crown response	Status of issue/concern and recommendations <i>(including any additional mitigation, commitments, follow-up or accommodations, as appropriate)</i>
				up monitoring activities including the CNSC’s Independent Environmental Monitoring Program, should there be interest.	

Appendix D-1 AOPFN Rights Impact Assessment

Algonquins of Pikwàkanagàn First Nation DRAFT Rights Impact Assessment Report for the NSDF Project

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1.0 Introduction

1.1 Purpose and scope of the Rights Impact Assessment

As mentioned in Chapter 9, the Canadian Nuclear Safety Commission (CNSC) as an Agent of the Crown recognizes the obligation to fulfill the duty to consult for decisions under CEAA, 2012 and the *Nuclear Safety and Control Act* (NSCA). In order to do this for the CEAA 2012 and NSCA decisions for the Near Surface Disposal Facility (NSDF or the Project), CNSC staff considered potential impacts to Indigenous and /or Treaty Rights by completing a community-specific Rights Impact Assessment (RIA) with the Algonquins of Pikwàkanagàn First Nation (AOPFN).¹ The process undertaken with the AOPFN is consistent with the Government of Canada's commitments with respect to recognition, protection, and upholding of the rights of Indigenous peoples fully implementing the United Nations Declaration on the Rights of Indigenous Peoples, and to reconciliation with Indigenous peoples.

AOPFN represents the rights and interests of its First Nation community members in AOPFN's traditional territory. The AOPFN's primary residential community is located approximately 50 km south of the Chalk River Laboratories (CRL) site on the shores of Golden Lake and the Bonnechere River in Renfrew County, making AOPFN the Indigenous community located closest to the Project.

As part of the Terms of Reference (ToR) for consultation signed between the CNSC and AOPFN with regards to the Project, the Parties committed to collaborating on and carrying out a thorough evidence-based, and methodologically sound RIA for the Project.

The purpose of this RIA is to assess the potential impacts of the Project on the Indigenous Rights of AOPFN and to come to a mutual understanding of the severity of any identified potential impacts on AOPFN's rights and interests, as a result of the Project, taking into account potential project-specific interactions with any existing and historical impacts on AOPFN's rights and interests. The RIA also identifies any potential mitigation and/or accommodation measures that might help to avoid, reduce, or compensate for any identified impacts, and communicates the process, outcomes, and recommendations in a collaborative way to the Commission as part of its decision-making process.

The RIA includes AOPFN Indigenous Knowledge, the perspectives of AOPFN members and leadership, and was implemented in a collaborative and transparent manner to ensure meaningful consultation. Where AOPFN and the CNSC were not able to agree on specific aspects of the RIA, differing views have been identified in text boxes and clearly articulated in each section of the RIA.

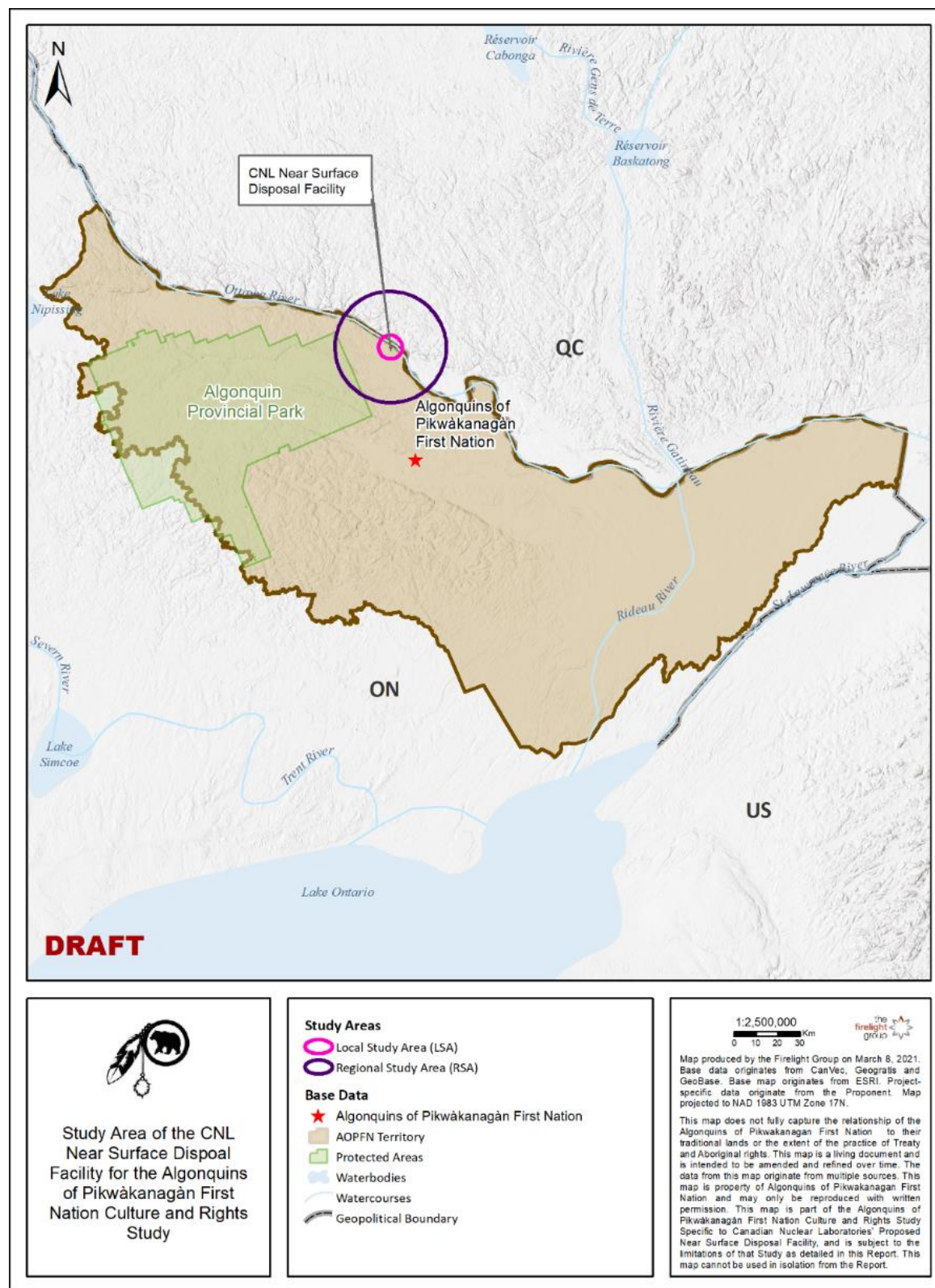
1.2 The NSDF Project and the study area(s)

AOPFN's traditional territory encompasses the area shown in figure 1, which also shows the location of the NSDF (and around it, the Chalk River Laboratories) along the west bank of the

¹ CNSC staff and the AOPFN are jointly called the Parties throughout this report.

Kichi-Sìbì (Ottawa River) in the north-central portion of AOPFN territory. AOPFN's Algonquin ancestors have occupied the length of Kichi-Sìbì (Ottawa River) for 9,000 years or more. AOPFN members have, since time immemorial, exercised their rights to hunt, trap, fish, gather, and perform other activities integral to their culture and way of life throughout their traditional territory, including in the Chalk River Laboratories (CRL) area. The CRL site resides within a critical cultural landscape tied to Kichi-Sìbì (Ottawa River), to which Algonquin, and AOPFN members specifically, hold a deep, complex, and enduring relationship, which predates the CRL site's establishment.

Figure 1: AOPFN traditional territory and the NSDF Project site



The NSDF, a proposed engineered disposal facility for low-level radioactive waste, is proposed to be located within the fenced area of the CRL site, which is approximately 3700 hectares (ha) and is currently inaccessible to the public, including AOPFN members. The footprint of the NSDF Project site, shown in more detail in figure 2 below, is approximately 37 ha.

For the purposes of this RIA, a spatial boundary (or “study area”) has been applied for the characterization of AOPFN Rights and practices in relation to the NSDF Project, following the AOPFN Algonquin Knowledge and Land Use Study (AKLUS) and the AOPFN Culture and Rights Study. The spatial boundaries include:

- The project footprint or Site Study Area (SSA), which is the NSDF Project site plus a 250 m buffer around it.
- The Local Study Area (LSA); Footprint plus a 5 km buffer radius².
- The Regional Study Area (RSA); Footprint plus a 25 km buffer radius, with a small additional “tongue” further downstream on the Kichi-Sìbì– see figure 3.

These spatial boundaries are considered standard for the assessment of effects on one of the Valued Components most closely tied to Aboriginal rights practice – traditional land and resource use. 5 kilometres approximate the distance easily travelled in a day from a point of origin (e.g., a cabin, camp, or other location) by foot, through bush, and back again, as when hunting. It is used as a reasonable spatial approximation of use surrounding a given transportation or habitation value. Direct and indirect Project effects may interact with AOPFN values in this area. The RSA is a broader area within which direct and indirect effects of the Project (such as noise, dust, odours, access management activities, traffic, effects on water, and other forms of disturbance) may be anticipated to interact with the effects of any other existing, historical or reasonably foreseeable developments, projects or activities, causing additive or synergistic effect with impacts to community values and exercise of rights.

Figure 2 shows the Project Footprint/SSA and LSA. Figure 3 shows the RSA, including the location of the RSA in relation to the overall CRL site and Canadian Forces Base Petawawa to the south.

² The AOPFN Culture and Rights Study used a 5 km LSA; the AOPFN AKLUS, a larger 7 km LSA. In order to be conservative, this RIA has adopted the smaller LSA of 5 km.

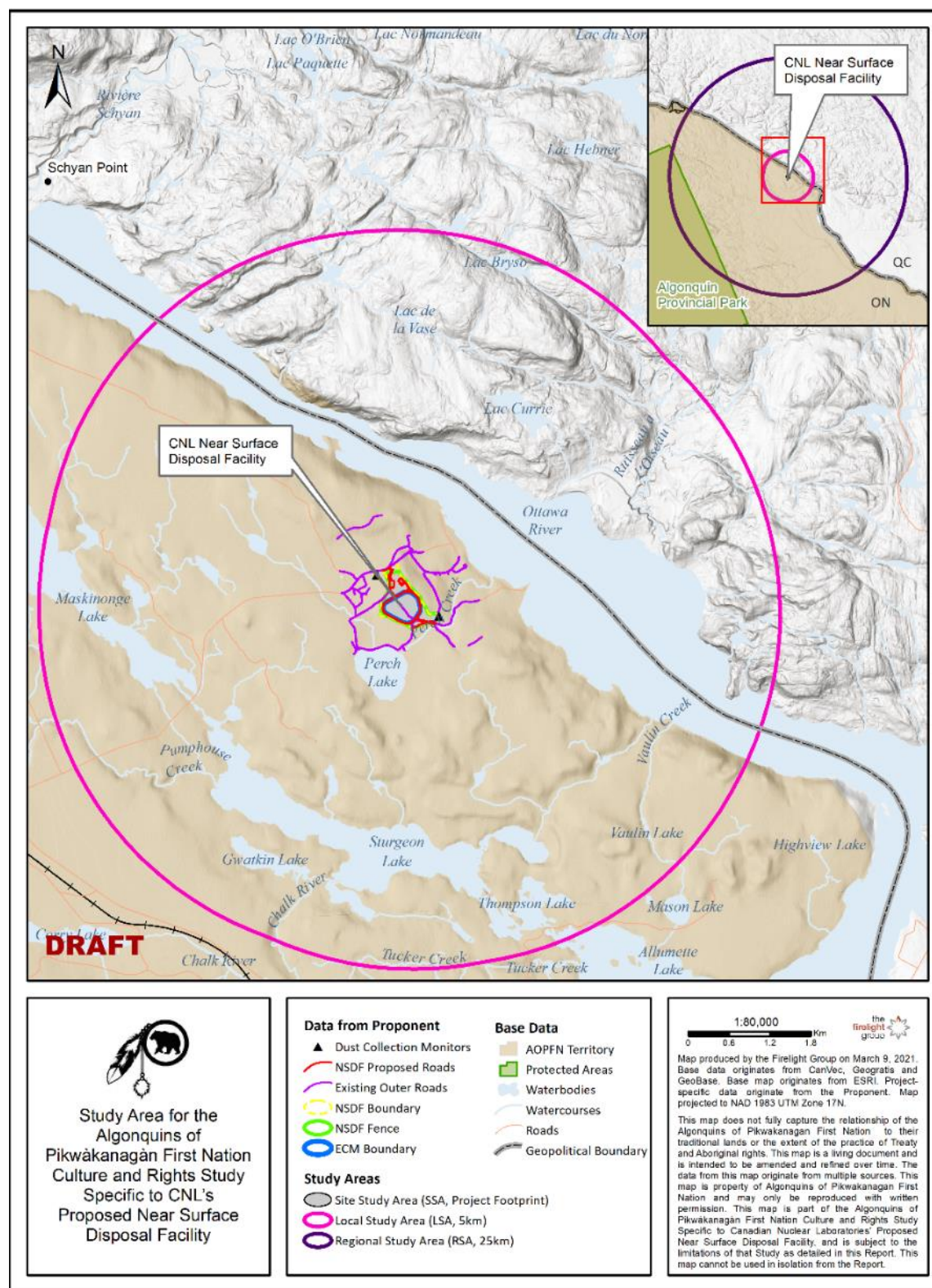
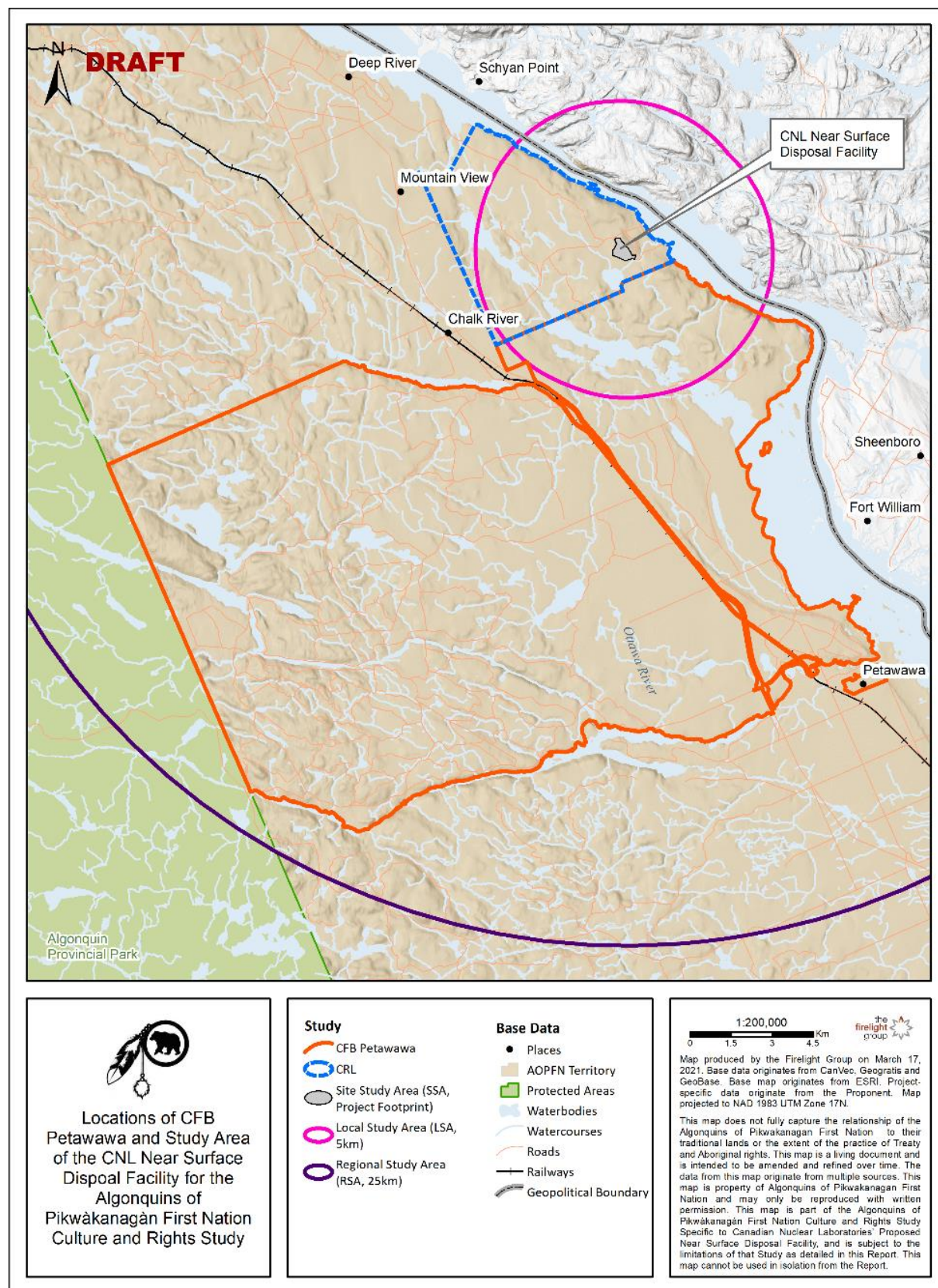
Figure 2: SSA and LSA for the Rights Impact Assessment

Figure 3: RSA for the rights impact Assessment (from Taylor et al 2020)



1.3 Principles of the rights impact assessment

The principles of this RIA, proposed by AOPFN and agreed to by the CNSC, are derived from the Impact Assessment Agency of Canada's (IAAC) guidance on this topic³ and from an understanding of best practice of RIA, filtered through an Algonquin lens, are as follows:

1. Joint Crown-Indigenous group conduct of the entire assessment, with adequate funding and time provided by the Crown for Indigenous group collaboration.
2. Conduct of a separate assessment for each affected Indigenous group.
3. A broad and generous interpretation of the nature and scope of rights and title in the scope of assessment, primarily derived from the understanding of the Indigenous group.
4. Adoption of a broad set of indicators related to the ability to meaningfully practice Aboriginal Rights.
5. Utilization of an Indigenous perspective and Indigenous knowledge is imperative.
6. Assessing impacts on rights requires more than assessing environmental effects on the current use of lands and resources for traditional purposes or on physical and cultural heritage.
7. Identification of the importance of the proposed project's location in relation to the exercise of Aboriginal Rights, while being very careful about assumptions as to whether those rights could be practiced/duplicated elsewhere.
8. Meaningful consideration and appropriate adoption of compensation and accommodation measures by the Crown for infringements on Aboriginal Rights.
9. Provision by the Crown of written justification for any instances where a residual adverse effect on Aboriginal or rights is likely to occur.
10. Inclusion of consideration of the context in which Aboriginal rights are practiced including, potential for existing and future cumulative effects, in combination with Project-specific effects, to impact on future generations' ability to meaningfully exercise rights.

³ <https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/guidance-assessment-potential-impacts-rights-indigenous-peoples.html>

Differing views

In addition to the joint principles listed above, AOPFN identified the following additional principle that was not agreed to by the CNSC as the CNSC considers this outside the scope of the project-specific RIA:

A heavy focus on establishing a realistic portrait of total cumulative effects loading on factors influencing Aboriginal and Treaty Rights, prior to the consideration of Project-specific effects.

The CNSC is of the view that while the current and historic context in which AOPFN practice their rights are important and should be considered in the RIA, the existing and future cumulative effects should not be the focus or emphasis of the project-specific RIA. Further, the CNSC considers the current and historic context as part of the baseline conditions for the assessment, which inform the overall magnitude severity criteria. The magnitude determination is then a component that informs the overall conclusion of the severity of the project's potential impacts on AOPFN's rights (see section 1.4.2 for methodology and Section 2 for a description of context, which informed the magnitude determination).

1.3.1 The seven sacred teachings

AOPFN's understanding of rights and approach to RIA is also drawn from important Algonquin cultural concepts called "The Seven Sacred Teachings". These, teachings, more information on which is included in appendix A, are guiding principles/values that AOPFN applies as a touchstone for guiding, shaping, and measuring actions and behaviour for themselves and others. Thus, the AOPFN RIA approach is anchored by these teachings.

1.4 Methodology

The methodology undertaken for the RIA uses a "right-by-right" approach, which considers potential impacts of the Project on each of the AOPFN's rights identified in Section 2 below individually, under 3 main categories of rights: harvesting rights, governance and stewardship rights, and cultural continuity rights. To evaluate the potential impacts of the Project on AOPFN's rights, the Parties primarily focused on identifying the potential pathways through which the Project could impact AOPFN's ability to exercise their rights, using western science, Algonquin knowledge, and the perspectives of AOPFN rights holders.

1.4.1 Process steps

Table 1 outlines the overarching process steps that AOPFN and CNSC staff (with input from CNL, where appropriate) followed and agreed upon in order to complete the RIA for the Project. For AOPFN, multiple verification steps, involving the AOPFN Advisory Committee and Chief and Council, were integrated to make sure that the RIA results match the understandings and observations of AOPFN members and leadership.

Table 1: Process steps for completing the RIA

Step	Section	Primary inputs	Verification by
Step 1: Identification of potentially impacted rights and interests	2	AOPFN AKLUS, Culture and Rights Study	AOPFN Advisory Committee
Step 2: Identification of current baseline conditions including cumulative effects, current territorial capacity and historical context	3	AOPFN AKLUS, Culture and Rights Study, Diet and Harvest Study	AOPFN Advisory Committee
Step 3: Identification of potential project interactions/pathways with identified rights and interests (i.e., potential changes to current baseline conditions related to the project)	4	AOPFN AKLUS, AOPFN Culture and Rights Study, EIS, CNSC-AOPFN consultation	AOPFN Advisory Committee (in combination with Step 4)
Step 4: Identification of severity of potential project interactions with identified rights and interests (including collaborative development of criteria and steps to assess and determine severity)	4	CNSC-AOPFN consultation, AOPFN studies (see section 1.4.1)	AOPFN Advisory Committee (in combination with Step 3)
Step 5: Identification of potential mitigation and/or accommodation measures to address identified potential project interactions with identified rights and interests	5	CNSC-AOPFN consultation, CNL, CNSC and AECL commitments	AOPFN Advisory Committee
Step 6: Identification of any residual impacts after consideration of proposed mitigation and/or accommodation measures	6	CNSC-AOPFN consultation	CNSC and AOPFN Working Group
Step 7: Consideration of any additional mitigation and/or accommodation measures, should residual impacts be identified, and conclusions on seriousness of any remaining impacts or concerns	6	CNSC-AOPFN consultation, additional engagement with CNL and AECL (as necessary)	AOPFN Advisory Committee; then AOPFN Chief and Council
Step 8: Documenting and submitting process steps and outcomes to decision-makers (the Commission) - Collaborative drafting of stand-alone rights impact analysis to be appended to CNSC staff's EA report - AOPFN written and oral interventions at Commission hearings	n/a	CNSC-AOPFN consultation	Chief and Council for AOPFN

In the ToR, the Parties agreed to work in good faith to try to overcome any differences of opinion on appropriate methodologies for conducting the RIA.

1.4.2 Sources of information used in the RIA

The primary AOPFN-led data sources informing the identification of these AOPFN rights and conduct of this RIA include:

- An AOPFN traditional land use study for the NSDF Project referred to as the AKLUS.
- Results and data from the AOPFN NSDF Culture and Rights Study;
- Preliminary results from the ongoing AOPFN Diet and Harvest Study, which included data collection and analysis related to NSDF⁴.
- Engagement between AOPFN's Consultation Department and the AOPFN Advisory Committee (AAC).

⁴ Each of the 3 AOPFN studies has or will be filed under confidential cover so they are available for review by the Commissioners.

1.4.3 Rights Impact severity criteria

The Parties assessed the severity and likelihood of potential Project-specific impacts on AOPFN's rights using agreed-upon criteria outlined in table 2.

Table 2: Criteria for assessing the severity and likelihood of impacts to Indigenous and/or Treaty Rights

Criterion	Definition	Rating		
Magnitude	Degree and importance of the change the impact will likely cause relative to an established baseline. Takes into account context and territorial capacity to withstand additional stressors.	Negligible to low Little change in quality or quantity of resources, locations, conditions and other factors required for the exercise of rights, relative to an established baseline. Impact is considered by the Indigenous Nation (rights holders) to be of relatively low importance and of a minor degree.	Moderate Changes in the quality, quantity, and accessibility of resources, locations, conditions, and other factors that affect the ability or willingness to exercise the right in the preferred manner and locations are considered by the Indigenous Nation (rights holders) to be of moderate importance and degree relative to an established baseline.	High Changes in the quality, quantity, and accessibility of resources, locations, conditions, and other factors such that the right can or will no longer be exercised in the preferred manner and locations and the impacts are considered by the Indigenous Nation (rights holders) to be of high/critical importance and degree relative to an established baseline.
Geographic extent	Area over which impact is expected to occur. This may differ from the physical footprint of the change.	Site-specific Project footprint, avoids preferred areas, little impact on interconnectedness.	Local Extends beyond project footprint, may affect preferred/valued areas, disrupts interconnectedness.	Regional Significant portion of the RSA, especially preferred/valued areas, disrupts interconnectedness.
Reversibility	Ability to return to established baseline. Considers both the reversibility of the impact pathway and the reversibility of the impact to the exercise of rights.	Reversible Easily reversible	Partially reversible Reversible but requires significant effort and cost or will take a long time via natural processes.	Irreversible Permanent or persistent.

Criterion	Definition	Rating		
Duration	How long an impact may last.	Short-term Short-term, only a year or 2.	Medium-term Lasts for more than a year or 2 but less than one generation.	Long-term Persists beyond one generation.
Likelihood	An estimate of the probability that a potential impact on the exercise of rights will occur as a result of the Project. Considers the degree of evidence available and level of certainty to characterize the likelihood of occurrence.	Low A potential impact on the exercise of rights has a low probability and is unlikely, but could occur.	Moderate A potential impact on the exercise of rights is probable and likely, but may not occur.	High An impact is highly likely to occur. Strong evidence is available and there is a high level of certainty in characterizing the likelihood of a potential impact to occur.

The severity criteria ratings informed determinations on the severity of identified potential Project-related impacts on AOPFN's rights while considering current and historic context. A decision matrix tool (table 3) was used to support both Parties (AOPFN and CNSC staff) in building common understanding, guide discussions and to inform a logical and information-based narrative regarding the overall determinations on the severity of potential impacts (based on the severity criteria ratings). It is understood by the Parties that table 3's "decision tree" is a tool to support discussion between the Parties toward consensus decisions on rights impact severity, rather than a deterministic model.

1.4.4 AOPFN views on RIA methodology and scope

AOPFN is of the view that there are some data limitations associated with the NSDF RIA, as well as some fundamental issues with how CNSC has chosen to scope the RIA. An important limitation from AOPFN's perspective is that the degree to which AOPFN members' practiced their rights in the pre-CRL era (prior to 1944) has not been subject to detailed research to date. An extension of this limitation is that there has been very little dedicated research, until the 2020-21 AOPFN NSDF AKLUS, Culture and Rights and Diet and Harvest studies, into how AOPFN rights have been impacted in the period between 1944 and the present day. This means that there is a limited set of data about both the practice of AOPFN rights before the CRL facility was initially developed, and about the nature and magnitude of impacts on those rights since the CRL facility was developed. Such data gaps are problematic for the conduct of a RIA, given that the expectation set out in the IAAC's guidance on RIA is that a strong understanding of cumulative effects context in the pre-project circumstance is essential. A full and proper calculation of both factors is really required, between AOPFN and the Government of Canada, before a proper understanding of what was in place and what has been lost - the magnitude and severity of harm on AOPFN rights at the CRL site - can be conducted. As a result, the findings of the RIA must be considered preliminary and partial, to be used only for the purposes of the CEAA 2012 environmental assessment for the Project, and should be augmented by future work.

It is also important to note that, in part due to the long time period (1940s to present) since industrialization of the CRL site and thus loss of access to the site for AOPFN members (and subsequent adverse effects on AOPFN knowledge transmission regarding the area), it is difficult to present a complete narrative of the specific importance to AOPFN of the NSDF site, and CRL more broadly. Despite this, the description of AOPFN Rights herein ties site-specific quantitative and qualitative data (collected during the aforementioned AOPFN studies) to the CRL site directly where possible.

It is also beyond the scope of this RIA to assess cumulative effects on rights at the AOPFN territorial level; thus, the focus in the assessment goes only up to the spatial scale of the Project-specific RSA.

Finally in relation to data limitations, there is not enough data available within the time and budget constraints of the RIA to establish a Planned Development Case (a future with the Project, existing activities and reasonably foreseeable future developments). Therefore, assessment against a Planned Development Case, which would in this case include the \$2 billion in capital developments being invested by Canada in the CRL site over the next 10 years, Small Modular Reactors being proposed for the CRL site, and a variety of other future developments within the Study Area, has not been formally conducted herein. This makes the RIA findings inherently conservative as they are focused primarily on Project-specific impacts and do not include all past, present and reasonably foreseeable future cumulative effects on AOPFN rights.

In terms of fundamental issues with how CNSC has chosen to scope the RIA, AOPFN is particularly concerned with the approach taken by CNSC that: a. a detailed cumulative effects characterization cannot occur for the pre-Project circumstance; and b. Project-specific effects should be considered against change from the current, already heavily damaged, baseline for rights practices in the LSA and RSA, rather than against a baseline time period where the rights were reasonably practicable. In both instances, the AOPFN holds that this fundamentally underestimates total cumulative effects loading on the rights in question in the Project Case. It is AOPFN's perspective that an RIA without detailed consideration of total cumulative effects loading on rights is not good practice. More detail on cumulative effects causes and outcomes can be found in the 3 AOPFN studies.

AOPFN also notes that CNSC has imposed length restrictions on AOPFN in the RIA, which impacts on the ability for this document to properly capture the perceptions, observations and experiences of the rights holders themselves. AOPFN refers readers to the three AOPFN studies for further context.

1.4.5 CNSC views on overall length of the RIA report

CNSC provided guidance to AOPFN with regards to the overall length of the RIA report, including a general guide on the length of each section of the report that AOPFN was to take the lead on drafting for inclusion in the report. This guidance was provided to ensure that the completed RIA report would remain commensurate with the overall length and scope of CNSC staff's EA report. CNSC staff worked with AOPFN to ensure that their views and concerns could be summarized and captured in the RIA report, which is in addition to AOPFN's own intervention to the Commission.

2.0 AOPFN rights subject to the assessment

2.1 Introduction

This section summarizes the spectrum of AOPFN rights subject to the RIA, as described by AOPFN. AOPFN's rights include harvesting rights, rights to steward and govern aspects of AOPFN traditional territory, and Algonquin cultural continuity rights. Each of these rights apply to all of AOPFN's members and to the breadth of AOPFN territory, but the focus herein is on how they are particularly expressed and constrained in relation to the CRL site (which includes the proposed NSDF) and in its vicinity – the RSA. The question of whether there is a viable Project-specific impact pathway or pathways from NSDF on each of the identified AOPFN rights is discussed in Section 4 of this RIA. The material below is not an exhaustive list of AOPFN Aboriginal rights and cannot be read as such. In addition, AOPFN outstanding title claim is not subject to this RIA; this does not imply that the Project would not have impacts on AOPFN title should it proceed.

The Aboriginal rights of AOPFN members are protected by section 35 of *The Constitution Act, 1982*. They cannot be extinguished, even when they are infringed upon. These rights should be practicable anywhere within AOPFN traditional territory. They do not rely on any Treaty with

Canada, and the entirety of AOPFN territory, including the area where the NSDF is proposed, is considered by AOPFN to be unceded Algonquin territory.

AOPFN rights include rights to harvest, travel through, enjoy, steward and make decisions over the use of lands and waters in AOPFN territory, and these rights extend from direct rights to “ancillary” rights, including activities and resources necessary for the meaningful practice of those rights. These rights also include “way of life” or cultural rights; rights associated with the language, practices, customs, beliefs and spiritual practices, connection to land, and worldview that underpin the way of life of AOPFN members.

AOPFN members’ well-being and quality of life is inexorably linked to their ability to practice their Aboriginal rights in the manner they are accustomed to, without interference, in preferred areas, and for preferred activities.

These rights are held by each member of the AOPFN, whether they currently exercise them or not, and regardless of where they currently reside. AOPFN’s Chief and Council and government departments are responsible to support the promotion and protection of those AOPFN rights. Canada and all of its representatives (including CNSC and AECL) are also responsible for protecting these rights, as part of the Honour of the Crown, and where those rights cannot be protected, to accommodate for their infringement in an appropriate manner.

2.2 Characterizing the breadth of AOPFN rights for the purpose of this assessment

The AOPFN NSDF Culture and Rights Study provided information related to AOPFN’s rights that are understood as core aspects of the AOPFN way of life:

1. harvesting and traditional use
2. governance and stewardship
3. cultural continuity

There is obvious overlap between many of the rights brought forward under the 3 discrete categories. AOPFN members do not think of these rights as “categorizable”; that is done here only to assist in the RIA process. In addition, there is no “hierarchy” of rights; the 3 categories are not presented in order of priority.

2.2.1 Harvesting and traditional use rights

AOPFN Rights related to harvesting and traditional use include:

- hunting
- trapping
- fishing
- gathering food plants and medicines
- gathering plants and other natural materials for crafting and other cultural activities (e.g., birch bark for canoes)
- habitation of camps and camping sites

Harvesting and consumption of country foods is critical to AOPFN culture and cultural continuity, health and wellbeing, and food security. A diverse array of wild fish, game, birds, plants (berries, nuts, trees, shrubs, including medicinal species), and mushrooms are harvested annually. Wild fish and game are especially important. For example, results of the AOPFN Diet and Harvest Study showed that the majority of AOPFN members reported consuming wild game and wild fish, respectively, within the last year, especially pickerel/walleye, lake whitefish, northern pike, bass, moose and deer.

2.2.2 Governance and stewardship rights

AOPFN Rights related to governance and stewardship, as defined by AOPFN members, include:

- right to self-determination
- right to participate in decision-making matters which would affect their rights
- right to use traditional Algonquin government structure in decision-making
- right to exercise traditional land tenure systems (e.g., who can access resources in which locations)
- right to exercise traditional stewardship systems (e.g., using protocols to protect species), and to protect and conserve lands and resources for future generations
- right to access information about the health of animals, fish, plants, medicines, and water, to be able to make informed decisions about harvesting and consumption of resources

These AOPFN governance and stewardship rights were all in place prior to contact with European culture and have never been surrendered by AOPFN. For example, AOPFN ancestors controlled the trade route along and across the Kichi-Sibi (Ottawa River). Even with these rights severely eroded by government actions and policies since contact, AOPFN governance and stewardship rights and responsibilities have not been extinguished. As stated by an Algonquin Advisory Committee member, “[w]e have an obligation to make sure that all our territory is well maintained and safe for everybody and all plants and all life forms.”

2.2.3 Cultural continuity rights

AOPFN Rights related to cultural continuity include:

- right to practice AOPFN culture, including the right to revive AOPFN cultural practices and sustain them into the future
- right to transfer knowledge between generations about the practice of AOPFN traditional use, harvesting and culture
- right to freely travel across the land and waters of AOPFN territory
- right to have solace from and a spiritual connection to natural settings (including specific preferred locations)

There are strong connections between the right to travel freely across lands and waters and cultural connections to specific places and quiet enjoyment of the land. For example, as one member of the AAC stated “One thing that... I think is missing is the ability to just have to walk

in nature and have solace. To be able to get off the bank [of the river] anywhere you want and just to be able to go with nature, find back to your roots.”

AOPFN culture can be thought of as a way of life, a system of knowledge, values, beliefs and behaviour, passed down between generations of AOPFN members. It encompasses the systems within which people live, play, work, and interact with one another and their surroundings on a day-to-day basis. Culture is reflected and embedded in AOPFN practices and the relationships between people and their natural environment. Culture includes physical elements that can be seen and touched (*tangible* cultural resources) and other elements that, while equally important, are non-physical, subjective, and knowledge- or value-based (*intangible* cultural resources). Examples of intangible elements of culture include:

- communally-held knowledge, values, and ways of knowing
- spiritual practices, ceremonies and beliefs
- traditions and traditional pursuits
- visual and physical aspects of landscapes with which people identify
- a common understanding of humankind’s connection to the natural environment

For many AOPFN members, their culture is the foundation of their personal identity, and the values, beliefs, knowledge, skills, symbols and activities that are built into their culture provides the “glue” for their well-being and connection to other members of their community and culture group. Land is the critical element of culture, it has been stated, “[t]he land connects us to the past and to the future”.

2.3 Establishing AOPFN practice of rights in the RSA

The Kichi-Sìbì corridor represents a critical cultural landscape for AOPFN members who occupied and used the corridor leading up to and continuing beyond the establishment of the CRL site.

AOPFN knowledge and use data, informed by the AKLUS and the AOPFN NSDF Culture and Rights Study, show that current AOPFN members continue to use and possess knowledge of the CRL site, and that the area remains important to the AOPFN identity as a people deeply connected to Kichi-Sìbì, despite a large number of physical and perceptual constraints on access to and use of large portions of the RSA. This includes the NSDF Project footprint and CRL site, which AOPFN members view as being inaccessible, but still part of their territory, even with diminished ability to practice their rights. While AOPFN members have not been able to access inside the fenceline at the CRL site since its establishment in 1944, the lands and resources in the vicinity of the site remain important for a suite of rights-based practices, AOPFN knowledge transmission, and the presence of important cultural and spiritual sites such as Pointe-au-Baptême and Oiseau Rock.

Based on information provided in the AOPFN AKLUS and the AOPFN NSDF Culture and Rights Study, AOPFN knowledge and use values in the LSA include:

- harvesting areas
- historic and culturally important sites

- important mónz (moose) and Wawáshkeshi (white-tailed deer);
- fish spawning habitat
- water routes on the Kichi-Sibì were identified as used for navigation, travel, fishing, and harvesting, with 1 participant reporting that their family no longer uses this route due to contamination and lack of access

Values reported in the overall RSA (within 25 km of the NSDF site) include:

- fishing areas for ashigan (bass), lake trout, and ogá (pickerel/walleye)
- fish spawning habitat areas for (pickerel/walleye) and lake sturgeon
- species at risk habitat areas (bald eagle)
- extensive habitat for wáboz (rabbit), makwa (bear), wawáshkeshi (white-tailed deer), mónz (moose), and mahìngan (wolf)
- a large number of wildlife harvesting locations (area or kill site) for makwa (bear), mónz (moose), pine (partridge), and wawáshkeshi (white-tailed deer)
- plant and natural materials gathering areas for many species, including wetland and riparian plants
- a number of Algonquin cultural sites such as historically significant sites, historic family or village sites, and spiritual, ceremonial, or sacred sites

AOPFN's views

AOPFN notes that the site-specific data described above and in other portions of the document below does not represent a complete or even near-complete picture of AOPFN rights in the CRL site, or of the area's overall value to AOPFN culture and identity. The AKLUS and Culture and Rights studies were limited in time and scope, and only involved a small fraction of the AOPFN community. In addition, AOPFN rights in the RSA have been highly constrained since - and in large part, because of - the establishment of CRL in 1944. Therefore, the depiction of knowledge and use above reflects a substantially depleted practice of AOPFN rights in an area of significant cultural importance to AOPFN.

3.0 Historic and current context for AOPFN rights in the RSA

3.1 Introduction

This section describes AOPFN's understanding of the baseline and change-over-time conditions (including cumulative effects and current and historical context) for AOPFN rights in the RSA where the NSDF project is proposed. As per federal guidance on the assessment of impacts on rights of Indigenous peoples, it is critical to establish a baseline time period when rights were reasonably practicable from the perspective of the Indigenous group itself, and then examine changes over time to date. In this way, we can establish what has been lost already in cases

where adverse impacts on rights have occurred. This helps us understand the sensitivity/vulnerability of those rights to further adverse impacts due to the proposed Project while considering the baseline and change-over-time context.

Section 3.2 establishes AOPFN's perspectives on some aspects of pre-contact and post-contact conditions for AOPFN rights at the wider territorial level. Section 3.3 characterizes AOPFN's views on baseline and change-over-time conditions for AOPFN rights in the RSA, as well as how these rights have been impacted over time since the establishment of CRL in 1944. This section also summarizes AOPFN members' perspectives on the RSA's meaning, value, and use, dating back where possible to pre-industrialization (i.e., pre-CRL).

An in depth assessment of cumulative effects on AOPFN rights, is beyond the scope of this RIA. More information regarding AOPFN's views on cumulative effects is provided in the 3 AOPFN studies for the NSDF project.

3.2 Baseline and change-over-time conditions for AOPFN rights at the territorial Level: An overview

AOPFN's preliminary understanding of baseline and change-over-time conditions for AOPFN rights at the territorial level is presented in this section. It was developed through review of AOPFN-led studies related to the NSDF project (AKLUS and the AOPFN NSDF Culture and Rights Study), and inputs from the AAC.

The Algonquins were traditionally a nomadic people whose traditional territory includes 9 million acres around the Ottawa and Mattawa Rivers. AOPFN ancestors had full access to and control over their unceded territory – including the RSA – prior to the establishment of the European fur trade in the 1630s. At the time of contact, ancestors of current AOPFN members enjoyed the full and undiminished practice of their suite of Indigenous rights in the RSA. This included access, control, and use of the Kichi-Sibì in the vicinity of the CRL site, the CRL site itself, and surrounding lands and resources.

The Kichi-Sibì valley was of particular importance to AOPFN members. Members travelled freely over land and waters of the Kichi-Sibì watershed; river-based traffic was quicker and could accommodate more supplies than overland traffic. Wildlife, fish, medicines, building materials and vegetation resources used by AOPFN for their mixed subsistence and trade economy were particularly ample at and near the Kichi-Sibì. AOPFN members enjoyed a healthy subsistence and trade economy and AOPFN members exercised governance and stewardship roles throughout their traditional territory.

After contact and over time, AOPFN rights began to be infringed upon from a variety of sources. Colonization brought European settlers, land privatization, and land clearing, increasing the constriction of the land and water base available for AOPFN rights practices. The residential reserve system and the *Indian Act* served to continue to perpetuate and accelerate these infringements. Habitat diminishment and competition for game and fish resources with colonial culture reduced the country food security of AOPFN members, while the growth of the wage economy altered their way of life. Government policies impacted on their stewardship, governance, and even spiritual/cultural connection with the AOPFN land base.

Post-contact changes were extensive, widespread and damaging to AOPFN rights practices. There was a rapid influx of colonial farmers taking advantage of government policies and the

rich soil of the Kichi-Sìbì valley. Increased numbers of settlers, the heavily forested nature of the Ottawa River valley, and ease of transport of materials down the river also led to increased industrial activity in the vicinity of the Ottawa including forestry, sawmills, pulp and paper facilities, hydroelectric dams, agriculture, tourism, mining, transportation, and urbanization. A large amount of the valley was logged before the beginning of the 20th century. Among the impacts of these industrial activities were:

- air and (especially) water pollution from sawmills and pulp and paper facilities
- fertilizer and pesticide runoff and pollution
- land cover change due to quarrying and mining
- linear transportation corridors in the form of roads and railroads
- up to 30 reservoirs and 40 dam/hydroelectric facilities along the Ottawa River, altering water flows and ecological and river transportation conditions

All of these industrial impacts had negative impacts on the ability of AOPFN members to practice their rights within their unceded territory. Land dispossession and development throughout the colonial settlement period in AOPFN territory gradually diminished AOPFN ability to access and control their unceded territory and practice their rights. Confinement to the Pikwàkanagàn reserve in the 19th century reduced but did not remove most AOPFN members' ability to access and use the area which became the CRL site, as well as other areas in AOPFN territory. Meanwhile, AOPFN territory has and continues to be developed for a range of land uses including forestry, hydro-electric, nuclear, agriculture, and human settlement. These industries, and forestry in particular, have had a deleterious effect on AOPFN Rights, especially harvesting and traditional use rights. AOPFN members note that large-scale land cover change in AOPFN territory associated with these developments has reduced the quantity and quality of wildlife habitat and contributed to observed reductions in the availability and quality of game in preferred harvesting areas.

Today, many AOPFN members see the Kichi-Sìbì as contaminated with reduced water quality and fish quality reported. The CRL site plays a major role in this, as do agriculture, mills, dams and other industrial developments.

Access to lands for the practice of rights such as hunting and fishing is an ongoing challenge due to land privatization and fencing off of areas throughout AOPFN unceded territory, including at the CRL site and the Canadian Forces Base Petawawa to the south. As 1 AAC member (January 25, 2021) put it when asked what factors have impacted on AOPFN ability to practice their rights, “[t]he only thing that comes to mind is goddamn fences...Fences everywhere”.

3.3 Baseline and change-over-time conditions for AOPFN rights in the RSA

It was into the context of an already infringed upon rights base that CRL was built in the 1940s. The portion of the LSA and RSA, as defined in Section 1, that are covered by the CRL site were farmlands prior to the 1940s. At least 2 and possibly more AOPFN families were associated with these lands, and were displaced from either residing or visiting the site after 1944, when the land was taken up by the federal government to build Canada's first dedicated nuclear research facility.

The site was fenced off and completely alienated from AOPFN use and occupancy. The CRL site lands were previously a critical part of AOPFN seasonal rounds, occupancy and harvesting activities, in large part due to its location on the west banks of the Kichi-Sìbì. Coupled with the development of Canadian Forces Base (CFB) Petawawa to the south, a large swath of the western shore of the Kichi-Sìbì was effectively cut off from AOPFN use and occupancy, and has remained so to the present time. This was high value, primarily forested, lands, with strong habitat values and high utility to AOPFN harvesters.

Based on information provided in the AOPFN AKLUS and the AOPFN NSDF Culture and Rights Study, AOPFN identified several factors related to the CRL site that have influenced change-over-time conditions for AOPFN rights in the RSA. These factors and conditions are described by AOPFN below.

3.3.1 Current conditions of AOPFN harvesting rights

Access constraints

AOPFN members have and continue to experience access constraints in the RSA, illustrated by:

- Lack of access to the CRL site since its establishment in 1944, and therefore no ability to practice any harvesting or traditional use rights in those areas.
- Displacement of at least 2 AOPFN families who had been living on the lands that became the CRL site, when the CRL site was established in 1944.
- Lack of access - and in some cases unwillingness to access - the Kichi-Sìbì waterfront portion of the NSDF/CRL site contributing to overall movement “inland” (away from the river).

The lack of access to the CRL site has and continues to be maintained by fencing, gates, and enforcement of access restrictions by CNL. Lack of access has contributed to long-term alienation of AOPFN members from the CRL site; they have been unable to harvest, spend time on the land, and pass knowledge about the site between generations.

Avoidance due to safety/contamination concerns and habitat changes

Perceived contamination associated with CRL site activities has had a substantial impact on the willingness of AOPFN harvesters to use accessible areas for the practice of AOPFN rights. Qualitative and site-specific information from AOPFN’s Culture and Rights Study and ongoing Diet and Harvest Study shows that perceived contamination has contributed to a lack of confidence in the health of animals, plants, and water. For example, AOPFN members have concerns about contamination of mammals (such as moose) and birds within the NSDF/CRL site boundaries, and the potential for these contaminated animals to be harvested outside of the site boundaries. 1 participant in the Culture and Rights Study expressed the enhanced need to check the health of harvested game and birds in the RSA, feeling concerned that the meat could be contaminated if the animal or bird migrated through nuclear project sites before being harvested. Another participant in the Culture and Rights Study noticed a decline in game and noticed signs of contamination on the livers of deer and moose harvested in the RSA, which they now no longer consume.

AOPFN also have concerns regarding perceived contamination of water bodies on the NSDF/CRL site and of the Kichi-Sìbì, which in turn contributes to perceived contamination of

fish and drinking water. Many AOPFN members avoid harvesting near the CRL site, including the Kichi-Sìbì, due to concerns about the quality and safety of food in the area. These areas of avoidance represent the loss of a critical cultural landscape, fishing area, and travel route used to access the territory and contribute to an overall decreased confidence in the health of resources in AOPFN territory. AOPFN members are concerned that CRL site activities are already impacting Kichi-Sìbì and are choosing to avoid the river and fishing, stating that “[t]here's absolutely no way we fish in the Ottawa River. The safety of and the health in the state of the fish is mainly the reason why.” The long-term lack of confidence in the health of resources related to the NSDF/CRL site has caused AOPFN members to avoid harvesting near the site and contributed to an overall decreased confidence in the health of resources in AOPFN territory.

In summary, the following are key existing conditions that provide context to AOPFN’s practice of Harvesting and Traditional Use Rights:

- Lack of access to the CRL site since 1944, including lack of access to good moose and deer habitat on site.
- Diminished quantity and quality (especially due to observed signs of poor health in harvested species) of game species in preferred hunting areas.
- Diminished ability to access preferred harvesting and traditional use areas.
- Lack of confidence in drinking water and water quality in water bodies.
- Lack of confidence in health of animals, fish, plants, medicines, and water in the RSA due to lack of access to data about the health of these resources.

3.3.2 Current Conditions of AOPFN’s governance and stewardship rights

Based on information provided by the AKLUS, the AOPFN Culture and Rights Study, and the AAC, in the time before and since the construction of CRL, AOPFN members were not adequately consulted about projects on site AOPFN considers this to be an ongoing violation of their unceded governance and stewardship rights.

Inadequate consultation and involvement in decisions regarding CRL site activities has been a key factor in (and evidenced by) the direct displacement of 2 AOPFN families from the CRL site

AOPFN also identifies a lack of access to information about the health of water, plants, and animals in the CRL site as an impact to their rights, as they need that information to be able to make informed decisions about the health of what they are harvesting and consuming.

The long-term lack of ability to exercise AOPFN governance rights in the RSA has contributed to overall degradation of AOPFN members’ rights to self-determination and decision-making in their traditional, unceded territory:

“I think it has, has a really big impact on us as, as AOPFN people to self-determine what could be done with that land. We don’t have a, a resource to, to stop this. It just bothers me that we don’t have a more meaningful voice to say we don’t want this project or yes, we do support this project. There’s no mechanism there for us... I think our hands are tied.”

AOPFN’s Culture and Rights Study provides information that supporting AOPFN’s concern that a lack of adequate consultation, AOPFN involvement in decision-making, and overall lack of transparency and information-sharing about the CRL site and activities has led to many

members' perception that the area is contaminated and not safe for the practice of AOPFN Rights, and is a contributing factor in avoidance of and loss of trust in the area around CRL.

In summary, the following are key existing conditions that provide context to AOPFN's practice of their Governance and Stewardship Rights:

- No permissions were sought from AOPFN to convert the area into a nuclear facility, nor has there been recognition of nor accommodation for loss of use for over 75 years.
- AOPFN families were displaced from their traditional areas as a result of the CRL site.
- AOPFN members have had no uncontrolled access to the CRL site.
- AOPFN members have not been provided opportunities to input into how the CRL site is being managed.
- AOPFN has not been consulted until very recently on anything to do with the management of the CRL site.
- AOPFN is currently being consulted about the proposed NSDF and NPD Closure Projects, but they do not have confidence that their input will be adequately considered and accommodated by the Proponent.

3.3.3 Current conditions of AOPFN's cultural continuity rights

AOPFN expressed concern about the change over time regarding cultural continuity rights due to the displacement from and subsequent lack of access to the CRL site from 1944 through to the present day. This interruption in the ability to use the CRL site removed the ability for AOPFN members to engage spiritually with and transfer knowledge about those areas, as they could not access them for ceremonial purposes teaching Algonquin knowledge to youth about Aboriginal rights practices or simply quietly enjoy the land. As an AAC member noted, "[w]e can't go to where our ancestors and our people lived on those lands [where the CRL site is]. We can't acknowledge where they lived... we've lost that right to go and do a ceremony at their homes or on their lands. So we've lost that right."

The lack of physical access to the LSA has impacted AOPFN members' ability to connect spiritually to the land, especially within the CRL boundaries. 1 AAC member described the importance of such spiritual connection to land and categorized it as a type of solace, noting that the lack of access to the CRL site prevents any AOPFN members from finding this spiritual connection in the LSA. AAC members were also concerned with their inability to access homestead sites in the CRL site where Algonquin families had been living prior to the establishment of CRL. These locations are important to AOPFN participants because they provide spiritual connection to ancestors through the land, and the lack of access is cited as an impediment to the transfer of knowledge between generations.

As mentioned in Section 2, the importance of the RSA for a suite of AOPFN rights, as well as AOPFN's intertwined identity and cultural relationships with the cultural landscape of Kichi-Sibi, increases the severity of impacts of AOPFN Rights and cultural continuity. There has been a prolonged loss of knowledge transfer capability at the CRL site over multiple generations, making it harder to maintain this knowledge long term, given that Algonquin knowledge held by Elders can only be properly shared on the land between generations, and many Elders who had knowledge of the RSA have passed. Alienation of AOPFN from culturally and spiritually

important locations situated in the LSA like Pointe au Baptême and Oiseau Rock was also identified by AOPFN members as resulting from the establishment of CRL.

In summary, the following are key existing conditions that provide context to AOPFN's practice of Cultural Continuity Rights:

- Diminished ability to teach and transfer knowledge about harvesting and traditional use rights.
- Diminished ability to teach and transfer knowledge about governance rights and responsibilities.
- No ability to teach and transfer Algonquin knowledge about the RSA due to long-term lack of access to the CRL site within the RSA.
- No ability to revive AOPFN cultural practices in the RSA due to long-term lack of access to the CRL site within the RSA.
- Lack of confidence in the ability to protect and conserve lands and resources in the RSA due to lack of trust in the consultation process.
- Concerns about reduced quality of culturally/spiritually important sites at or near the CRL site within the RSA, and the ability to protect and use these sites by AOPFN members.

3.4 Current conditions and change over time in practicability of AOPFN Rights in the RSA

Baseline conditions for the practice of AOPFN rights in the RSA are strongly connected to historic and ongoing nuclear industry-related activities at the CRL site. While other impact sources noted previously, such as other CNSC-regulated nuclear facilities, mining, forestry, agriculture, and hydro-electric developments, also influence AOPFN rights at the local and regional level, AOPFN members' abilities and willingness to use the RSA, especially within but extending beyond the LSA, has been profoundly affected by the establishment of the CRL site, including displacement due to access restrictions, and perceived impacts from nuclear activities extending beyond the site (e.g., water and wildlife contamination).

Existing rights infringements on AOPFN rights in relation to the NSDF project within the AOPFN traditional territory occur at 2 distinct geographic scopes. The first is at the LSA level. AOPFN members have been physically unable to access the whole CRL site since the 1940s. Portions of land within the CRL site fenceline and up to the west shore of the Ottawa River have been largely to completely removed from the area of AOPFN territory where meaningful AOPFN rights practices can occur, which constitutes a severe pre-existing constraint on AOPFN rights practices in the LSA.

Data collection for the AOPFN AKLUS shows an absence of data at the CRL site in the LSA indicating that AOPFN members no longer use the area for traditional activities. This absence is not, however, indicative of the CRL site not having values associated with rights practices, as shown in the data from the AKLUS flagged above. The direct testimonials of AOPFN members indicate that the absence of data is not due to an inherent unattractiveness or past lack of use, but rather caused by the establishment of the CRL site and "closing off" of these areas from AOPFN use.

The second geographic scope of assessment for rights is the RSA. Based on information from AOPFN-led studies (AKLUS, the Culture and Rights Study and the Harvest and Diet Study), AOPFN is of the view that, in addition to effects in the LSA, there have been adverse effects on AOPFN rights practices in the RSA beyond the fenceline of the CRL site. In other words, alienation or displacement of AOPFN is not limited to the area that is fenced off from AOPFN use. Data collected in the above-noted studies show an “absence of use” impact radius that extends outwards from the LSA into the RSA. Within this larger radius, even though technically AOPFN members could access the area and there may be vegetation, wildlife and waters that they could harvest, AOPFN members are more reluctant to or refuse to frequent or harvest from it. While not enough data has been collected to establish the full “impact radius” around the fenceline of the CRL site which is within the RSA, AOPFN members indicate that their rights have been infringed upon in areas outside the fenceline since 1944, and that those impacts are felt up to this day.

Information from the AOPFN AKLUS and AOPFN Diet and Harvest Survey suggest that there is widespread current avoidance of use of the RSA, which includes the CRL site. The RSA is notable for being the region in AOPFN territory where harvesting of country foods is most likely to be reported to be avoided due to concerns about the quality and safety of land or aquatic foods.

3.5 Conclusion

Based on the information presented above, AOPFN is of the view that AOPFN is left with a large hole in its territory within which its members' Aboriginal rights are already heavily negatively impacted, and in some places (primarily CRL and CFB Petawawa), are almost to the point of being impracticable. This section has identified a number of pre-existing cumulative constraints on AOPFN harvesting, governance/stewardship, and cultural continuity rights in the RSA. It is in this context of existing conditions that already impact AOPFN Indigenous rights in the LSA and RSA, that any additional development at the CRL site (including the NSDF project) must be considered.

Corollary information regarding AOPFN's views on the baseline conditions and context in which AOPFN practice their rights is provided in the AOPFN NSDF Culture and Rights Study and will be communicated to the Commission via AOPFN's submission through the Commissions public hearing process. In addition, AOPFN conducted a study of the existing state in which their rights are practiced (including cumulative effects of past and current activities) which will also be communicated to the Commission via AOPFN's intervention. For the purposes of conducting a collaborative RIA, a summary of AOPFN's views is provided below:

- The evidence suggests that in the period between 1944 and the present day, at the CRL site and to a lesser but still moderate to high severity in its surroundings in the LSA and RSA, AOPFN Aboriginal rights have been infringed upon.
- The magnitude of this loss diminishes the further out from the CRL site 1 goes, but remains measurable for many km in both the terrestrial and aquatic environments.
- There exists now long-standing (75+ years), continuous and ongoing severe cumulative adverse effects on AOPFN rights practices in the project footprint and LSA used for this RIA and, at minimum, impacts on rights of a moderate (and in some cases high) severity at the RSA level.

- This alienation of AOPFN rights is most severe at and in the immediate surroundings of the CRL site. While CRL represents only a small portion of AOPFN territory, it is in a critical cultural area on the west bank of the Kichi-Sibì. This is critical rights practice territory for AOPFN that has been lost from use for over 75 years.
- In the Pre-NSDF Project cumulative effects context, AOPFN members' ability to access game, fish, edible and medicinal plants and ability to transmit culture has already been reduced by industrial development in this portion of AOPFN's traditional territory and is therefore highly sensitive/vulnerable to any additive change regardless of magnitude.

CNSC Views

It is important to note that CNSC staff cannot endorse the assessment of cumulative impacts (including severity conclusions) as summarized in the above bullets as this assessment is outside of the scope of the regulatory processes for the NSDF Project.

4.0 Potential NSDF Project interactions with AOPFN rights

As described in section 2, the AOPFN assert a spectrum of Indigenous rights including harvesting and traditional uses, governance and stewardship and cultural continuity rights throughout their traditional territory that includes the CRL site where the NSDF project is proposed.

The following section summarizes the potential Project-specific impacts to AOPFN rights, as identified by the Parties. Where differing views occurred regarding potential project interactions and impacts, this is noted with the perspective of both Parties shared. Please note that the impact pathways and potential impacts to AOPFN rights are reported as they could occur before mitigation measures are applied or considered in the text below.

4.1 Impacts on AOPFN harvesting rights

Temporal extension of access constraints

While AOPFN members have been physically cut off from use of the CRL site since it began operating, the area remains within AOPFN territory and responsibility for stewardship. The NSDF project is proposed to be located within the restricted, fenced area of the CRL site, which is approximately 4000 ha and is currently inaccessible to AOPFN community members for traditional practices, including harvesting. The footprint of the proposed NSDF is approximately 37ha. If constructed, the NSDF project site would remain inaccessible to the AOPFN community members indefinitely.

As mentioned in Section 2, AOPFN expressed that the Kichi-Sibì (Ottawa River) is a culturally important waterbody, and that the Pointe au Baptême site located on the CRL site is culturally and spiritually significant to them. The Pointe au Baptême site is located within the LSA and the proponent has confirmed that they are aware of the importance of this site to Indigenous peoples

and do not restrict access to it. In addition, the proposed Project is not predicted to physically impact this site or access to it. However, AOPFN members have expressed concerns that additional nuclear-related activities at the CRL site, including those activities that could increase the length of time that the facility will be off limits or subject to continued fear and stigma, would increase the alienation and loss of use of culturally important locations on or around the CRL site.

Any closure of the CRL site as currently developed would require reclamation of the land, and presumably, a return to a natural or close to natural state. However, the NSDF Project would be built to permanently store radioactive waste, which means its footprint is not meant to be restored to the pre-project state. The 37 hectare footprint of permanently anthropogenically changed, non-forested area, and a yet to be determined buffer zone around the NSDF Project will likely be alienated from AOPFN due to access restrictions and increased stigma that occur around a nuclear waste facility, no matter the category or level of risk of the wastes. CNL's EIS explains that security fencing and gates in the area will remain through the decommissioning period and into post-closure, which is expected to last until the year 2400. This means that there will not be any harvesting rights practiced on the project footprint or in the buffer zone for many generations of AOPFN members, if ever.

Avoidance due to safety/contamination/disturbance concerns

Based on information gathered in AOPFN's AKLUS, AOPFN has expressed concerns about the CRL site being potentially contaminated because of historic and ongoing nuclear operations and activities. Due to this perceived risk, some AOPFN community members currently avoid or otherwise constrain their use of the lands, waters and resources near the CRL site to exercise their rights.

In addition, AKLUS participants noted that AOPFN community members may continue to alter land use because of perceived environmental contamination and impacts in the vicinity of CRL, which may affect land use and enjoyment into the future, as a result of the NSDF Project. AOPFN have also raised concerns about the disruption to the quality of experience from sensory disturbances including, noise and dust.

CNL commits that the facility will be engineered according to best practices and with standards to result in an acceptable level of safety, and a low risk of contamination via multiple media. From AOPFN's perspective, this does not mean that the risk is negligible, and does not mean that avoidance due to perception of risk will not continue to occur. Despite this information, it is likely that AOPFN members will continue to avoid harvesting and practicing cultural activities in the RSA because of the stigma around radioactive waste at the CRL site. Through specific examples and general discussion about current fears and how they may increase with the development of the NSDF (in the AOPFN AKLUS and the AOPFN's Culture and Rights Study), AOPFN members described their existing reluctance to harvest near the CRL site. Although the avoidance of conducting traditional activities in the LSA and RSA are considered by AOPFN to be severe, AOPFN members are still vulnerable to additional increased levels of concern about the management of nuclear materials on the CRL site, especially when involve projects that are of a permanent nature, such as the proposed NSDF. During AKLUS interviews, AOPFN members expressed concerns relating to the proposed NSDF project including potential contamination of traditional medicines, impacts to animals, plants and water, as well as groundwater contamination affecting the Ottawa River and downstream areas throughout and

even potentially extending outside of the RSA both during its operation and for future generations. For example, 1 community member raised concerns that animals, plants, and water will be affected by buried nuclear waste. Another participant expressed concern that there is risk that the Ottawa River will be impacted through groundwater contamination and that this contamination could go far downstream. And these contamination concerns impact on harvesting, health and cultural continuity in holistic fashion:

“I am worried about, you know, am I going to be harvesting something in a few years? Or will I be teaching my daughter to harvest things in a few years that are potentially compromised, or going to compromise the health of people that I provide medicines to? It’s a serious, serious consideration to take when you’re telling people to make teas and you’re making, you know, compresses and topicals and things like that that are going to go into their skin.”

It has yet to be fully established how far these concerns extend from the SSA. Several AOPFN members in the AKLUS, AOPFN NSDF Culture and Rights Study and AOPFN Diet and Harvest Study spoke of not taking fish from the Kichi-Sìbì, especially not downstream of the CRL site. AOPFN members have also raised concerns that the NSDF project is located too close to the Kichi-Sìbì, including in comments to CNL during the early planning phases for the Project. CNL has not moved its preferred location for the NSDF project based on this AOPFN feedback. It is likely that the creation of a permanent radioactive waste facility would increase already existing perceived risks about water and fish contamination and could result in continued reduced use of and harvesting (of fish, water and vegetation) from the Kichi-Sìbì by AOPFN members, which is a critical part of the AOPFN cultural landscape and considered a critical cultural area along its entire length. This effect could also be extended longer in time by the permanent nature of the NSDF Project. CNL indicated in their EIS that the deciding factor that drove selection of the NSDF design and the East Mattawa Road (EMR) site is that the waste stream, low-level radioactive waste comprising primarily of impacted soils and demolition debris is mostly at the CRL site. CNL’s assessment of alternatives (including site selection) takes into consideration technical and economic criteria. CNSC staff reviewed CNL’s alternatives assessment and as mentioned in section 4.2 of the EA report agrees with the findings. In contrast, for AOPFN, the proximity of the NSDF proposed site to the Kichi-Sìbì and the lack of meaningful engagement of AOPFN in consideration of alternative sites remain outstanding issues.

Other AOPFN members spoke about not taking animals that may have traveled through the area impacted by the NSDF Project due to potential contamination. Perceptions of contamination of wildlife, water and fish, will likely increase should a permanent radioactive waste disposal facility be constructed and operated at the CRL site, and may impact the willingness of AOPFN community members to harvest animals in the vicinity of the CRL site, as well as the RSA due to fears that fish and wildlife could have traveled through the NSDF site, or perceived to be potentially impacted by activities at the site (e.g., fish in the Kichi-Sìbì). For wildlife like moose and deer, which are mobile resources, it is uncertain how far away from the site this stigma and avoidance behaviours will occur, although results from the AOPFN Diet and Harvest Study indicate that there are impacts on willingness to harvest due to contamination concerns that extend well into the RSA. This lack of willingness may be extended further in time if the NSDF is constructed and operated on the CRL site.

As outlined in CNL’s EIS, during the construction period, there will be a 5-6% increase in traffic from offsite traveling through AOPFN territory to access the CRL site, which could also potentially increase wildlife collision risks. This incremental increase in traffic may reduce

AOPFN members' willingness to travel to areas outside but in proximity to the CRL site in order to harvest, due to reduced quiet enjoyment of the land or public safety concerns. The traffic and noise effects from the Project are likely to be slight but discernible and are not expected to be a substantial contributor to AOPFN community members avoidance behaviours and overall potential project specific impacts on AOPFN's harvesting rights. In addition, the EIS provides evidence that dust, noxious fumes and ground and surface water alterations from construction and operations are not expected to have substantial biophysical environmental effects outside the fence line" of the NSDF site. Given that AOPFN members are currently completely alienated from conducting traditional activities or practicing their rights inside the fence line of the CRL site, no direct adverse effects from these on-site air and water disturbances are expected to be encountered by AOPFN harvesters. As a result, this is not being brought forward into the effects characterization.

AOPFN members also expressed concerns about potential impacts of accidents and malfunctions if water management systems are inadequate and radioactive materials escapes through ground water or surface water, and the potential impacts of hydrocarbon spills, on long-term wildlife and wildlife habitat health, and long-term willingness to harvest from the areas around the facility and CRL site. Lack of faith that previous spills at the CRL site were properly reported or responded to underline and accentuate these project specific concerns.

AOPFN's AKLUS and Culture and Rights Study participants expressed concerns related to what could happen in the event of an accident. 1 interview participant also expressed alarm at the idea that the NSDF could be taking waste from other CNL nuclear sites throughout Canada, as this poses additional risk to the areas it would be travelling through. Additionally, participants expressed concerns surrounding the potential release of irradiated water or other accidents that could impact the Kichi-Sibi and surrounding areas close to AOPFN's community and traditional territory.

From an AOPFN perspective, great precaution is needed to avoid potential accidents and malfunctions, and perceived risks of accidents and malfunctions related to the NSDF contribute to prevailing fear and stigma associated with the CRL site. Taking into account the assessment of exposure pathways, appropriate mitigation measures in place, short duration of accidents, and the potential adverse effects are localized (on-site) and would be contained, CNSC staff concur with CNL that the residual effects to the public and the environment resulting from the accidents and malfunctions at the engineered containment mound (ECM) and the wastewater treatment plant (WWTP) are negligible. CNSC staff also considers the mitigation measures and the emergency preparedness program are adequate to reduce accident rates, and to prevent and minimize their effects.

Notwithstanding the CNSC's findings, AOPFN has indicated that it is likely that without stronger communication of risks to AOPFN members, strong involvement of AOPFN in monitoring and reporting, and the building of a strong relationship between AECL, CNL, CNSC and AOPFN, that constructing and operation NSDF project will could exacerbate these existing concerns about operational and accidental impacts to the environment associated by AOPFN members with the CRL facility.

Impacts on wildlife and wildlife habitat

The construction and operation of the NSDF project will require extensive physical works and activities, involving land clearing, building construction, excavation and blasting activities, increased traffic, water diversions, noise, vibration, and dust, among other impacts. Wildlife can be expected to be significantly disturbed within and likely to avoid both the project footprint and portions of the LSA for the entire period of construction, which will take approximately 2 years. As a result there are thus disturbance effects on the behaviour and distribution of animals, as well as potential morbidity and mortality effects on wildlife, including culturally important species like (but not limited to) moose, deer, bald eagle, and Blanding's Turtle. Because species like moose and deer are mobile, impacts on these species as a result of the NSDF project may alter their distribution, abundance and health conditions offsite, in the RSA, as well. Given the proximity of the NSDF project to areas identified in the AOPFN AKLUS as preferred locations for moose and deer harvesting for AOPFN community members, the NSDF project may impact AOPFN members' ability to harvest in areas to which they and their families are culturally connected, forcing them to travel farther and incur greater expenses in order to harvest animals that are perceived as healthy.

The NSDF requires the clearing of 37 hectares of primarily forested cover, which will be replaced by an industrial landscape under active institutional control for 300 years and then a permanent man-made elevated clearing with no tree cover during the institutional control period, far into the future. The design of the NSDF is such that wildlife habitat in the project footprint will not return to its previous state for hundreds of years, and possibly ever. CNL's EIS for the project explains that after closure, trees will not be allowed to grow on the ground cover because their roots could disrupt the integrity of that cover. As the institutional control period is expected to last until 2400, native vegetation will be lost from that land until at least then.

Therefore, the NSDF Project has the potential to exacerbate any existing impacts on harvesting rights by:

- Reduced long term harvesting area available due to access restrictions that will remain in place for hundreds of years.
- Reduction in forested land base for wildlife habitat and harvesting due to permanent clearing of 37 hectares of forested area.
- Increased perceived risk of contamination to species harvested (wildlife, fish, water and vegetation in RSA and LSA) associated with the Project due to permanent disposal of low-level radioactive waste.

These impacts will be carried forward into the following section for mitigation to be applied and assessed.

4.2 Impacts on AOPFN governance and stewardship rights

Members of AOPFN feel strongly that they have a responsibility to take care of the land and water within their territory. This includes lands alienated currently by the CRL site, including lands potentially impacted in the future by the NSDF. AOPFN members have discussed the importance of their responsibility towards the land and raised concerns about their inability to know or understand what was happening to the land within the CRL site including the SSA. This includes the view as raised by an AOPFN member that the amount of disturbance that exists,

does not preclude their obligation as caregivers of the land. Additional examples of concerns raised include the lack of ability to see how medicinal plants are growing within the CRL site and a desire to have a site inventory; and frustration that AOPFN members are not permitted to go within the CRL site on a regular basis to conduct traditional activities and make sure the land is being maintained properly. As indicated in section 2, though the SSA and LSA is only a small portion of their traditional territory, it is a significant piece of land to some AOPFN members, especially given strong past connections of some AOPFN families to what is now the CRL Site, the proximity to the Kichi-Sìbì, and the presence of other culturally important locations at or near the CRL Site.

AOPFN members conveyed a feeling that the loss of land use decision-making and stewardship on the lands within the CRL site and now potentially on the SSA are a part of a continued loss of agency by AOPFN and its members over their traditional territory.

AOPFN members have raised concerns about the proximity of the NSDF Project to the Kichi-Sìbì, and the lack of revisions to the planned location by CNL after these concerns were raised by AOPFN members, including a Council member, in limited discussion on this topic with CNL. This raises concern about a lack of control over activities proposed to occur in AOPFN territory by AOPFN members and leadership. Substantial concerns have been raised about whether AOPFN providing inputs into this EA process will actually lead to meaningful changes to the project plan. AOPFN also raised concerns about not being involved by CNL in the assessment of alternative means to undertake the project. And AOPFN notes that CNL to date is not willing to support and agree with AOPFN's 2 priority requests related to the NSDF Project regarding AOPFN governance and stewardship:

1. Adoption of a "Willing Host" requirement and respect for AOPFN's free, prior and informed consent decision (yet to be made) in relation to the proposed NSDF on AOPFN territory.

2. Requirement for co-approval by AOPFN of any imports of waste bound for the NSDF from any sources or locations outside AOPFN territory.

CNSC views with regards to UNDRIP, Free Prior and Informed Consent (FPIC) and “Willing Host” Principles

CNSC’s view with regards to FPIC is that processes for consultation and engagement with Indigenous Peoples, including public Commission proceedings, are mindful of the principles articulated in UNDRIP, including FPIC. In conducting its consultation, regulatory and decision-making processes, CNSC staff follows existing legal frameworks including the *Canadian Environmental Assessment Act 2012*, the *Nuclear Safety and Control Act*, and the common law duty to consult.

It is also important to note that CNSC staff cannot endorse the references to “Willing Host” as summarized above by AOPFN. Licensees or applicants are responsible for the site selection process. The CNSC, as an independent regulator, does not have the authority or the mandate to dictate the location of where nuclear projects are proposed. However, consultation with Indigenous groups and the public is a very important aspect of the CNSC’s regulatory and decision-making processes to ensure that their concerns are heard and addressed throughout the consultation and regulatory process and in order to determine that the project as proposed by the proponent, will make adequate provisions to protect people and the environment.

CNL and the site owner – AECL – have declined to respect AOPFN’s right to be a “Willing Host” or to confirm they will respect free, prior and informed consent decisions that AOPFN make. From AOPFN’s perspective, this means that the Project as proposed has the potential to undercut AOPFN’s asserted governance and stewardship rights. The Project’s nature and permanence is likely to impact on future land use and tenure options available to AOPFN. The process by which CRL and the specific site were chosen by AECL and CNL as the proposed location for a permanent radioactive waste disposal facility, which largely excluded AOPFN, is reflective of a continued lack of agency for AOPFN in regards to governance, stewardship, and decision making in relation to this expropriated, unceded land, and a lack of recognition of AOPFN as a legitimate governance authority in relation to these unceded lands. This enforced subservience to federal government agencies is emblematic of, and extends further into the future, adverse effects on AOPFN governance and stewardship rights.

AOPFN leadership and members have expressed strong opposition to the importation of radioactive wastes onto AOPFN territory on multiple occasions including the following:

“Why is our site – and I say “our site” because they are in our Nation – why is our site the best site, the most protected site, you know what I mean, like the safest site for someone else’s radioactive waste to go? Cheapest site probably. But I don’t know, I think they should take care of their own garbage. That’s just my thoughts, take care of your own garbage. Because again, like everyone should take care of their own garbage.”

Lack of support and agreement to AOPFN’s requests reflects a lack of the establishment of a potential meaningful role for AOPFN in the governance and stewardship for the NSDF Project.

Overall, from AOPFN’s perspective, if the NSDF Project is managed in the way that prior and existing CNL and AECL physical works and activities have been managed at the CRL site to date, and in the fashion that is proposed in the EIS, this would potentially extend the lack of agency that AOPFN has had in relation to planning, monitoring and managing the CRL site going back over 75 years. This lack of agency would lead to the continuation of adverse effects on the ability for AOPFN to make decisions on, and steward, its traditional territory. These adverse effects, while problematic in their own right, also could contribute to negative effects on the well-being and quality of life of AOPFN members and leadership, where they feel the psychological impacts of being marginalized and cut off from decisions that impact their lives, their cultural landscape, their traditional territory, their mobility, and their control over their children’s and community’s futures.

Therefore, the NSDF Project has the potential to exacerbate any existing governance and stewardship impacts by:

- Lack of AOPFN involvement in, and access to information regarding, monitoring and adaptive management system structures.
- Lack of adherence to AOPFN’s identified principles for nuclear projects, including “Willing Host”, FPIC, and the importation and transportation of radioactive waste within AOPFN territory.
- Permanence of the NSDF Project to be located within AOPFN’s traditional territory and further remove AOPFN’s ability to manage lands in manner agreeable to AOPFN.

These impacts will be carried forward into the following section for mitigation to be applied and assessed.

4.3 Impacts on cultural continuity rights

The NSDF Project is designed to be a permanent facility that will not be removed or fully remediated, as its purpose is for permanent storage of radioactive waste. As discussed above, the risk of air, water, and soil contamination is low according to estimates and assessments described in CNL’s EIS; however, the perception of contamination may lead to AOPFN members avoiding the LSA should the NSDF Project be constructed, for the long-term. As noted in Section 3, while AOPFN members have been alienated physically from the entire CRL site, they still use areas around the site, although in a constrained fashion, at this time due to a number of existing and historical activities, facilities and impacts. Any additional perceived risk, such as from the creation of a permanent radioactive waste disposal facility, will likely adversely impact AOPFN members’ ability and willingness to use the LSA for cultural practices and to pass teachings on to younger generations, possibly over a long-term to permanent basis. This was articulated by an AOPFN participant in the AOPFN Culture and Rights Study, who is concerned that present-day decisions made about lands could affect the future viability of areas to support teaching their children:

“And to try to make a decisions on that, trying to protect what, I guess, like I said, the, the secure land-base and traditional spots to go, if anything ever went wrong, and it had a drastic effect on it in the future for my kids or my grandkids or seven generations down the road, I don’t know if anybody can ever agree to certain things like that because you don’t know what could happen, right? ... So, it’s the past, the present and the future are, are all the keys to make a decision on what’s going on. Without all that information, I don’t think – it’s really hard, and then it comes

down to respect. If there was anything that came out, out of those, out of all those key elements to move forward. Whether our recommendations get, get heard or not. So, all of that entailed, it'd probably make a great involvement to make decisions. And like I said, I, I try not to think about it too much, but I, I do think about the future of my young lad. And if the areas that we do harvest in and learn from get contaminated by – can't contaminate it by any way, he will never be able to teach his kids that."

Though specific cultural sites are within the LSA such as Pointe au Baptême, AOPFN members also identified the importance of the RSA for the continuity of their culture over the long-term. 1 AOPFN member interviewed in the AOPFN AKLUS described how Oiseau Rock, while a small place on the map of AOPFN's traditional territory, is an important site that is connected to the entirety of AOPFN's territory, and from an AOPFN perspective, effects to the land and waters surrounding Oiseau Rock are just as important as effects directly to Oiseau Rock itself. Other study participants talked about Kichi-Sìbì as an important trading route for their ancestors and Pointe au Baptême, where travelers would stop to camp. All of these places tie in to the important history of AOPFN members and their connection to all lands and waters in the RSA. Therefore, these areas are part of a larger cultural landscape that includes the NSDF project, and the cultural connection or the risk to the cultural sites from the NSDF project is measurable and adverse from AOPFN's perspective. These culturally important locations can be further impacted by, having any portion of the CRL site as a permanent radioactive waste disposal facility.

In addition, potential project effects on cultural continuity can also vary based on the activity AOPFN members are engaging in and are directly linked to the ability for AOPFN to practice other rights and traditional activities. For example, potential effects on cultural continuity are directly tied to the effects on AOPFN's harvesting rights, as harvesting and passing on wisdom regarding harvesting, is a part of cultural continuity for AOPFN. As summarized in the section on potential impacts on harvesting above, the NSDF project may result in an increased reluctance to harvest fish within the RSA (especially but not limited to, downstream of the CRL site) and moose at least within the RSA. While AOPFN members may feel comfortable being on Kichi-Sìbì in parts of the RSA and therefore able to engage in cultural activities, such as passing on knowledge and spending time on the water, they may not feel comfortable harvesting fish from Kichi-Sìbì from anywhere within the RSA as a result of the NSDF project. Likewise, while AOPFN may feel comfortable being on the land within the RSA, they may not feel comfortable harvesting from the land within the RSA.

One AOPFN NSDF Culture and Rights Study participant stressed that decisions must be made keeping respect for the needs of future generations in mind, especially when making decisions about the land-base for traditional activities. While feeling that their input may not be heard by CNL, the participant is concerned that present-day decisions made about lands that they harvest from could affect future viability of areas to support teaching their children.

An additional concern with regards to cultural continuity rights identified by AOPFN is that through the process of clearing and excavating the SSA, CNL may disturb yet to be found Algonquin heritage resources. AOPFN members have a strong connection to their ancestors and cultural and heritage resources throughout their traditional territory, and treat any such disturbance as a potential desecration of their culture and ancestors. Appropriate involvement of AOPFN members in monitoring and management of heritage resources would be central to reducing the identified concerns, as would the development of an appropriate protocol for management of any found artefacts, agreeable to AOPFN.

Therefore, the NSDF Project has the potential to exacerbate any existing cultural continuity impacts by:

- A physical change to a portion of the CRL site - shifting from a forested ecosystem to a cleared, an engineered structure, visibly different from its surroundings - that will impact on the long-term ability to have a personal connection to and conduct cultural and teaching activities at and around the affected area, and by extension reduce the ability to transmit knowledge, due to alterations to make the site look and feel unnatural to AOPFN members.
- Potential increased stigma of contamination associated with the permanent disposal of radioactive waste, that also impacts on the long-term ability to have a personal connection to and conduct cultural and teaching activities at and around the affected area, and by extension reduce the ability for AOPFN members to transmit knowledge not only in the SSA, but on the Kichi-Sìbì, Pointe au Baptême, Oiseau Rock and in other portions of the LSA and RSA.
- Potential disturbances of any unfound heritage resources during construction of the NSDF Project.

These impacts will be carried forward into the following section for mitigation to be applied and assessed.

5.0 Mitigation, accommodations, monitoring and follow-up measures and characterization of impacts

As indicated in section 4, potential NSDF Project impact pathways were identified for AOPFN's harvesting and traditional use, governance and stewardship, and cultural continuity rights. Section 5 identifies key mitigation, accommodation, monitoring⁵ and follow-up measures to avoid, minimize, and/or effectively manage these impacts, and assesses the severity of the impact while taking into consideration the baseline and context for the practice of the rights. While relevant CNL commitments are summarized in this section where appropriate, a full list of commitments by CNL in relation to AOPFN can be found in [*CNL's Near Surface Disposal Facility Project Consolidated Commitments Report*](#).

⁵ While monitoring is not mitigation unto itself, monitoring commitments are identified where relevant herein. Effective monitoring can assist in the identification of impacts in a timely fashion, potentially allowing for impacts to be subject to adaptive management and reduction in their magnitude, temporal and/or geographic scope.

AOPFN's views

AOPFN notes that some of the CNL committed-to mitigation would only be applied should the Project proceed. Reference to it here in the residual impacts characterization process does not imply AOPFN free, prior and informed consent for the Project as proposed; this decision had not yet been made by AOPFN Chief and Council at the time this RIA was completed.

5.1 Mitigation, follow-up and monitoring - Impacts on AOPFN harvesting rights

The following potential adverse impacts from the NSDF Project on AOPFN harvesting rights were identified:

- Reduced long term harvesting area available due to access restrictions that will remain in place for hundreds of years.
- Reduction in forested land base for wildlife habitat and harvesting due to permanent clearing of 37 hectares of forested area.
- Increased perceived risk of contamination to species harvested (wildlife, fish, water and vegetation in RSA and LSA) associated with the Project due to permanent disposal of low-level radioactive waste.

In relation to the above impacts, CNL has committed to a number of mitigation, monitoring and follow-up measures. CNL has proposed mitigation measures to ensure the amount of land lost has minimal effects to wildlife and plant species in the area (see sections 6.3 Terrestrial Environment, 7.2 Migratory Birds, and 8.1 Species at Risk of the EAR). For potential effects to water quality and fish, CNL has proposed a number of mitigation measures to ensure no effects occur (see sections 6.2 Surface Water Resources and 7.1 Fish and Fish Habitat of the EAR). CNL has indicated that mitigation measures and follow-up programs would be implemented to mitigate effects to terrestrial vegetation and wildlife species, including wildlife-vehicle collision monitoring, designing the SSA to avoid wetlands and limit disturbance to the natural environment, establishing buffers along identified wetlands near the SSA, avoiding activities with the highest levels of noise and habitat disturbance during most sensitive life history phase, and installing a 6-foot high chain link wildlife exclusion fencing around the NSDF EMR footprint that will remain through post closure.

CNL has committed to offsetting the loss of forested habitat from the NSDF Project through its proposed Sustainable Forest Management Plan for the CRL site. CNL has committed to engage AOPFN in the co-development of this plan and has further committed to consider support for offsets at off-site locations brought forward by AOPFN. CNL has also committed to engage AOPFN in the development of the Project Environment Protection Plan and Follow-up Monitoring Plan, including development of appropriate thresholds and responses for impacts on wildlife and wildlife habitat. In addition, CNL's commitment to implement AOPFN's Guardian

Program in relation to the Project should ensure that AOPFN will have involvement from the outset in protecting the LSA from Project effects on wildlife, plants and habitat. Finally, CNL has committed to engage AOPFN in a pre-construction site Inventory gathering process from an Indigenous Knowledge perspective, in and around the Project footprint. This will allow the identification and – if deemed appropriate by AOPFN members, removal – of valued plant species from the SSA prior to construction, and identification of sensitive areas around the SSA that merit extra precautions during construction and operation.

In addition, the Parties have identified that the NSDF project will also contribute to fear and avoidance behaviours associated with an increased perceived risk of contamination from the project for AOPFN community members. Given the permanent nature of the waste disposal facility, the temporal scope of these fear and avoidance behaviours in the LSA and to a lesser degree in the RSA, would likely be extended by the NSDF. The Parties note that the deposition only of low-level radioactive waste is a helpful mitigation by design, as this level of radioactive material will reduce in risk relatively rapidly over time, approaching natural background levels of radiation by approximately 2100. AOPFN notes, however, that there is a wide gulf between the scientific potency of radioactive materials and the perception of risk caused by radioactive materials, especially in proximity to the Kichi-Sibi.

In order to support a reduction of risk perception, fear and stigma by AOPFN members associated with the NSDF, CNL has committed to continuing to fund the AOPFN NSDF Working Group and AOPFN Advisory Committee (AAC), until a CRL site-wide agreement is established, ensuring AOPFN is involved in the Environmental Assessment Monitoring Framework, Sustainable Forest Management Plan and other mitigation, monitoring and management plans. CNL has also committed to develop additional communication materials for AOPFN community members and communicate NSDF Project details more clearly and frequently including funding for a full-time, AOPFN employed communications specialist. This increased communication and opportunity for AOPFN to provide input into follow-up and monitoring activities for the NSDF is expected to build trust and mitigate concerns with respect to perceived contamination and risk. CNL and AECL have also committed funds for AOPFN to start developing a Country Foods Monitoring and Risk Communication Program in 2021. The purpose of such a program is to make sure that AOPFN members have access, in a form that works for them, to accurate and trusted information about the quality of wildlife, plants, and water in the Project-affected area.

In addition, CNL has committed to support the development and implementation of an AOPFN Guardian Program as it relates to the NSDF Project. It is expected that the application of the Guardian Program and further commitments by CNL to develop a Project-specific Site Access Plan with AOPFN, allowing members greater access to the location, will also contribute to the re-establishment of a relationship between AOPFN and the Project location that has been missing since the 1940s, and may support the reduction of fear and stigma associated with the site and activities therein.

5.2 Mitigation, follow-up and monitoring - Impacts on AOPFN governance and stewardship rights

The following potential adverse impacts from the NSDF Project on AOPFN Governance and Stewardship rights were identified:

- Lack of AOPFN involvement in, and access to information regarding, monitoring and adaptive management system structures.
- Lack of adherence to AOPFN’s identified principles for nuclear projects, including “Willing Host”, FPIC, and requirements re: the importation and transportation of radioactive waste within AOPFN territory.
- Permanence of the NSDF Project to be located within AOPFN’s traditional territory furthering AOPFN’s inability to manage lands in manner agreeable to AOPFN.

AOPFN’s views

From AOPFN’s perspective, the latter two impact pathways from the NSDF Project (lack of adherence to AOPFN’s nuclear principles and permanence of the Project impacting on future AOPFN land management opportunities) have the potential to more substantially impact on AOPFN’s governance and stewardship rights. AOPFN’s stated nuclear principles, shared with CNL and AECL, seek to have nuclear-related projects avoid proximity to waterways, not see radioactive waste imported into or transported through AOPFN territory, and allow for nuclear projects only if they respect the “Willing Host” concept and AOPFN’s right of Free, Prior and Informed Consent as per UNDRIP. Indeed, FPIC is singled out in UNDRIP for projects proposing hazardous waste disposal in Indigenous traditional territories. That is not the case with the NSDF. In addition, locating a permanent radioactive waste disposal facility in AOPFN territory fundamentally reduces the flexibility AOPFN has with regards to future use of those impacted lands.

CNL has committed to multiple mitigation, monitoring and planning measures to improve AOPFN’s involvement in NSDF Project monitoring and management. CNL has committed to continuing to provide capacity to the AOPFN NSDF Working Group and the AAC until a CRL site wide agreement is established, and increasing communication with AOPFN community members, as well as supporting AOPFN’s long-term involvement in the NSDF Project via multiple collaborative venues and opportunities. Additionally, as mentioned in Section 5.1.1, CNL intends to actively involve AOPFN in the follow-up, and monitoring measures for the NSDF through supporting AOPFN’s involvement in the Environmental Assessment Monitoring and Follow-up Program, as well as provide capacity for an AOPFN Guardian Program which will be piloted at the NSDF Project location. As mentioned in section 5.1. CNL has also committed to ensuring AOPFN will have access to information regarding follow –up and monitoring.

With respect to AOPFN’s concerns for involvement in the management of the NSDF long-term, CNL has made multiple commitments to explore potential practical, meaningful roles for AOPFN in the NSDF Monitoring Program. CNL has also committed to provide AOPFN with a co-development role in the Sustainable Forest Management Plan, and a co-development role in identifying adaptive management triggers/thresholds and responses in relation to valued components related to AOPFN rights and interests, to be built into the EA Follow-up Monitoring

Plan. AOPFN, CNL and AECL have also signed a Memorandum of Understanding to support discussions regarding the development of a Long-term Relationship Agreement for the broader CRL site, which may include provisions for AOPFN's involvement in environmental and cultural stewardship and monitoring.

Differing views

As noted in Section 4, CNSC finds CNL's rationale for the location of the proposed NSDF Project to be acceptable. In contrast, AOPFN remains concerned about proximity to the Kichi-Sibi and the lack of meaningful engagement of AOPFN in assessment of alternative locations for siting any such facility or having this facility in AOPFN territory in general. From AOPFN's perspective, the creation of a permanent radioactive waste disposal facility in AOPFN territory, especially one with importation of radioactive waste from other facilities, is opposed to AOPFN principles and the [2017 Anishinabek-Iroquois Declaration on nuclear waste](#).

5.3 Mitigation, follow-up and monitoring - Impacts on AOPFN cultural continuity rights

The following potential adverse impacts from the NSDF Project on AOPFN Cultural Continuity rights were identified:

- A physical change to a portion of the CRL site - shifting from a forested ecosystem to a cleared, an engineered structure, visibly different from its surroundings - that will impact on the long-term ability to have a personal connection to and conduct cultural and teaching activities at and around the affected area, and by extension reduce the ability to transmit knowledge, due to alterations to make the site look and feel unnatural to AOPFN members.
- Potential increased stigma of contamination associated with the permanent disposal of radioactive waste, that also impacts on the long-term ability to have a personal connection to and conduct cultural and teaching activities at and around the affected area, and by extension reduce the ability for AOPFN members to transmit knowledge not only in the SSA, but on the Kichi-Sibì, Pointe au Baptême, Oiseau Rock and in other portions of the LSA and RSA.
- Potential disturbances of any unfound heritage resources during construction of the NSDF Project.

Offset against this high likelihood adverse effect are some potential mitigating factors. One is that the CRL site within which NSDF would be located is already currently completely alienated from AOPFN cultural use and has been so for over 75 years. This means that AOPFN cultural practices in the NSDF Project location are unlikely to change in the Project Case from their current, completely alienated and unpractical, status.

AOPFN's Views

AOPFN does not consider impacts to culture to be automatically negligible or low magnitude, however, because AOPFN does not agree with using a current, “damaged” baseline, as the proper measurement of change in the Project Case. From AOPFN’s perspective, this is an existing, largely to completely unrecognized and completely unaccommodated for, cultural rights infringement, and does not excuse the accumulation of additional, even longer-term (permanent) adverse effects on AOPFN’s cultural rights. AOPFN was alienated from the CRL site by government actions; that alienation was never voluntary and at the present day, AOPFN members have indicated they want to reconnect culturally with the CRL site. From AOPFN’s perspective, impacts on culture need to be considered in light of this desired reconnection to the practicability of the right in this location, not solely to current practice of the right(s).

CNL has also committed to multiple mitigation and monitoring measures in relation to AOPFN cultural rights. While the NSDF Project site will be permanently inaccessible for traditional use and cultural rights practices, CNL has committed to continuing to maintain access to Pointe au Baptême (located in the LSA), which is a culturally significant site identified by the AOPFN. In order to mitigate changes to the landscape, the NSDF Project site will be graded to minimize visibility from the Ottawa River, AOPFN members’ nearest vantage point. CNL has also proposed measures to ensure AOPFN’s concerns regarding potential impacts to culture and heritage resources are mitigated through the development of a co-written, CNL-AOPFN Chance Find Procedure for culture and heritage resources, and involvement in a Traditional Land and Resource Use Discovery Plan to supplement existing mitigation measures identified in CNL’s EIS. These processes and commitments will increase the likelihood that AOPFN is involved in mitigating and monitoring effects from the NSDF Project on AOPFN Cultural Continuity rights.

In order to mitigate the potential impact of loss of teaching areas due to stigma of contamination, as mentioned in Sections 5.1.1 and 5.1.2, CNL has committed to increasing communication with AOPFN community members and the development of a Long-term Relationship agreement between AOPFN, CNL and AECL which may include provisions for AOPFN involvement in cultural stewardship and monitoring activities. These measures, in addition to CNL’s proposed mitigation measures and commitments regarding greater inclusion of AOPFN in the NSDF Project and CRL site monitoring, will work to build trust with AOPFN community members and decrease stigma and perceived contamination concerns.

CNL has also committed to develop a Project-specific Site Access Plan with AOPFN, to allow for AOPFN members to have higher access to the NSDF Project location, and to support location-specific commemoration and/or cultural recognition activities by AOPFN with respect to the NSDF Project, prior to construction and prior to operations. This may assist in increasing reconnection of AOPFN families that used the site prior to its expropriation, and support cultural healing. CNL has committed to AOPFN conducting a site inventory at and around the NSDF

SSA prior to construction, and harvesting materials where appropriate, prior to clearing activities. CNL has committed to develop an Eagle Feather Protocol with AOPFN, with eagle feathers found on site being donated to the Algonquin Way Cultural Centre. Finally, CNL has committed to co-develop with AOPFN a Project-specific Cultural Protection Plan.

AOPFN, AECL and CNL are also involved in ongoing discussions regarding cultural protection and promotion at the CRL site level.

5.4 CNSC additional mitigation and monitoring measures

In addition to the CNL mitigation measures and the follow-up and monitoring activities summarized above, CNSC staff are committed to long-term engagement with the AOPFN and have offered to negotiate a ToR for Long Term Engagement, including an engagement plan to be collaboratively developed with AOPFN. CNSC staff propose to initiate discussions on this ToR over the coming year.

As part of this agreement, CNSC staff will commit to collaborate with AOPFN on CNSC environmental monitoring activities around the CRL site, including for AOPFN to input into the sampling plans and observing sampling activities, where appropriate. It is a priority for the CNSC that our sampling reflects AOPFN land use, values and knowledge where possible.

CNSC staff will also be monitoring the implementation of all of CNL's commitments with regards to the NSDF Project, including those specific to the AOPFN, and is committed to meet annually with AOPFN to verify whether CNL complies to the commitments.

In addition, CNSC staff also propose that the engagement plan include ongoing communication and regular meetings, as well as engagement with AOPFN community members to ensure that the CNSC and the AOPFN can continue to work together to build trust in the safety of the CRL site, including the proposed NSDF.

CNSC staff are committed to continuing to collaborate, communicate and engage with AOPFN regarding its follow-up, monitoring and compliance activities as it relates to commitments and measures specific to AOPFN. CNSC staff will be conducting EA follow-up and licensing compliance activities throughout the life cycle of the NSDF Project, should it be approved.

5.5 Characterizing residual impacts on AOPFN rights

Table 3: Residual effects characterization table for AOPFN Indigenous Rights with respect to the Near Surface Disposal Facility Project

Established/ potential/ asserted right(s)	AOPFN perspective on import of LSA/RSA for right(s) practice	Pre-NSDF Context for practice of right(s)	Potential project impact	Mitigation and follow up measures (proponent)	Mitigation and follow up measures (CNSC)	Residual impact - magnitude	Residual impact- geographic extent	Residual impact - Reversibil ity	Residual impact - Duration	Residual impact - Likelihood	Overall severity of residual impact
Harvestin g											
Hunting, trapping, fishing and gathering of natural resources for food, social or ceremonia l purposes, habitation of camps and camping sites - Key source of food and	-Several AOPFN families lived in and/or preferred to harvest from the LSA prior to 1940s -Strong moose, deer and walleye habitat identified in the LSA	Regional: - substantial restrictions to the ability to use the lands since 1940 due to expropriati on and fencing off of large areas -use of the Kichi-Sibi still possible but constrained	<i>37 ha of wildlife habitat to become permanent ly inaccessib le for hunting and harvesting and will have reduced habitat values as it will not return to a forested state</i>	-Mitigation measures in CNL's EIS are designed to address potential biophysical impacts (including offsetting of habitat lost) from the Project in relation to wildlife.	CNSC staff will be monitoring CNL's biophysica l mitigation measures to ensure the outcomes are as predicted.	Low, given relatively small size of area, its situation within an area already alienated from harvesting , and the role of the NSDF in supportin g cleanup of other areas on CRL site.	Site specific	Perman ent	Long- term	High	CNSC and AOPFN: Low

some income - Cultural importance through food sharing, medicines, knowledge transfer, and traditional protocols	- Proximity to the Kichi-Sibi means an important part of harvesting and traditional rounds for many AOPFN members	by competition, alteration to habitat and wildlife availability, and concerns about contamination -AOPFN members have identified concerns about food quality (contamination) across much of the RSA Local: - extensive occupancy and use of CRL site before the site was established	<i>Perceived contamination of animals, water and plants near the CRL site causes avoidance behaviour due to low trust in quality of resources.</i>	-CNL commits to engaging AOPFN in NSDF Project Follow-up programs including the EAFMP, Sustainable Forest Management Plan and creation of an AOPFN Guardian Program to help address concerns raised regarding fear and avoidance behaviours -CNL committed to increased communication/information sharing	CNSC commits to negotiating a CNSC-AOPFN ToR for Long-Term Engagement which would include, collaboration on CNSC environmental monitoring activities around the CRL site (Independent Environmental Monitoring Program), ongoing communication and regular Working Group and community	Low to moderate, given this is the first time a permanent radioactive waste disposal facility has been proposed for CRL site, which may lead to increased perception of contamination at and around the site.	Concentrated in LSA, with potential impacts in portions of the RSA	Permanent	Long-term	Moderate, as there is potential that proper risk communication may alter risk perception over time.	CNSC and AOPFN: Low to moderate
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		-access to the CRL site has been fully restricted since establishment of the site in the 1940's		with AOPFN community members.	y meetings.						
Stewardship and Governance											
Right to self-determination; participate in decision-making matters, which would affect their rights, use traditional Algonquin government structure in decision-making,	-despite large areas being expropriated by Canada, the LSA and RSA are within unceded AOPFN territory. As such, AOPFN governance and stewardship rights should apply.	Regional: - long-standing restrictions on access to and role in governance and stewardship over large portions of the terrestrial part of the RSA (especially CRL site and CFB Petawawa) Local:	<i>Lack of AOPFN involvement and access to information regarding monitoring and adaptive management system structures.</i>	- CNL, AECL and AOPFN have signed an MOU towards developing a long-term relationship agreement that will help to enhance the relationship and foster greater collaboration and inclusion.	-CNSC commits to negotiating a CNSC-AOPFN ToR for Long-Term Engagement which would include, collaboration on CNSC environmental monitoring activities around the CRL site (Independent	Negligible, in fact a beneficial effects is likely to occur, but this is not considered under CEAA 2012	Local	Reversible	Short-term	Low	CNSC and AOPFN: Negligible

exercise land tenure and stewardship systems and access information about their lands.		<p>- AOPFN members resided in and practiced aspects of governance and stewardship in portions of the CRL site prior to the 1940s</p> <p>-access to the CRL site has been restricted since establishment of the site in the 1940's</p>		- CNL has committed to engaging the AOPFN in their NSDF Project Follow-up programs including the EAFMP, Sustainable Forest Management Plan and creation of an AOPFN Guardian Program to be applied at the NSDF Project	Environmental Monitoring Program), ongoing communication and regular Working Group and community meetings.						
			<i>Lack of adherence to AOPFN's principles for nuclear projects, including Willing Host,</i>	-CNL and AECL willing to have further discussions regarding "Willing Host" and AOPFN Free, Prior	-See Section 4.2.2 for CNSC's views on this impact and consideration of this impact.	Moderate to high given lack of commitment to adhere to AOPFN nuclear principles	Concentrated in LSA, but movement of radioactive wastes from off site has RSA and extra-	Permanent	Long-term	High	CNSC: N/A; outside CNSC mandate to consider AOPFN: Moder

			<i>FPIC, and importation of radioactive waste</i>	and Informed Consent; importation of waste will be subject to regulatory requirements			RSA implications				ate to High
			<i>Permanence of the NSDF Project in AOPFN's traditional territory further reducing AOPFN's ability to manage lands in manner agreeable to AOPFN.</i>		-CNSC has consulted AOPFN on the project and its' impacts and also commits to engagement with AOPFN on the effectiveness of the follow-up and monitoring related to impacts to AOPFN.	CNSC: Low given the size of the site relative to larger AOPFN traditional territory AOPFN: Moderate, given the permanence of the use of the site fundamentally alters future land use flexibility	Site Specific	Permanent	Long-term	High	CNSC: Low AOPFN: Moderate
Cultural Continuity											

Right to practice and sustain AOPFN culture, transfer knowledge between generations, travel within AOPFN territory and have solace from and spiritual connection to natural settings.	-All areas of AOPFN territory have value for cultural practices, connection to land and spirit, and inter-generational knowledge transfer -Several AOPFN families have a specific connection to the CRL site, having lived and preferentially harvested there in the past -There are	Regional: - some restrictions to the ability to use the lands - AOPFN members report reduced ability to enjoy the Kichi-Sibi and its cultural values, due in part to contamination concerns, increased competition and reduced resources	<i>Altering the physical characteristics of a portion of the CRL site, shifting from a forested ecosystem to a cleared, an engineered structure, visibly different from its surroundings, impacting on ability to connect to the site culturally</i>	-CNL will grade the NSDF so that it is not visible from the Kichi-Sibi - Engagement of AOPFN in development of Sustainable Forest Management Plan and consideration of off-site land offsets put forward by AOPFN	-CNSC is committed to engaging with AOPFN to ensure CNL's proposed commitments are producing the anticipated results.	Low	Local	Permanent	Long-Term	High	CNSC and AOPFN: Low
		Local: - use by AOPFN members of CRL site before the site	<i>Increasing the stigma of contamination in culturally important</i>	-CNL will continue to maintain access to Pointe au Baptême	-CNSC commits to negotiating a CNSC-AOPFN ToR for Long-	Low to moderate	Primarily local, including on the Kichi-Sibi, and at Pointe	Permanent	Long-term	Moderate to High	CNSC and AOPFN: Low to

	several locations in the LSA that have high cultural import to AOPFN members, including the Kichi-Sibi itself, Point au Baptême, and Oiseau Rock	was established -access to the CRL site has been restricted since establishment of the site in the 1940's, cutting much of the area off from cultural practices -shoreline cultural areas still technically accessible at the CRL site; AOPFN members indicate reduced willingness to access these sites due to contamination	<i>and teaching areas, creating a barrier to the transmission of Algonquin Knowledge and to ability to practice culture at important sites. Therefore, a loss of a teaching area means that knowledge cannot be transmitted to future generations.</i>	- CNL, AECL and AOPFN have signed an MOU towards developing a long-term relationship agreement that will help to enhance the relationship and foster greater collaboration and inclusion. -CNL committed to increased communication/information sharing with AOPFN community members.	Term Engagement which would include, collaboration on on CNSC environmental monitoring activities around the CRL site (Independent Environmental Monitoring Program), ongoing communication and regular Working Group and community meetings.		au Baptême					Moderate
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		concerns and feeling unwelcome									
			<i>Potential disturbances of any unfound heritage resources during construction of the NSDF Project.</i>	- CNL-AOPFN collaboration on Chance Find Procedure for heritage resources, and on a Traditional Land and Resource Use Discovery Plan	-CNSC is committed to engaging with AOPFN to ensure CNL's proposed commitments are producing the anticipated results.	Low – with proper procedures in place for co-management of heritage resources, between AOPFN and CNL	Site specific	Permanent (heritage resources taken out of their context is an irreversible effect)	Short-term (potential only during construction)	Moderate	CNSC and AOPFN: Low

5.5.1 Conclusions on severity of likely residual impacts

With respect to impacts to harvesting rights, with the full and proper application of CNL's and CNSC's committed-to mitigation and monitoring measures, it is predicted that the Project will have a high likelihood, low magnitude, low severity adverse impact on the amount of land and wildlife resources, starting in approximately 2100, available to support AOPFN rights practices. This impact will be limited to the LSA and focused primarily in the SSA. With the full and proper application of CNL's and CNSC's committed-to mitigation and monitoring measures, it is predicted that the Project will have a moderate likelihood, low to moderate magnitude, low to moderate severity adverse impact on AOPFN perception of contamination of wildlife, water, vegetation and land in the LSA and potentially portions of the RSA. Taken together, the total Project contribution to adverse impacts on AOPFN harvesting rights is estimated to be of low to moderate severity.

For impacts to governance and stewardship rights, with the full and proper application of CNL's committed-to mitigation and monitoring measures, it is predicted that the Project will have a high likelihood, moderate magnitude, beneficial impact on AOPFN access to information on, and role in, monitoring and management of the NSDF Project. There is at least a moderate likelihood that this will also have a beneficial impact within a substantial portion of the LSA through the development of a meaningful relationship between AOPFN, CNL and AECL and the CRL site level. Because there is a likely beneficial effect, this means that the Project will have a negligible adverse impact.

Differing Views

In contrast, even with the full and proper application of CNL's committed-to mitigation and monitoring measures, AOPFN is of the view that the Project will have a high likelihood, moderate to high magnitude and severity, adverse impact on adherence to AOPFN's stated nuclear principles and right to free, prior and informed consent. CNL has indicated that the Project may proceed with or without AOPFN's FPIC, and that they cannot commit to a "Willing Host" requirement. In addition, CNL and AECL have not committed to AOPFN's direct request that they receive AOPFN support before bringing any radioactive wastes from other off-site facilities to the NSDF. The permanent, irrevocable nature of the Project also impacts on AOPFN's ability to manage its unceded territory, now and into the very long-term future, and this impact is estimated to be of moderate severity. Taken together, the total Project contribution to adverse impacts on AOPFN governance and stewardship rights is estimated to be of moderate to high severity.

With respect to impacts to cultural continuity rights, with the full and proper application of CNL's committed-to mitigation and monitoring measures, it is predicted that the Project will have a high likelihood, low magnitude, low adverse impact on AOPFN cultural connection to the land in the SSA and LSA and ability to pass on place-based cultural knowledge between generations, as a result of physical changes to the SSA. In addition, given AOPFN concerns about contamination and health effects of radioactive waste, there is likely to be a long-term, low to moderate magnitude impact on AOPFN cultural continuity associated with fear and stigma from the NSDF Project. With the full and proper application of committed-to mitigation and monitoring measures, it is predicted that the Project will have a moderate likelihood, low magnitude, low adverse impact on cultural and heritage resources exposed during the clearing of the site for NSDF operations. Only the SSA would be subject to these impacts. The time period where this impact can occur would be short-term, during construction (clearing activities) only, and be subject to co-developed mitigation, monitoring and accommodation rules developed between AOPFN and CNL through the Project plans identified above. Taken together, the total Project contribution to adverse impacts on AOPFN cultural continuity rights is estimated to be of low [to moderate?] severity.

6.0 Conclusions and recommendations

The following section summarizes the conclusions of the assessment of the NSDF Project's impacts on AOPFN rights.

6.1 The parties' conclusions on project's impacts on AOPFN rights

The following are the Parties overall conclusions for AOPFN harvesting, governance and stewardship and cultural continuity rights.

In conclusion, when taking into consideration mitigation, monitoring and follow-up measures, 5 of the 9 impact pathways from the NSDF Project on AOPFN rights will likely be negligible (1 impact pathway) or low (4 impact pathways) in severity. In addition, the Project is predicted to cause impact from low to high severity to the following rights:

Harvesting rights

AOPFN and CNSC concluded conservatively, low to moderate severity adverse impacts on AOPFN traditional use and harvesting rights due to the increasing amount of time that perception of contamination associated with the CRL site will likely continue due to the creation of a permanent radioactive waste disposal facility on site.

Governance and Stewardship rights

AOPFN concluded moderate to high severity adverse impacts on AOPFN governance and stewardship rights, related to lack of adherence to AOPFN's stated nuclear principles, 'Willing Host' principle and right to free, prior and informed consent.

CNSC's Views

CNSC staff cannot make a conclusion on this impact as it is outside of the mandate of the CNSC. The CNSC as an independent regulator does not have the authority or the mandate to dictate the location of where nuclear projects are proposed and therefore, does not have the authority to weigh in on AOPFN's request for the 'Willing Host' principle.

CNSC concluded low and AOPFN concluded moderate severity impacts on AOPFN governance and stewardship rights, related to the temporal, effectively permanent extension of the current inability to manage this portion of its unceded lands in a manner agreeable to AOPFN.

Cultural continuity rights

With respect to AOPFN's cultural continuity rights due to increased stigma of contamination from the NSDF impacting on AOPFN connection to land and ability to pass knowledge about the area down to future generations, AOPFN and CNSC staff concluded conservatively low to moderate adverse impacts.

6.2 AOPFN's perspective on total cumulative effects for the Project

This section summarizes, from AOPFN's perspective, the total cumulative effects in the LSA and RSA on each of the 3 "pools" of AOPFN rights (Harvesting and Traditional Use, Governance and Stewardship, and Cultural Continuity) by considering the pre-Project circumstance (existing cumulative effects; see Section 3) together with the Project case (Project effects; see Section 5). Note that this is not a "Planned Development Case" analysis – it cannot estimate other reasonably foreseeable future developments and their contribution, and as a result the "total cumulative effects" as described below must be considered conservative.

In conducting this cumulative effects assessment, AOPFN graduated, following accepted practice, graduated any measurable adverse effects (low severity or higher) from the project-specific assessment to the cumulative effects assessment.

Harvesting and traditional use rights

In the Project Case, total cumulative effects on AOPFN Harvesting and Traditional Use Rights are of high severity in the LSA and moderate to high severity in the RSA. While the Project's contribution is relatively low, it will contribute (especially by extending the timeline that effects will be felt for) to the continuation and potential additional exacerbation of loss of use and perceived contamination of traditional resources in the LSA and to a lesser degree, the RSA, for

a longer time period (and within the smaller SSA, constitutes a permanent loss of harvesting opportunities).

Pre-existing adverse cumulative effects on AOPFN Harvesting and Traditional Use Rights are of high severity in the LSA and moderate to high severity in the RSA. These effects include lack of access to the CRL site since 1944 and diminished ability to access preferred harvesting and traditional use areas in the LSA and RSA, diminished quantity and quality of game species in preferred hunting areas, and reduced confidence in the health of resources in the LSA and RSA due to pervasive perceived risk of contamination associated with the nuclear laboratory, combined with a lack of access to trusted data about environmental conditions, especially as it relates to country foods and water quality in the Kichi-Sibi. Added on top of this, potential adverse Project-specific impacts from the NSDF Project on AOPFN Harvesting and Traditional Use Rights are of low to moderate severity in the LSA, and of low severity in the RSA. These additional incremental impacts include reduced harvesting areas and forested land base due to long-term access restrictions and permanent clearing of 37 hectares of forested area, increased perceived risk of contamination to resources harvested in the LSA and RSA due to permanent storage of low-level radioactive waste, and reduced enjoyment of harvesting activities in proximity to the NSDF site due to sensory disturbances.

Governance and stewardship rights

In the Project Case, total cumulative effects on AOPFN governance and stewardship rights are considered by AOPFN to be of high severity in both the LSA and RSA, with the NSDF Project contributing moderate to high severity Project-specific impacts on top of pre-existing high severity impacts in the LSA and moderate to high severity impacts in the RSA. It is important to note that while there are both adverse and beneficial effects to consider, the adverse effects are higher in magnitude. The beneficial effects of greater information flows about the impacts of the NSDF to AOPFN members is more than offset by the exacerbation of existing adverse effects on AOPFN's ability to see its expectations, principles, laws and norms, and governance rights and responsibilities, due to multiple parties not committing to adhere to AOPFN's nuclear principles and expectations re: the location of the facility, the importation of nuclear waste without AOPFN permissions, and lack of commitment to Willing Host or AOPFN FPIC.

Pre-existing cumulative effects on AOPFN Governance and Stewardship rights are of high severity in the LSA and of moderate to high severity in the RSA. These effects include lack of permissions sought from and (until very recently) lack of meaningful engagement and consultation with AOPFN on the conversion of what is now the CRL site into a nuclear facility and ongoing management of the CRL site, displacement of AOPFN families from homes and preferred lands as a result of the establishment of the CRL site, no recognition of nor accommodation for loss of use, no uncontrolled access to the CRL site for AOPFN members, and lack of confidence that AOPFN input will be adequately considered and accommodated by the proponent. On top of this, potential adverse impacts from the NSDF Project on AOPFN Governance and Traditional Use rights are of moderate to high severity in the LSA and moderate to high severity in the RSA. These additional incremental impacts include lack of AOPFN involvement in, and access to information regarding, monitoring and adaptive management system structures, lack of adherence to AOPFN's identified principles for nuclear projects, including "Willing Host", FPIC, and requirements re: the importation and transportation of radioactive waste within AOPFN territory, and the permanence of the NSDF Project to be located within AOPFN's traditional territory furthering AOPFN's inability to manage lands in a

manner agreeable to AOPFN. Of these Project-specific impacts, it is the lack of adherence to AOPFN's nuclear principles and requirements that contributes the most to the moderate to high severity. AOPFN has also found moderate Project-specific impacts on governance and stewardship rights due to reduced future ability to manage portions of AOPFN's territory with the development of this permanent radioactive waste disposal facility, which contributes incrementally to the heightening of LSA cumulative effects on governance and stewardship rights.

Cultural continuity rights

In the Project Case, total cumulative effects on AOPFN Cultural Continuity rights are of high severity in the LSA and moderate to high severity in the RSA. While the Project's contribution is relatively low, it will contribute (especially by extending timeline that effects will be felt for) to the continuation and potential additional exacerbation of the limitations on teaching and transferring Algonquin knowledge, reviving spiritual practices, and protecting lands, resources, and culturally/spiritually important sites in the LSA and to a lesser degree, the RSA, for a longer time period (and within the SSA, permanent loss).

Pre-existing cumulative effects on AOPFN Governance and Stewardship rights are of high severity in the LSA and moderate to high severity in the RSA. These effects include a diminished ability to teach and transfer Algonquin knowledge or revive cultural practices (and no ability to do so in the LSA due to long-term lack of access to the CRL site), lack of confidence in the ability to protect and conserve lands, resources, and culturally/spiritually important sites in the RSA due to lack of trust in the consultation process, and concerns about reduced quality of culturally/spiritually important sites at or near the CRL site within the RSA. On top of this must be added potential adverse impacts from the NSDF Project on AOPFN Cultural Continuity rights of a low to moderate severity in the LSA and a low severity in the RSA. These additional incremental impacts include extending the period of time that the CRL site will be deemed unusable for teaching and cultural purposes through the development of a permanent radioactive waste disposal facility, permanent physical alteration of a forested ecosystem to a cleared, engineered structure visibly different from its surroundings, increased stigma of contamination in teaching areas, and potential disturbances of any unfound heritage resources during construction of the NSDF Project.

Implications of the total cumulative effects on AOPFN rights

While with the exception of the above-noted (and very important) impacts on governance and stewardship rights, the Project by itself is unlikely to cause high severity adverse impacts on AOPFN rights, decisions made about it must be considered with recognition that it is proposed for development in a context of already heavily impacted AOPFN rights. As a result, any additional adverse effects on AOPFN rights brings with it the risk of further alienation/infringement of AOPFN rights, already sensitive to pre-existing changes. Because of this existing sensitivity, it is AOPFN's finding that for each of the 3 pools of rights, there is in the LSA a high likelihood of high severity impacts on AOPFN rights in the Project Case, and in the RSA there is a moderate to high likelihood of moderate to high severity impacts on AOPFN rights in the Project Case.

This does not mean that AOPFN either opposes or supports the NSDF Project. That decision has not been made by AOPFN leadership at the time of completion of the RIA. AOPFN notes that the Proponent has made some important commitments to reduce impacts on each of the 3 pools

of AOPFN rights – harvesting, governance and stewardship, and cultural continuity. In AOPFN's opinion, more needs to be done in order to start recognizing and reconciling total cumulative effects on AOPFN rights, which have been severely undermined in the LSA (and to a lesser degree the RSA), as a result of decisions, physical works and activities, by CNL, AECL and Canada over time.

It is also important to note that with the exception of governance and stewardship rights at the RSA level, the proposed Project does not change the overall severity findings in relation to cumulative adverse effects. In almost all instances, NSDF itself is not the primary contributor to total cumulative effects on AOPFN rights in the Local or RSA. That said, AOPFN considers it critical to focus on total cumulative effects loading, and notes that much, and perhaps the majority, of cumulative effects in the LSA have been and will continue to be caused by the same landowner, Canada and site operator, CNL.

CNSC's Views

In the spirit of collaboration, AOPFN's views and assessment of cumulative effects of the project were included in section 6.2 (above), however CNSC staff would like to clarify that the above text does not represent the views of CNSC staff nor is it considered within the scope of the CNSC's recommendations for the NSDF Rights Impact Assessment.

6.3 Conclusion

Based on the information gathered and the collaborative RIA process conducted between the CNSC and AOPFN, CNSC staff have come to the conclusion that the potential impacts identified as a result of the NSDF Project on AOPFN rights and interests are considered to be of an overall low severity with the exception of the perceived contamination and stigma impacts, which may have a low to moderate severity. However, with the mitigation and follow-up measures proposed by CNL, AECL and CNSC staff, CNSC staff and AOPFN feel that the agreed to Project impacts and concerns can be adequately managed and addressed. AOPFN's perspective, however, differs on the manageability of impacts on governance and stewardship rights. In addition, all parties involved, including the AOPFN, CNL, AECL and the CNSC, are committed to ongoing engagement and dialogue to work towards addressing concerns raised by the AOPFN and enhancing the relationships through collaboration in relation to the NSDF Project and the CRL site in general.

With respect to issues and impacts related to AOPFN's governance and stewardship rights, CNSC staff encourage AOPFN to continue to work with CNL and AECL to find a path forward to resolve these issues.

Appendix A - The seven sacred teachings

Among the Anishinaabe people, the Seven Sacred Teachings, is a set of teachings on human conduct towards others. These teachings are guiding principles and or values that AOPFN applies as a touchstone for guiding, shaping, and measuring actions and behaviour for themselves and others.

Nibwaakaawin—Wisdom: To cherish knowledge is to know Wisdom. Wisdom is given by the Creator to be used for the good of the people. In the Anishinaabe language, this word expresses not only “wisdom,” but also means “prudence,” “intelligence”, or “knowledge”.

Zaagi’idiwin—Love: To know Love is to know peace. Love must be unconditional. When people are weak they need love the most. In the Anishinaabe language, this word with the reciprocal theme indicates that this form of love is mutual.

Minaadendamowin—Respect: To honor all creation is to have Respect. All of creation should be treated with respect. You must give respect if you wish to be respected.

Aakode’ewin—Bravery/Courage: Bravery is to face the foe with integrity. In the Anishinaabe language, this word literally means “state of having a fearless heart.” To do what is right even when the consequences are unpleasant. **Gwayakwaadiziwin**—Honesty: Honesty in facing a situation is to be brave. Always be honest in words and actions. Be honest first with yourself, and you will more easily be able to be honest with others. In the Anishinaabe language, this word can also mean “righteousness.”

Dabaadendiziwin—Humility: Humility is to know yourself as a sacred part of Creation. In the Anishinaabe language, this word can also mean “compassion.” You are equal to others, but you are not better. In addition to “humility” can also be translated as “calmness,” “meekness,” “gentility” or “patience.”

Debwewin—Truth: Truth is to know all these things. Speak the truth. Do not deceive yourself or others.

Appendix B - Decision matrix for applying the assessment criteria to determine the overall severity of the impact to a right

Magnitude	Reversibility	Duration*	Geographic Extent	Likelihood	Severity
Negligible to Low**	Any level of reversibility	Any duration	Any extent	Negligible to low	Negligible to Low
Magnitude	Reversibility	Duration*	Geographic Extent	Likelihood	Severity
Moderate	Fully reversible	Short- or medium-term	Site-specific or local	Negligible to low to Moderate	Low
			Regional	High	Moderate
		Long-term	Site-specific	Negligible to low to Moderate	Low
			Local or regional	High	Moderate
	Partially Reversible	Short-term	Site-specific	Negligible to low to Moderate	Low
			Local or regional	High	Moderate
		Medium or long-term	Site-specific or local	Negligible to low to Moderate	Moderate
			Regional	High	High
	Permanent	Long-term***	Site-specific	Negligible to low to Moderate	Moderate
			Local or regional	High	High
Magnitude	Reversibility	Duration*	Geographic Extent	Likelihood	Severity
High	Fully reversible	Short- or medium-term	Any	Negligible to low to Moderate	Moderate
		Long-term	Site-specific	Negligible to low to Moderate	Moderate

			Local or regional	High	High
	Partially reversible	Short- or medium-term	Site-specific	Negligible to low to Moderate	Moderate
			Local or regional	Moderate to High	High
		Long-term	Any	Moderate to High	High
	Permanent	Long-term***	Any	Moderate to High	High

Rationale for severity determination decision tree

- *The contribution of timing and frequency is considered on a case-by-case basis when determining severity. Timing and frequency may not be relevant to all impacts, and therefore is not included in the generic decision trees.
 - Frequency is assumed to be continuous, therefore if less frequent, it may downgrade the severity.
 - Timing is assumed not to coincide with sensitive activities, therefore if timing is relevant, it may upgrade the severity.
- **Impacts deemed to be of negligible to low magnitude are generally considered of low severity regardless of the other assessment criteria.
 - These impacts are those which have little to no impact on the right concerned, or are within acceptable/normal variation of baseline conditions.
 - Permanent, regional effects may be upgraded to moderate severity.
- ***Irreversible impacts can't be short or medium-term, only long-term

Appendix D-2 MNO Rights Impact Assessment

Métis Nation of Ontario DRAFT Rights Impact Assessment Report for the NSDF Project

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1.0 Introduction

1.1 Purpose and scope of the Rights Impact Assessment

As mentioned in Chapter 9 of the NSDF EA report, the CNSC as an Agent of the Crown recognizes its obligation to fulfill the duty to consult for decisions under *CEAA, 2012* and the *NSCA*. In order to do this for the *CEAA, 2012* and *NSCA* decisions for the Near Surface Disposal Facility (NSDF) (the Project), CNSC staff considered potential impacts to Indigenous and /or Treaty Rights by completing a specific Rights Impact Assessment (RIA) with the Métis Nation of Ontario (MNO).

The purpose of this RIA is to assess the potential impacts of the Project on the Indigenous Rights of the MNO and to come to a mutual understanding of the severity of any identified potential impacts on MNO's rights and interests, as a result of the Project. The RIA also identifies any potential mitigation and/or accommodation measures that could help to avoid, reduce, or compensate for any identified impacts and communicate the process, outcomes and recommendations in a collaborative way to the Commission as part of its decision-making process.

The NSDF, a proposed engineered disposal facility for low-level radioactive waste planned for the Chalk River Laboratories site (CRL), is proposed to be located within the fenced area of the CRL site, which is approximately 4000 ha and is currently inaccessible to MNO Citizens for traditional activities. The footprint of the Project site is approximately 37ha⁶ (also called the Site Study Area (SSA)). The Local Study Area (LSA) is selected in consideration of the NSDF Project footprint and the spatial extent of potential direct effects of the Project on valued components (VCs), whereas the RSA is defined as the area within which the potential effects of the NSDF Project may interact with the effects of other existing or reasonably foreseeable projects and extends beyond the boundaries of the CRL site boundary.

The MNO represents its Citizens and regional rights-bearing Métis communities throughout the Province of Ontario. The CRL site is located within the Mattawa/Lake Nipissing Métis Traditional Harvesting Territory, which is represented by the North Bay Métis Council and the Sudbury Métis Council. However, the Kawartha/Ottawa River Métis community (Region 6) has ties and interest in the Project area as well.

1.2 Principles of the Rights Impact Assessment

As part of the ToR for consultation signed between the CNSC and the MNO with regards to the Project, CNSC staff and MNO are committed to collaboratively drafting and carrying out a thorough evidence-based, and methodologically sound RIA for the Project.

The process undertaken with the MNO is consistent with the Government of Canada's commitments with respect to recognition, protection, and upholding of the rights of Indigenous Peoples. The RIA has been completed in collaboration between CNSC staff and the MNO and

⁶ Please note that MNO is of the view that the entire CRL site, and not only the NSDF site, should have been used as a baseline and assessed for this RIA.

includes information collected by the Proponent (CNL), where appropriate. The goal of this collaborative process was to reach consensus on the content of the RIA and work towards mutually agreeable measures to address any identified adverse impacts that would allow for the continued exercise of rights.

The RIA includes MNO Indigenous Knowledge, the perspectives of MNO Citizens and leadership and was implemented in a collaborative and transparent manner to ensure meaningful consultation.

1.3 Methodology

The methodology undertaken for the RIA uses a “pathways approach”, in which pathways of impacts on rights from project-related activities are identified. The 3 key pathways where potential impacts of the project were considered in the assessment are access, quality, and quantity of resources, and the quality of experience of exercising MNO’s rights.

1.3.1 Process steps

Below are the overarching process steps that the MNO and CNSC staff (with input from CNL, where appropriate) followed and agreed upon in order to complete the RIA for the Project.

Table 1: Process steps for completing RIA

Step 1: Identification of potentially impacted rights and interests
Step 2: Identification of current baseline conditions including cumulative effects, current territorial capacity and historical context
Step 3: Identification of potential project interactions/pathways with identified rights and interests (i.e., potential changes to current baseline conditions related to the project)
Step 4: Identification of severity of potential project interactions with identified rights and interests (including collaborative development of criteria and steps to assess and determine severity)
Step 5: Identification of potential mitigation and/or accommodation measures to address identified potential project interactions with identified rights and interests
Step 6: Identification of any residual impacts after consideration of proposed mitigation and/or accommodation measures
Step 7: Consideration of any additional mitigation and/or accommodation measures, should residual impacts be identified, and conclusions on seriousness of any remaining impacts or concerns
Step 8: Documenting and submitting process steps and outcomes to decision-makers (the Commission) <ul style="list-style-type: none"> - Collaborative drafting of stand-alone rights impact analysis to be appended to CNSC staff’s EA report - MNO written and oral interventions at Commission hearings

1.3.2 Rights impact severity criteria

Table 2. Criteria for assessing the severity of impacts to Indigenous and/or Treaty Rights.

▪ Criterion	▪ Definition	▪ Rating		
▪ Magnitude	<ul style="list-style-type: none"> ▪ Degree and importance of the change the impact will likely cause relative to an established baseline. Takes into account context and territorial capacity to withstand additional stressors. ▪ ▪ 	<ul style="list-style-type: none"> ▪ Low ▪ Little impact on quality or quantity of resources, locations, conditions and other factors required for the exercise of rights, relative to an established baseline. Impact is considered by the Indigenous Nation (rights holders) to be of relatively low importance and of a minor degree. 	<ul style="list-style-type: none"> ▪ Moderate ▪ Changes in the quality, quantity, and accessibility of resources, locations, conditions, and other factors that affect the ability or willingness to exercise the right in the preferred manner and locations are considered by the Indigenous Nation (rights holders) to be of moderate importance and degree relative to an established baseline. 	<ul style="list-style-type: none"> ▪ High ▪ Changes in the quality, quantity, and accessibility of resources, locations, conditions, and other factors such that the right can or will no longer be exercised in the preferred manner and locations and the impacts are considered by the Indigenous Nation (rights holders) to be of high/critical importance and degree relative to an established baseline.
▪ Geographic extent	<ul style="list-style-type: none"> ▪ Area over which impact is expected to occur. This may differ from the physical footprint of the change. 	<ul style="list-style-type: none"> ▪ Site-specific ▪ Project footprint, avoids preferred areas, little impact on interconnectedness. 	<ul style="list-style-type: none"> ▪ Local ▪ Extends beyond project footprint, may affect preferred/valued areas, disrupts interconnectedness. 	<ul style="list-style-type: none"> ▪ Regional ▪ Significant portion of the Indigenous Nation's territory affected, especially preferred/valued areas, disrupts interconnectedness.
▪ Reversibility	<ul style="list-style-type: none"> ▪ Ability to return to established baseline. Considers both the reversibility of the impact pathway 	<ul style="list-style-type: none"> ▪ Reversible ▪ Easily reversible 	<ul style="list-style-type: none"> ▪ Partially reversible ▪ Reversible but requires significant effort and cost or will take a long time via natural processes. 	<ul style="list-style-type: none"> ▪ Irreversible ▪ Permanent or persistent.

	and the reversibility of the impact to the exercise of rights.			
▪ Duration	▪ How long an impact may last.	▪ Short-term ▪ Short-term, only a year or 2.	▪ Medium-term ▪ Lasts for more than a year or 2 but less than 1 generation.	▪ Long-term ▪ Persists beyond 1 generation.
▪ Frequency	▪ When an impact may occur.	▪ Infrequent.	▪ Frequent or at regular intervals.	▪ Continuous impact.
▪ Timing	▪ When an impact may occur. This considers seasonality, time of day, predictability of occurrence.	▪ Timing is not expected to coincide with sensitive activities, and/or is predictable and can be easily planned around.	▪ Timing may coincide with some sensitive activities and would be an imposition to plan around.	▪ Timing will coincide with sensitive activities and/or is highly unpredictable.

Table 3. Decision matrix for applying the assessment criteria to determine the overall severity of the impact to a right.

Magnitude	Reversibility	Duration*	Geographic extent	Severity
Low**	Any level of reversibility	Any duration	Any extent	low
Magnitude	Reversibility	Duration*	Geographic extent	Severity
Moderate	Fully reversible	Short- or medium-term	Site-specific or local	Low
			Regional	Moderate
		Long-term	Site-specific	Low

			Local or regional	Moderate
	Partially Reversible	Short-term	Site-specific	Low
			Local or regional	Moderate
		Medium or long-term	Site-specific or local	Moderate
			Regional	High
	Permanent	Long-term***	Site-specific	Moderate
			Local or regional	High
Magnitude	Reversibility	Duration*	Geographic extent	Severity
High	Fully reversible	Short- or medium-term	Any	Moderate
		Long-term	Site-specific	Moderate
			Local or regional	High
	Partially reversible	Short- or medium-term	Site-specific	Moderate
			Local or regional	High
		Long-term	Any	High
	Permanent	Long-term***	Any	High

Rationale for severity determination decision tree (table 3)

- *The contribution of timing and frequency is considered on a case-by-case basis when determining severity. Timing and frequency may not be relevant to all impacts, and therefore is not included in the generic decision trees.
 - Frequency is assumed to be continuous, therefore if less frequent, it may downgrade the severity.
 - Timing is assumed not to coincide with sensitive activities, therefore if timing is relevant, it may upgrade the severity.
- **Impacts deemed to be of low magnitude are generally considered of low severity regardless of the other assessment criteria.
 - These impacts are those which have little to no impact on the right concerned, or are within acceptable/normal variation of baseline conditions.
 - Permanent, regional effects may be upgraded to moderate severity
- ***Irreversible impacts can't be short or medium-term, only long-term

2.0 Context and potentially impacted Métis Nation of Ontario rights and interests

The following description of MNO's Indigenous Rights and the context in which they practice these rights was written by the MNO.

Following the constitutional commitment made in 1982 – with the protection of Métis rights within Section 35 of the Constitution Act, 1982 – the MNO embarked on an ongoing journey to have the Government of Canada affirm the rights inherent to the Métis people. To date, harvesting rights and some self-government rights have been established through this journey. Canada and MNO signed the MNO-Canada Métis Government Recognition and Self-Government Agreement (“Agreement”) on June 27, 2019. The purpose of the Agreement is to support and advance the inherent right of self-determination and self-government of the Métis Communities as represented by the MNO through a constructive, forward looking, and reconciliation-based arrangement between Canada and the MNO. For the purpose and scope of the Project, only harvesting rights will be characterized, contextualized and described, as the pathway for impact solely applies to harvesting rights.

Harvesting rights

Harvesting Rights are, perhaps, the best understood rights held by the Métis. This is due to a number of factors including:

- The Métis Nations’ “hunt for justice” and eventual unanimous Supreme Court decision in *R. v. Powley*⁷.

⁷ R. v. Powley, 2003 SCC 43 (CanLII), [2003] 2 SCR 207.

- The MNO-Minister of Natural Resources and Forestry (MNR) Framework Agreement on Métis Harvesting (2018)⁸.

Within the *Powley* decision, harvesting rights are understood to be premised on the right to hunt for food in the traditional hunting grounds of the Métis community. The practice of the rights must be integral to the historic Métis community and have continuity between the historic practice and contemporary rights. The practice must also be integral to the MNO's distinctive culture.

Harvesting rights are further expanded and clarified within the MNO-MNR Framework Agreement on Métis Harvesting (2018) which specifically defines Métis Harvesting Rights or Métis Harvesting as “[...] hunting, trapping, fishing and gathering of natural resources for food, social or ceremonial purposes.” While the Framework Agreement definition does not include harvesting for commercial purposes, it is specifically noted that the MNO “[...] asserts collectively-held Métis commercial harvesting rights as well as other Métis rights.” This definition of Métis rights is important for a number of reasons. First, the inclusion of ‘social or ceremonial purposes’ links the definition with the premise set out in *Powley*⁹ which noted that the practice of the rights must be integral to the Métis community. This directly ties the exercise of these rights to a more holistic purpose than just subsistence and connects the exercise of rights to MNO's distinctive culture. Secondly, the inclusion of ‘Métis Harvesting’ as part of the defined term. This differentiates between the right (i.e., the right to hunt) and the exercise of the rights (i.e., hunting or Métis harvesting). This distinction is important for the purposes of the Rights Impact Assessment.

For further clarity:

MNO-MNR Harvesting Right	Exercise of the Right / Métis Harvesting
Right to Hunt	Hunting
Right to Trap	Trapping
Right to Fish	Fishing
Right to Gather	Gathering

Therefore, in order to understand the *right*, there must be both a consideration of the exercise of the right, the implications of potential impacts on the right to food harvesting for subsistence, social, or ceremonial purposes.

Harvesting rights currently exist and were in existence prior to effective Canadian Sovereignty, as evidenced in the *Powley*¹⁰ decision (as well as extensive ongoing historical research); and the

⁸ MNO-MNR Framework Agreement on Métis Harvesting (2018). <https://www.metisnation.org/wp-content/uploads/2015/07/metis-harvesting-framework-agreement.pdf>.

⁹ R. v. Powley, 2003 SCC 43 (CanLII), [2003] 2 SCR 207.

¹⁰ Ibid.

Indigenous perspective of these rights is clearly laid out in the MNO-MNRF Agreement definition of rights and Métis harvesting.

The Chalk River Traditional Knowledge and Land Use Study report¹¹ (TKLUS report) completed for the NSDF provided specific contextual information related to this Project including the exercise of the right to hunt, trap, fish and gather; as well as how these rights connect to Métis culture and heritage. While the TKLUS report clearly indicates within Section 1.0 (Disclaimer) that the information contained therein “[...] provides information on the types of land use activities that might be occurring on the lands and waters across the Study Area”, or in other words provides information on the *exercise of the right*, there is important information within the TKLUS report which can be used to contextualize the rights.

The exercise of rights in the Project Area included:

Harvesting Right	Exercise	Broad examples	Specific examples
Right to Hunt	Hunting	Large Game	Moose Deer
		Small Game	Rabbit
		Upland Birds	Partridge
			Grouse
			Duck
			Goose
Right to Trap	Trapping	Unspecified	Unspecified
Right to Fish	Fishing	Subsistence / Commercial / Bait	Pickrel / Walleye
			Trout
			Bass
			Northern Pike / Jackfish
			Sturgeon
Right to Gather	Gathering	Plants	Unspecified
		Berries	Unspecified

¹¹ KNOW History Historical Services, Chalk River TKLUS report, 2019.

Harvesting Right	Exercise	Broad examples	Specific examples
		Wood	Unspecified
		Other Natural Material	Unspecified

Please note that all levels of court declined to characterize rights as species specific¹². It was found that emphasis on species places undue emphasis on regulatory concerns and removes the right from the Indigenous perspective¹³.

Harvesting Rights consists of 2 subcomponents, Available Land and Land Functionality. These subcomponents are broad enough to include consideration of the right to hunt, trap, fish and gather. Available Land as a subcomponent of the Harvesting Rights can be selected because of its intrinsic importance to the continued ability to exercise the right and to best understand the impacts of the amount of land being taken up by the Project.

As a subcomponent of Harvesting Rights, Land Functionality (or avoidance behaviours) has been selected as a potential Project interaction with MNO harvesting rights. While there may be additional Available Lands within the vicinity of the NSDF/CRL site, Métis harvesters may view this land as non-functional, or less desired, as there may be avoidance behaviours of those exercising their harvesting rights based on real or perceived Project related aspects. Avoidance behaviours may also be exacerbated by changes to the Experience (Noise and Dust) as identified and discussed in section 3.3 of this RIA assessment.

The primary pathway for change in Land Functionality is through MNO avoidance of the nuclear facilities, additive to the land removed through the Available Lands calculation. This can be ascertained through previous research completed by the MNO in other Regions whereby avoidance of Nuclear Facilities was collected and the maximum avoidance area of 2km was identified¹⁴.

Issues Outside of Scope of Assessment

In addition to the potential impacts, mitigations and follow-up measures assessed and discussed above, MNO is of the view that the existence of the CRL site and related historic and ongoing impacts, even though it is considered as being out of scope for the proposed NSDF Project, must also be taken into consideration as part of the RIA. MNO is concerned that the original allocation of land to AECL for the development of CRL did not involve adequate consultation with the MNO or its Citizens. The MNO is of the opinion that the original development of CRL caused disruption and displacement of Métis Citizens from the area, which has resulted in limited exercise of rights in the Project area today. The MNO is of the view that they should not be

¹² Teillet, Jean, “Métis Harvesting Rights in Canada: R V Powley” [2001] IndigLawB 72; (2001) 5(12) *Indigenous Law Bulletin* 16.

¹³ *Idem*.

¹⁴ After discussions between the MNO and CNSC staff, it was concluded that for the purpose of NSDF the baseline is a 2km buffer of avoidance of the exercise of harvesting rights around the NSDF site.

penalized through these current regulatory mechanisms for past wrongs of the Crown. Instead, AECL should acknowledge this displacement and begin discussions about accommodation related to the long-altered landscape in the spirit of reconciliation.

Although these concerns are out of scope of the NSDF Project, MNO and CNSC staff have brought this concern to the attention of CNL and AECL who have committed to having ongoing discussions to work collaboratively to address the concerns raised by the MNO, where possible.

3.0 Potential project impacts/interactions and severity assessment

3.1 Discussion

MNO Citizens (MNO Region 5 Lake Nipissing/ Mattawa Métis & Region 6 Kawartha/Ottawa River) assert Indigenous Rights throughout their traditional territories including the CRL site where the NSDF project is proposed.

In the information provided by MNO to the proponent and the CNSC, traditional uses such as hunting, trapping, fishing and plant harvesting were identified in the RSA. As identified in MNO's Traditional Knowledge and Land Use Study (TKLUS) for the NSDF project, hunting for large and small game as well as birds are a key source of food and sometimes income for MNO Citizens. It is also of cultural and socioeconomic importance through food sharing, knowledge transfer, and traditional protocols. The TKLUS identifies several hunting VCs within the vicinity of the project area (available lands and waterbodies outside the CRL site), indicating that MNO Citizens continue to use this area for hunting and other traditional activities.

Métis Citizens assert and exercise a variety of rights throughout their traditional territory and regions. For the purpose of this RIA, harvesting rights were identified as the principle asserted rights that could potentially be impacted by the Project. Harvesting rights are understood to be premised on the right to hunt for food in the traditional hunting grounds of the Métis Nation.

The potential impacts and severity of impacts presented below are based on agreed-upon criteria mentioned on section 1.3.2. Project impacts on the exercise of harvesting rights by MNO Citizens may occur through access restrictions, avoidance behaviours, and/or sensory disturbances. The potential impacts via these pathways were considered within the current and historical context of MNO traditional uses and activities in the LSA, and did not take into account the ongoing presence of the entire CRL property, as it is out of scope of the environmental assessment for the NSDF project.

Through the analyses summarized below, it was found that the potential impacts of the Project identified on MNO's Harvesting Rights are expected to be of a minor degree, and within normal variation of baseline conditions. As a result, it is expected that the magnitude of the potential impacts is of an overall low severity.

Based on the information in CNL's Environmental Impact Statement (EIS) for the NSDF project and confirmed by CNSC staff (summarized in CNSC staff's EA report for the Project), CNSC staff have not identified any residual impacts to the quality and quantity of resources as a result of the Project within the RSA (Section 9 of the EA report). In addition, CNSC staff were unable to make a clear linkage to the NSDF's potential unique contribution to potential avoidance behaviours and perceptions reported by the MNO. Based on the analysis in the sections below,

potential access restrictions and potential impacts on experience are expected to have an overall low to negligible severity of impact. Therefore, these specific impact pathways were not identified for further analysis in terms of potential impact severity, as part of the RIA.

3.2 Impacts to access

The NSDF Project is proposed to be located within the restricted, fenced area of the CRL site, which is approximately 4000 ha and is currently inaccessible to MNO Citizens for traditional practices, including harvesting. The footprint of the NSDF Project site is approximately 37ha. If constructed, the NSDF project site would remain inaccessible to MNO Citizens indefinitely.

MNO expressed that the Kichissippi (Ottawa River) is a culturally important waterbody, and that the Pointe au Baptême site located on the CRL site is culturally and spiritually significant to them. The Pointe au Baptême site is located within the LSA and the proponent has confirmed that they are aware of the importance of this site to Indigenous Peoples, including MNO Citizens, and do not restrict access to it. In addition, the proposed Project is not predicted to impact this site or access to it.

The MNO identified in their TKLUS that there are a number of VCs important for harvesting in the vicinity of the CRL site and that their ability to conduct traditional harvesting activities in the RSA is already impacted by a number of existing stressors, including existing developments and land restrictions such as the CRL site and CFB Petawawa. However, it is expected that the magnitude of changes from the current baseline conditions as a result of the Project on the ability for MNO Citizens to access harvesting locations is still low. The proposed project footprint is currently not accessible for traditional harvesting practices as it is within the CRL site. Although the Project footprint itself represents the permanent use of approximately 37ha of the CRL site, it is likely to have little additional or new impact on the exercise of hunting rights in the RSA compared to the current baseline conditions. Therefore, the potential overall severity of this impact pathway is assessed as low for the proposed NSDF Project.

3.3 Impacts to quality of experience (avoidance)

Based on information gathered in their TKLUS, MNO Citizens have expressed concerns about the CRL site being potentially contaminated as a result of historic and ongoing nuclear operations and activities. Due to this perceived risk of contamination, some MNO Citizens currently avoid using the land and resources near the site to exercise their rights.

In addition, TKLUS participants noted that MNO Region 5 and 6 Citizens may continue to alter land use because of perceived environmental contamination and impacts in the vicinity of CRL, which may affect land use and enjoyment into the future, as a result of the NSDF Project. In addition, perception and fears of contamination may perpetuate a reduction in harvesting country foods in favour of store bought and processed foods.

The NSDF Project is a permanent facility. As such, from MNO's perspective, the source of fear that leads to avoidance behaviour within the CRL site cannot be removed. However, the MNO did indicate that the consolidation of CRL's low-level radioactive wastes into one facility (the NSDF) to be managed for the long-term could potentially contribute to increasing confidence in the CRL site and reducing the overall sentiment of fear and mistrust with the site over time. As a result, it is unclear how much the proposed Project would contribute to the perpetuation of

avoidance behaviours over time, given the historical and present context of existing fear and avoidance behaviours.

In addition, it is possible that the Project may lead to some avoidance behaviours in the RSA during particular phases of the Project, due to an anticipated increase in traffic, noise, and dust during the construction and operation phases of the Project. However, CNSC staff confirmed in the EA report that when taking into consideration CNL's proposed mitigation measures (Ch. 6, section 6.1.1 of the EA report), there are no residual adverse environmental effects expected as a result of the Project, including in relation to noise, dust and traffic.

Therefore, CNSC staff do not expect the Project to lead to new adverse impacts on the MNO's quality of experience, including potential avoidance behaviors in the RSA. CNSC staff concludes that the potential overall severity of this impact pathway is **low** based on the rights impact severity criteria decision matrix.

4.0 Mitigation, accommodations, monitoring and follow-up measures

The 2 main project pathways to potential impacts on MNO's rights and interests that were identified through the analysis in section 3 were found to be of a low overall severity. However, to ensure that the concerns raised by the MNO regarding any potential impacts to access and the quality of experience to conduct traditional activities related to the Project are appropriately managed during all phases of the Project, CNSC staff and the MNO assessed mitigation and other measures proposed by CNL, AECL and CNSC staff to determine their adequacy and effectiveness.

CNSC staff confirmed that the mitigation measures identified in CNL's EIS are adequate to address potential biophysical impacts from the Project in relation to wildlife and potential concerns around access and the sensory experience in the RSA. With regards to potential impacts to access, CNL will continue to maintain access to the Pointe au Baptême site along the Ottawa River, which is a culturally significant site identified by the MNO. CNL will also consult with trappers about their use of the surrounding areas for trapping activities and to understand any concerns to limit potential effects on traditional hunting and trapping within the CRL site boundary.

As per potential impacts to the quality of experience, CNL has committed to engaging and involving the MNO in their NSDF Project follow-up programs and share results of monitoring activities in order to help address concerns raised regarding fear and avoidance behaviours and build trust in the proposed NSDF Project as well as current and ongoing operations at the CRL site. CNL has also committed to seeking input from MNO for additional mitigation measures to include within the NSDF Project Environmental Protection Plan, which includes the dust management, erosion and sediment control and surface water management plans. CNL will also share its Archaeological Master Plan and Cultural Resource Management Program with the MNO.

CNL, AECL and the MNO are in the process of developing a long-term relationship agreement that will help to enhance the relationship and foster greater collaboration and inclusion of the MNO and its Citizens in CNL's projects and operations. CNL and the MNO have also signed a Memorandum of Understanding and agreed to a mutually beneficial, on-going working

relationship so that CNL can engage with the Métis community at the local and regional levels in order to better understand any Métis Rights and Interests that may be impacted in the general and surrounding areas around the projects. CNSC staff and the MNO found that these proposed measures and commitments are adequate to address the concerns raised by the MNO and will help manage the potential impacts identified through this RIA throughout the life cycle of the NSDF.

In addition to the mitigation measures and the follow-up and monitoring activities summarized above, CNSC staff are committed to long-term engagement with the MNO as per the CNSC-MNO ToR for Long-Term Engagement signed in 2019. As per the ToR, CNSC staff are committed to developing a MNO Region 5/6 specific engagement plan. CNSC staff propose that the engagement plan include collaboration on CNSC environmental monitoring activities around the CRL site, ongoing communication and regular meetings, as well as engagement with MNO Citizens and harvesters to ensure that the CNSC and the MNO can continue to work together to build trust in the safety of the CRL site, including the proposed NSDF.

When taking into consideration the overall low severity of potential impacts on MNO's rights, as well as the proposed mitigation and other measures to address the concerns raised by the MNO in relation to the Project, no residual impacts were identified in relation to the Project that required further analysis or consideration of additional mitigation or accommodation measures.

Table 4: Summary of the severity of potential impacts to Indigenous Rights for MNO with respect to the Near Surface Disposal Project

Established/potential/asserted right (Nature, Scope, Exercise)	MNO perspective on the importance, value, uniqueness of an area, resources or species	Context	Potential project impact (Type and Description)	Magnitude	Geographic extent	Reversibility	Duration	Frequency & timing	Overall severity	Mitigation and follow up measures (proponent)	Mitigation and follow up measures (CNSC)	Residual impacts
Harvesting												
Hunting, trapping, fishing and gathering of natural resources for food, social or ceremonial purposes	<ul style="list-style-type: none"> - Key source of food and sometimes income - Cultural importance through food sharing, knowledge transfer, and traditional protocols 	<p>Regional:</p> <ul style="list-style-type: none"> - CNSC staff is of the view that the NSDF will not impact MNO's Citizens ability to harvest at the regional level <p>Local:</p> <ul style="list-style-type: none"> - use of CRL site before the site was established -access to the CRL site has been restricted since establishment of the site in the 1940's and there are currently no plans for re-establishing general public access and use for traditional practices for the CRL site 	1. Access 37 ha of land become permanently inaccessible for hunting and harvesting	Low	Site Specific	Permanent	Long-term	Continuous	Low to no impacts	<ul style="list-style-type: none"> -The mitigation measures identified in CNL's EIS are adequate to address potential biophysical impacts from the Project in relation to wildlife and potential concerns around access and the sensory experience in the RSA. -CNL has committed to engaging and involving the MNO in their NSDF Project Follow-up programs in order to help address concerns raised regarding fear and avoidance behaviours -CNL has committed to enhancing its engagement with the MNO, sharing results of monitoring activities and follow-up programs including those for air quality, surface water quality, terrestrial environment, aquatic environment and ground water quality. -CNL will also share its Archaeological Master Plan and Cultural Resource Management Program with the MNO. 	Long-term engagement with the MNO as per the CNSC-MNO ToR for Long-Term Engagement signed in 2019, including collaboration on CNSC environmental monitoring activities around the CRL site, ongoing communication and regular meetings, as well as engagement with MNO Citizens and harvesters.	None identified. Mitigation and follow-up measures are deemed adequate to address and manage potential impacts.
			2. Experience (Fear and Avoidance) Perceived contamination of animals, water and plants near the CRL site causes avoidance behaviour due to low trust in quality of resources. (Sensory) Noise, traffic, and dust from construction and operation activities degrades the sensory experience of being on the land, causing	Low	Local	Permanent	Long-term	Continuous	Low to no impacts			None identified. Mitigation and follow-up measures are deemed adequate to address and manage potential impacts.

			avoidance of the area							<p>-CNL will also continue to maintain access to Pointe au Baptême</p> <p>-CNL and the MNO are in the process of developing a long-term relationship agreement that will help to enhance the relationship and foster greater collaboration and inclusion.</p>		
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5.0 Conclusions and recommendations

Based on the information gathered and the collaborative RIA process conducted between the CNSC and MNO, CNSC staff have come to the conclusion that the potential impacts identified as a result of the NSDF Project on MNO rights and interests are considered to be of an overall low severity. With the mitigation and follow-up measures proposed by CNL, AECL and CNSC staff, all identified Project impacts and concerns can be adequately managed and addressed. Therefore, there are no residual impacts expected to MNO's Indigenous Rights in relation to the Project. All parties involved, including the MNO, CNL, AECL and the CNSC are committed to ongoing engagement and dialogue to work towards addressing concerns raised by the MNO and enhancing the relationships through collaboration in relation to the NSDF Project and CRL site in general. MNO agrees with the conclusion, recommendations and proposed approach.

Appendix E. List of acronyms

AANTC	Algonquins Anishinabeg Nation Tribal Council
AECL	Atomic Energy of Canada Limited
AGCV	Above ground concrete vault
AGGLFN	Algonquins of Greater Golden Lake First Nation
AKLUS	Algonquin Knowledge and Land Use Study
ALARA	As low as reasonably achievable
ANS	Anishinabek Nation Secretariat
AOO	Algonquins of Ontario
AOOs	Anticipated operational occurrences
AOPFN	Algonquins of Pikwakanagan First Nation
BDBA	Beyond design basis accidents
C ₂ H ₂ Cl	Vinyl chloride
C ₃ H ₄ O	Acrolein
CCME	Canadian Council of Ministers of the Environment
CDWQ	Canadian Drinking Water Guidelines
CEAA 2012	<i>Canadian Environmental Assessment Act, 2012</i>
CH ₄	Methane
CIAR	Canadian Impact Assessment Registry
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
CLFN	Curve Lake First Nation
CNL	Canadian Nuclear Laboratories
CNSC	Canadian Nuclear Safety Commission
CO	Carbon monoxide
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
COPC	Contaminants of potential concern
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CRL	Chalk River Laboratories
CRM	Cultural resource management
CSA	Canadian Standard Association
CURL	Current Use of Lands and Resources
DBA	Design basis accidents
DEC	Design extension conditions

DCP	Dose control points
DMP	Dust management plan
DRL	Derived release limit
EA	Environmental assessment
EAFMP	Environmental Assessment Follow-Up Monitoring Program
ECCC	Environment and Climate Change Canada
ECM	Engineered containment mound
EIS	Environmental impact statement
EMR	East Mattawa Road
EQS	Environmental quality standard
FA	Federal authority
FPRT	Federal-Provincial Review Team
FRI	Forest Resource Inventory
GHG	Greenhouse gas
GoCo	Government Owned Contractor Operated
GWMF	Geological Waste Management Facility
GWMP	Groundwater monitoring program
Ha	Hectare
HC	Health Canada
HFC	Hydrofluorocarbons
HFN	Hiawatha First Nation
Hg	Mercury
HHRA	Human health risk assessment
H ₂ S	Hydrogen sulphide
IAA	<i>Impact Assessment Act</i>
IAEA	International Atomic Energy Agency
IEMP	Independent Environmental Monitoring Program
IER	Indigenous Engagement Report
km	Kilometres
KZA	Kitigan Zibi Anishinabeg
L	Litre
LCH	Licence condition handbook
LLW	Low level waste
LSA	Local study area
m	meter

m3	Cubic metres
MBCA	<i>Migratory Birds Convention Act</i>
MDL	Method detection limit
MECP	Ministry of the Environment, Conservation and Parks
MELCC	Ministère de l'Environnement et de la Lutte contre les changements climatiques
MNO	Métis Nation of Ontario
MOECC	Ministry of the Environment and Climate Change
MOU	Memorandum of understanding
NEW	Nuclear energy workers
NO _x	Nitrogen oxides
NPD	Nuclear Power Demonstration
NPRI	National Pollutant Release Inventory
NRCan	Natural Resources Canada
NSCA	<i>Nuclear Safety and Control Act</i>
NSDF	Near Surface Disposal Facility
O ₃	Ozone
OBG	Ottawa-Bonnechere Graben
OHS	Occupational health and safety
Pb	Lead
PC	Parks Canada
PD	Project description
PFC	Perfluorocarbons
PFP	Participant Funding Program
PM	Particulate matter
PWQO	Provincial Water Quality Objectives
RA	Responsible authority
RIA	Rights Impact Assessment
RSA	Regional study area
SARA	<i>Species at Risk Act</i>
SF ₆	Sulfur hexafluoride
SFMP	Sustainable Forest Management Plan
SO ₂	Sulphur dioxide
SPM	Suspended particulate matter
SSA	Site study area
SWMP	Surface Water Management Plan

TKLUS	Traditional Knowledge and Land Use Study
ToR	Terms of Reference
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
VC	Valued component
WL	Whiteshell Laboratories
WMA	Waste Management Area
WTFN	Williams Treaties First Nations
WWTP	Waste water treatment plant

PART TWO

Part Two provides all relevant information pertaining directly to the licence, including:

1. proposed changes to the existing licence;
2. proposed licence;
3. proposed licence conditions handbook; and
4. current licence.

PROPOSED LICENCE CHANGES

Overview

Should the Commission approve the NSDF construction, the NSDF licence amendment application will become part of the CRL operating licence. The proposed licence is provided on the following pages of the document. The proposed licence incorporates standardized licence conditions in a standard format.

Licence Conditions

The proposed licence incorporates the standardized licence conditions applicable to the authorization by the Commission to construct the proposed NSDF at CRL. The proposed licence contain conditions that authorize changes within the licensing basis as defined in CNSC's information document REGDOC-3.5.3, *Regulatory Fundamentals*, and reflects the current licensing framework.

Licence Format

The proposed licence uses the standard format.

Licence Period

Construction approval of the proposed NSDF will be governed by the CRL operating licence, therefore there is no change to the licence term which is valid from April 01, 2018 to March 31, 2028.

PROPOSED LICENCE

e-Doc 6647732 (Word)

e-Doc 6678493 (PDF)



NUCLEAR RESEARCH AND TEST ESTABLISHMENT OPERATING LICENCE CHALK RIVER LABORATORIES

I) LICENCE NUMBER: NRTEOL-01.00/2028

II) LICENSEE: Pursuant to section 24 of the *Nuclear Safety and Control Act*, this licence is issued to:

**Canadian Nuclear Laboratories Ltd.
Laboratoires Nucléaires Canadiens Ltée
286 Plant Road
Chalk River, Ontario
K0J 1J0**

III) LICENCE PERIOD: This licence is valid from April 1, 2018, to March 31, 2028 unless suspended in whole or in part, amended, revoked or replaced.

IV) LICENSED ACTIVITIES:

This licence authorizes the licensee to operate the Chalk River Laboratories located in the Town of Deep River, County of Renfrew, Province of Ontario, as further detailed in paragraphs (a) to (d) below:

- (a) prepare a site for, construct, operate, modify, decommission or abandon a nuclear facility;
- (b) possess, transfer, use or abandon a nuclear substance, prescribed equipment or prescribed information;
- (c) produce, refine, convert, process, package, manage, store or dispose of a nuclear substance; and
- (d) produce or service prescribed equipment.

V) EXPLANATORY NOTES:

- (a) Nothing in this licence shall be construed to authorize non-compliance with any other applicable legal obligation or restriction.
- (b) Unless otherwise provided for in this licence, words and expressions used in this licence have the same meaning as in the *Nuclear Safety and Control Act* and associated regulations.

- (c) The Chalk River Laboratories Licence Conditions Handbook provides compliance verification criteria used to verify compliance with the conditions set out in this licence, including information regarding delegation of authority and applicable versions of documents and a process for version control of codes, standards or other documents that are used as compliance verification criteria.

VI) CONDITIONS:

G. General

- G.1 The licensee shall conduct the activities described in Part IV of this licence in accordance with the licensing basis, defined as:
 - (i) the regulatory requirements set out in the applicable laws and regulations;
 - (ii) the conditions and safety and control measures described in the facility's or activity's licence and the documents directly referenced in that licence; and
 - (iii) the safety and control measures described in the licence application and the documents needed to support that licence application;unless otherwise approved in writing by the Canadian Nuclear Safety Commission (hereinafter "the Commission").
- G.2 The licensee shall give written notification of changes to the facility or its operation, including deviation from design, operating conditions, policies, programs and methods referred to in the licensing basis.
- G.3 The licensee shall control the use and occupation of any land within the exclusion zone.
- G.4 The licensee shall provide, at the nuclear facility and at no expense to the Commission, suitable office space for employees of the Commission who customarily carry out their functions on the premises of that nuclear facility (onsite Commission staff).
- G.5 The licensee shall maintain a financial guarantee for decommissioning that is acceptable to the Commission or a person authorized by the Commission.
- G.6 The licensee shall implement and maintain a public information and disclosure program.
- G.7 The licensee shall implement the licensing regulatory actions prescribed by the Commission. Review and closure of the licensing actions is administered by the Commission or a person authorized by the Commission.
- G.8 The licensee shall implement the Environmental Assessment (EA) regulatory commitments prescribed by the Commission. Review and closure of the EA regulatory commitments is administered by the Commission or a person authorized by the Commission.

1. Management System

1.1 The licensee shall implement and maintain a management system.

2. Human Performance Management

2.1 The licensee shall implement and maintain a human performance program.

2.2 The licensee shall implement and maintain a training program.

2.3 Persons appointed to the following positions shall be certified:

- (a) Senior Reactor Shift Engineer; and
- (b) NRU Health Physicist.

3. Operating Performance

3.1 The licensee shall implement and maintain an operating program, which includes a set of operating limits.

3.2 The licensee shall implement and maintain a program for reporting to the Commission or a person authorized by the Commission.

4. Safety Analysis

4.1 The licensee shall implement and maintain a safety analysis program.

4.2 The licensee shall implement and maintain a nuclear criticality safety program.

5. Physical Design

5.1 The licensee shall implement and maintain a design program.

5.2 The licensee shall implement and maintain a pressure boundary program and shall have in place a formal agreement with an authorized inspection agency.

6. Fitness for Service

6.1 The licensee shall implement and maintain a fitness for service program.

7. Radiation Protection

7.1 The licensee shall implement and maintain a radiation protection program, which includes a set of action levels. When the licensee becomes aware that an action level has been reached, the licensee shall notify the Commission within seven days.

8. Conventional Health and Safety

8.1 The licensee shall implement and maintain a conventional health and safety program.

9. Environmental Protection

9.1 The licensee shall implement and maintain an environmental protection program, which includes a set of action levels. When the licensee becomes aware that an action level has been reached, the licensee shall notify the Commission within seven days.

10. Emergency Management and Fire Protection

- 10.1 The licensee shall implement and maintain an emergency preparedness program.
- 10.2 The licensee shall implement and maintain a fire protection program.

11. Waste Management

- 11.1 The licensee shall implement and maintain a waste management program.
- 11.2 The licensee shall maintain a decommissioning plan.

12. Security

- 12.1 The licensee shall implement and maintain a security program.

13. Safeguards and Non-Proliferation

- 13.1 The licensee shall implement and maintain a safeguards program.

14. Packaging and Transport

- 14.1 The licensee shall implement and maintain a packaging and transport program.

SIGNED at OTTAWA, this day of August, 2022.

Rumina Velshi, President
on behalf of the Canadian Nuclear Safety Commission

PROPOSED LICENCE CONDITIONS HANDBOOK

Overview

The licence conditions handbook (LCH) associated with the proposed licence provides compliance verification criteria used by CNSC staff to determine whether the conditions of the licence have been met. Additionally, the LCH includes information such as applicable standards and/or regulatory documents, regulatory interpretation, references to relevant licensee documents and guidance. This structure allows more freedom for the licensee to improve and update its documentation within the licensing basis.

Proposed LCH:

e-Doc 6647722 (Word)

e-Doc 6678497 (PDF)



eDoc 6647722 (Word)
eDoc 6678497 (PDF)

LICENCE CONDITIONS HANDBOOK

NRTEOL-LCH-01.00/2028

CHALK RIVER LABORATORIES NUCLEAR RESEARCH AND TEST ESTABLISHMENT OPERATING LICENCE

NRTEOL-01.00/2028

Revision 3



**Licence Conditions Handbook
(NRTEOL-LCH-01.00/2028,
Revision 3)**

Effective: August xx, 2022

**Chalk River Laboratories Nuclear Research and Test
Establishment Operating Licence
NRTEOL-01.00/2028 (Effective: August xx, 2022)**

SIGNED at OTTAWA this xx day of August, 2022

**Candida Cianci, Director
Canadian Nuclear Laboratories Regulatory Program Division
Directorate of Nuclear Cycle and Facilities Regulations
CANADIAN NUCLEAR SAFETY COMMISSION**

REVISION HISTORY:

Effective Date	Rev. #	e-Doc #	Description	CAF e-Doc #
May 08, 2018	0	4978828	New document	
February 25, 2019	1	5694991	Updated information to reflect changes occurring at CRL	5695789
February 28, 2021	2	5867166	Updated to reflect changes occurring at CRL and to reflect current versions of compliance verification criteria publications and documents	6334794
August xx, 2022	3	6647722	Updated to reflect changes to authorize the construction of the Near Surface Disposal Facility (NSDF) at CRL and to add the associated compliance verification criteria	xxxxxxxxx

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INTRODUCTION

The general purpose of the Licence Conditions Handbook (LCH) is to identify and clarify the relevant parts of the licensing basis for each licence condition. This will help ensure that the licensee performs the licensed activities at the Chalk River Laboratories (CRL) in accordance with the licensing basis for CRL and the intent of the CRL licence. The LCH should be read in conjunction with the licence.

The LCH typically has three parts under each licence condition: the Preamble, Compliance Verification Criteria (CVC), and Guidance. The Preamble explains, as needed, the regulatory context, background, and/or history related to the licence condition. CVC are criteria used by Canadian Nuclear Safety Commission (CNSC) staff to verify and oversee compliance with the licence condition. Guidance is non-mandatory information, including direction, on how to comply with the licence condition.

The documents referenced in the LCH by e-Access numbers are not publicly available. The links provided in the LCH are references to the internal CNSC electronic filing system, and those documents cannot be opened from outside of the CNSC network.

Current versions of the licensing basis publications, licensee documents that require notification of change, and guidance documents referenced in the LCH are tracked in the document *Licensing Documents for Chalk River Laboratories-CRL-Specific* (e-Doc 5507949) and - *Company-Wide* (e-Doc 5507946), which are controlled by the Canadian Nuclear Laboratories Regulatory Program Division and are available to the licensee upon request.

Most CNSC documents referenced in the LCH are available through the CNSC public website. Documents listed on the CNSC website may contain prescribed information as defined by the *General Nuclear Safety and Control Regulations*. Information in these documents will be made available only to stakeholders with appropriate security clearance on a valid need to know.

The licensee documents referenced in the LCH are not publicly available; they contain proprietary information or prescribed information as defined by the *General Nuclear Safety and Control Regulations*.

Domestic and international standards (in particular consensus standards produced by the Canadian Standards Association (CSA) Group) are an important component of the CNSC's regulatory framework. Standards support the regulatory requirements established through the *Nuclear Safety and Control Act* (NSCA), its regulations and licences by setting out the necessary elements for acceptable design and performance at a regulated facility or a regulated activity. Standards are one of the tools used by the CNSC to evaluate whether licensees are qualified to carry out licensed activities.

The CNSC offers complimentary access to the CSA Group [suite of nuclear standards](#) through the CNSC website. This access platform allows interested stakeholders to view these standards online through any device that can access the Internet.

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Up to date lists of the nuclear and support facilities at CRL that are subject to CNSC regulatory oversight, and legacy facilities that were placed under care and maintenance or undergoing decommissioning under buildings removal plans, are maintained in the CNL document 900-514300-LST-001, *Site Licences, Certificates, Permits, Building/Facility Contacts, & Licence Representatives*.

Appendix A to the LCH provides definitions of terms and a list of acronyms used throughout it.

More information on the LCH is available in the CNSC document titled *How to Write a Licence Conditions Handbook* (e-Doc 4967591).

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INTRODUCTION

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Licence Condition G.1: Licensing Basis

The licensee shall conduct the activities described in Part IV of this licence in accordance with the licensing basis, defined as:

- (i) the regulatory requirements set out in the applicable laws and regulations;
- (ii) the conditions and safety and control measures described in the facility's or activity's licence and the documents directly referenced in that licence; and
- (iii) the safety and control measures described in the licence application and the documents needed to support that licence application;

unless otherwise approved in writing by the Canadian Nuclear Safety Commission (hereinafter "the Commission").

Preamble:

The licensing basis sets the boundary conditions for acceptable performance at a regulated facility or activity, and thus establishes the basis for the CNSC's compliance program in respect of that regulated facility or activity. The degree to which the regulatory requirements are applied to CRL facilities and activities should reflect their importance to health and safety of persons, environment, national security, international obligations to which Canada has agreed, licensee's quality and economic expectations, the complexity of facility or activity, and the possible consequences if accidents occur or the activity is carried out incorrectly.

Where the licence condition requires the licensee to implement and maintain a particular program, the licensee documents that describe and implement the program are part of the licensing basis. Programs required by licence conditions or referred to in the LCH may or may not be health, safety, security, environment, and quality programs as defined in the Canadian Nuclear Laboratories Ltd. (CNL)'s management system.

Compliance Verification Criteria:

Part (i) of the Licensing Basis

Part (i) of the licensing basis refers to applicable laws and regulations. There are many federal and provincial acts and regulations, and international laws, agreements, guidelines, etc., applicable to activities performed at CRL.

The laws, regulations and international agreements for which CNSC has a regulatory role are:

- *Nuclear Safety and Control Act (NSCA)* and its regulations
- *Canadian Environmental Assessment Act, 2012 (CEAA, 2012)* and its regulations
- *Transportation of Dangerous Goods Act* and its regulations
- *Canada Labour Code* and *Canada Occupational Health and Safety Regulations*
- *Nuclear Liability and Compensation Act* and its regulations

- *Fisheries Act* (CNSC responsibilities are defined in the *Memorandum of Understanding between the CNSC and Fisheries and Oceans Canada*)
- Canada/IAEA safeguards agreements

All Memoranda of Understandings between the CNSC and other regulatory agencies or government departments are available on the CNSC Webpage under [Acts and Regulations/Domestic Arrangements](#).

Through its decision of October 22, 2014, the Commission, pursuant to section 7 of the NSCA, exempted CNL from the requirements of sections 15.01 and 15.02 of the *CNSC Class II Nuclear Facilities and Prescribed Equipment Regulations* in relation to the requirement for a certified radiation safety officer (e-Doc 4543516).

Part (ii) of the Licensing Basis

Part (ii) of the licensing basis refers to the conditions and the safety and control measures included in the CRL licence and in the documents directly referenced in the licence.

Under the standardized format and content, the CRL licence requires the licensee to implement and maintain certain programs. For the purpose of meeting a licence requirement, a program may be a series of documented, coordinated activities, not necessarily a single document.

Part (iii) of the Licensing Basis

Part (iii) of the licensing basis refers to the safety and control measures described in the licence application and the documents needed to support that licence application. The safety and control measures include important aspects of that documentation such as, but not limited to: the facility-specific design basis and operational information documented in the most recent safety analysis and operational limits and conditions documents.

Part (iii) of the licensing basis also includes safety and control measures outlined in CNSC regulatory documents, CSA standards, and other standards, codes and references that are cited in the application or in the licensee's supporting documentation.

Applicable licensee documents are listed in the LCH under the heading "Licensee Documents that Require Notification of Change". Applicable CNSC regulatory documents, CSA standards and other documents are listed in the LCH under the heading "Licensing Basis Publications". The licensee documents listed in the LCH could cite other documents that also contain safety and control measures (i.e., there may be safety and control measures in "nested" references in the application). The licensee documents listed in the LCH and their "nested" references define the licensing basis for the programs required by the CRL licence as long as they include safety and control measures.

Regulatory Role of the Licensing Basis

The licensing basis is established when the Commission renders its decision regarding the licence application.

Licence condition G.1 requires the licensee to conduct the licensed activities in accordance with the licensing basis. For activities that are found to be not in accordance with the licensing basis, the licensee shall take action as soon as practicable to return to a state consistent with the licensing basis, taking into account the risk significance of the situation.

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The applicability of the licensing basis publications may be graded based on the specific activity being considered.

CNSC Staff's Approach to Assessing the Licensing Basis for CRL

The licence condition G.1 is not intended to unduly inhibit the ongoing management and operation of the site or the licensee's ability to adapt to changing circumstances and continuously improve, in accordance with its management system. Where the licensing basis refers to specific configurations, methods, solutions, designs, etc, the licensee is free to propose alternate approaches as long as they remain, overall, in accordance with the licensing basis and have a neutral or positive impact on health, safety, the environment, security, and safeguards. However, the licensee shall assess changes to confirm that operations remain in accordance with the licensing basis. The assessment shall be documented and made available to CNSC staff upon request.

For any proposed activity to be carried out on the CRL site, CNSC staff will review the information submitted by CNL to independently determine if the proposed activity remains within the licensing basis. CNSC staff assess a proposed activity as being within the licensing basis based on the hazard and risk of the change, and its impact on the overall safety of the CRL site.

CNSC staff will submit to the Commission for consideration any proposed activity which CNSC staff consider to be outside the licensing basis. If the Commission grants approval to such an activity, it will become part of the licensing basis for CRL and reflected in updates to LCH as appropriate.

Activities Included in the CRL Licensing Basis

Conduct of licensed activities at CRL includes:

- (a) Operate, wholly or in part, any facility/building at CRL.
- (b) Carry out site preparation, construction, or construction modification, or undertakings that are required for, associated with, or arise from the conduct of licensed activities at CRL.
- (c) Construct, modify or abandon any facility/building at CRL.
- (d) Transition from operation to an extended or permanent safe shutdown state any facility/building at CRL, or any parts thereof.
- (e) Maintain in safe shutdown state (extended or permanent) any facility/building at CRL, or any parts thereof.
- (f) Transition from operation or from safe shutdown state to decommissioning any facility/building at CRL, or any parts thereof.
- (g) Decommission/demolish any facility/building at CRL, or any parts thereof.
- (h) Release any decommissioned/demolished facility/building from CNSC regulatory control.
- (i) Produce, possess, process, refine, transfer, use, package, manage, store, dispose or abandon nuclear substances.

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- (j) Produce, possess, use, service, transfer or abandon prescribed equipment.
- (k) Produce, possess, use, transfer or abandon prescribed information.
- (l) Process, store or dispose of waste received from offsite clients.
- (m) Receive, repair, modify, store and return contaminated equipment from offsite clients.

Operational Class I and Class II nuclear facilities at CRL are listed below. A complete list of all nuclear facilities at CRL is found in 900-514300-LST-001, *Site Licences, Certificates, Permits, Building/Facility Contacts, & Licence Representatives*.

Class I Nuclear Facilities	Class II Nuclear Facilities
National Research Universal (NRU) Reactor (permanently shutdown facility)	Health Physics Neutron Generator
Nuclear Fuel Fabrication Facility (NFFF)	Gamma Beam Irradiation Facility
Recycle Fuel Fabrication Laboratories (RFFL)	Gamma Beam Irradiator
ZED-2 Reactor	Van de Graaff Electron Accelerator
Universal Cells	
Molybdenum-99 Production Facility	
Tritium Laboratory	
Waste Treatment Centre and Associated Facilities	
Fuels and Materials Cells	
Waste Management Areas	
Combined Electrolysis and Catalytic Exchange Upgrading and Detritiation Test Facility	

Licence Application Documents and Supporting Documents

Document Number	Document Title	e-Doc
CRL-CNNO-17-0005-L	Application for Renewal of the Nuclear Research and Test Establishment Operating Licence for the Chalk River Laboratories – 2018	5507949
CRL-CNNO-17-0010-L	Application for Renewal of the Nuclear Research and Test Establishment Operating Licence for the Chalk River Laboratories – 2018 (Supporting Information for CNSC Staff)	5507949
CRL-CNNO-17-0017-L	Implementation of REGDOCs and CSA Standards in Support of Relicensing	5507949
232-CNNO-21-0004-L	Updated Application for Licence Amendment to add the Near Surface Disposal Facility to the Chalk River Laboratories Licensing Basis	6523912

Guidance:

The CNSC regulatory document REGDOC-3.5.3, *Regulatory Fundamentals*, outlines the CNSC's regulatory philosophy and approach to applying the *Nuclear Safety and Control Act*. It provides information for licensees, applicants and the public, and contains neither guidance nor requirements. In particular, subsection 6.1.1 of the REGDOC-3.5.3 provides information about the licensing basis.

When the licensee becomes aware that a proposed change or activity might be outside the licensing basis, it should first seek direction from CNSC staff regarding the potential acceptability of this change or activity. The licensee should take into account that certain types of proposed changes might require significant lead times before CNSC staff can make recommendations and/or the Commission can properly consider them.

Licence Condition G.2: Notification of Changes

The licensee shall give written notification of changes to the facility or its operation, including deviation from design, operating conditions, policies, programs and methods referred to in the licensing basis.

Preamble:

Most changes to the CRL site and its facilities are captured as changes to corresponding licensee's documents. The LCH identifies licensee documents that require written notification of changes to the CNSC.

Compliance Verification Criteria:

The licensee shall, as a minimum, notify CNSC staff of changes to licensee's documents identified in the LCH. The written notification of change shall include a copy of the revised document and a description of the change.

CNL program requirements documents (PRDs) and program description documents (PDDs) are accompanied by governing document indices (GDIs). The licensee shall provide updated versions of PDDs quarterly and GDIs annually or upon request from CNSC.

Licensee documents listed in the LCH are subdivided into groups having different requirements for notification of change.

Prior Notification Requirement	Definition
Requires prior notification	<p>The licensee shall submit the revised document to the CNSC as far in advance of planned implementation as practicable, but not less than 30 days prior to planned implementation. The licensee shall allow sufficient time for the CNSC to review the change proportionate to its complexity and the importance of the safety and control measures being affected. This is denoted by a Y in the column "prior notification".</p> <p>Where a document or some part of it requires acceptance by CNSC staff prior to implementation, a footnote has been added to the notification column.</p>
Requires notification at time of implementation	<p>The licensee shall notify the CNSC at the time of implementing a revised document. This is denoted by a N in the column "prior notification".</p>

Changes that may affect the licensing basis, including any change that is not captured as a change to a document listed in the LCH (e.g., construction of new facilities/buildings, transitioning any facility/building from one phase of its life cycle to another, or infrastructure improvements at CRL), requires written prior notification to the CNSC to verify they are in accordance with the licensing basis.

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For any change that is outside the licensing basis defined in subsection G.1 of the LCH, the licensee shall obtain Commission approval before proceeding with the change.

Guidance:

For proposed changes that would not be in accordance with the licensing basis, the guidance for licence condition G.1 applies.

Licence Condition G.3: Land Use and Occupation

The licensee shall control the use and occupation of any land within the exclusion zone.

Preamble:

The initial description of CRL property was included in the Schedule to the Atomic Energy Control Board (AECB) Order 1/14/74, dated June 4, 1974, and published in Part I of the Canada Gazette for June 8, 1974, which designated CRL as a protected site. As the concept of exclusion zone for CRL was not defined in AECB Order 1/14/74, for the purpose of this licence condition the exclusion zone is interpreted as the entire CRL site comprising the controlled area and the supervised area.

The current legal description of the CRL property is included in the Ontario Land Registry under the PINs 57075-0003(LT), 57074-021(LT) and 57076-0049(LT).

Compliance Verification Criteria:

The licensee shall control land use and occupation such that no permanent dwelling (house, residence) is permitted within the supervised or controlled areas at the CRL site.

Permanent dwelling refers to housing that is meant to be fixed. The licensee may erect, for a short time, or remove, without prior notification, temporary structures required for operational purposes (e.g., a trailer, sheds and weather structures).

Licensee Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
E-4500-1101	CRL Outer Area Plant Boundary Monuments Property Plan	5507949	N

Guidance:

None provided.

Licence Condition G.4: Office Space for Onsite CNSC Staff

The licensee shall provide, at the nuclear facility and at no expense to the Commission, suitable office space for employees of the Commission who customarily carry out their functions on the premises of that nuclear facility.

Preamble:

CNSC staff require suitable office space and equipment at the CRL site in order to satisfactorily carry out their regulatory activities.

Compliance Verification Criteria:

The licensee shall keep the office space of onsite CNSC staff secured and separated from the remainder of the building in which it is located by walls, partitions or other suitable structures.

Guidance:

Any changes to accommodation or equipment provided to onsite CNSC staff should be made based on discussion, and subsequent arrangement, between the CNSC and the licensee. The licensee should provide access to its intranet through licensee-owned computers installed in the CNSC site office at CRL.

Licence Condition G.5: Financial Guarantee

The licensee shall maintain a financial guarantee for decommissioning that is acceptable to the Commission.

Preamble:

Atomic Energy of Canada Limited (AECL) is a Schedule III, Part 1 Crown Corporation under the *Financial Administration Act* and an agent of Her Majesty in Right of Canada. As an agent of Her Majesty in Right of Canada, AECL's liabilities are ultimately liabilities of Her Majesty in Right of Canada. While the restructuring of AECL has seen the ownership of CNL transferred to a private-sector contractor, the Canadian National Energy Alliance (CNEA), AECL retains ownership of the lands, assets and liabilities associated with CNL's licences. These liabilities have been officially recognized by the Minister of Natural Resources in a letter dated July 31, 2015 (e-Doc 4803454, 6373440, 6373441, 6373442).

Compliance Verification Criteria:

None provided.

Guidance:

Guidance Documents

Document Number	Document Title	Version
G-206	Financial Guarantees for the Decommissioning of Licensed Activities	2000

Licence Condition G.6: Public Information and Disclosure Program

The licensee shall implement and maintain a public information and disclosure program.

Preamble:

Class I Nuclear Facilities Regulations require that an application for a licence shall contain the proposed program to inform persons living in the vicinity of the site of the general nature and characteristics of the anticipated effects on the environment and the health and safety of persons that may result from the activity to be licensed.

Class II Nuclear Facilities and Prescribed Equipment Regulations require that an application for a licence shall contain the program to inform persons living in the vicinity of the site of the general nature and characteristics of the anticipated effects on the environment and the health and safety of persons that may result from the nuclear facility.

This licence condition requires the licensee to implement and maintain a public information and disclosure program to improve the public's level of understanding about CRL's facilities and activities.

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Version	Effective Date
REGDOC-3.2.1	Public Information and Disclosure	2018	November 30, 2020

Licence Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
CW-513430-REPT-001	Public Information Program for Canadian Nuclear Laboratories (CNL)	5507946	N

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Guidance:

None provided.

Note: The following part of the LCH might be revised further to and based on the Commission's decisions

Near Surface Disposal facility (NSDF) – Facility Specific

Licence Condition G.7: Construction licensing requirements

The licensee shall implement the licensing regulatory actions prescribed by the Commission. Review and closure of the licensing regulatory actions is administered by the Commission or a person authorized by the Commission.

Preamble:

The NSDF Licensing Regulatory Actions identifies a set of conditions resulting from CNSC staff's licensing regulatory review and technical assessments of CNL's licence application to construct the NSDF. CNSC staff will conduct compliance verification activities to verify that the requirements associated with this licence condition are being met.

Compliance Verification Criteria:

The licensee shall implement construction requirements as outlined in the NSDF Licensing Regulatory Actions document, that are applicable to construction and pre-operation activities. Other CNL-directed actions not applicable to construction and pre-operation activities will be addressed in subsequent licensing phases.

Document Title	Document Number	Prior Notification
NSDF Licensing Regulatory Actions	e-Doc 6617091	Y*

*The licensee shall update and report on the progress of the implementation of licensing regulatory actions to CNSC staff on an annual basis or as required by the Commission.

Guidance:

Guidance Documents

Document Number	Document Title	Version
REGDOC-2.11.1	Waste Management, Volume III, Version 2: Safety Case for the Disposal of Radioactive Waste.	2021

Licence Condition G.8: Environmental assessment commitments

The licensee shall implement the Environmental Assessment (EA) regulatory commitments prescribed by the Commission. Review and closure of the EA regulatory commitments is administered by the Commission or a person authorized by the Commission.

Preamble

The licensee's [Near Surface Disposal Facility Project Consolidated Commitments Report, 232-513440-REPT-001](#) identifies EA regulatory commitments, including mitigation measures and follow-up program measures, made by CNL during the EA review process pursuant to the CEAA 2012. CNSC staff will conduct compliance verification activities to verify and confirm that the EA regulatory commitments are being adequately implemented.

Compliance Verification Criteria

The licensee shall implement EA regulatory commitment as outlined in the [Near Surface Disposal Facility Project Consolidated Commitments Report, 232-513440-REPT-001](#) that are applicable to construction and pre-operation activities. This does not include CNL commitments (i.e., good corporate responsibility) that are outside the scope of the CNSC's mandate. Other CNL commitment not applicable to construction and pre-operation activities will be addressed in subsequent licensing phases.

Document Title	Document Number	Prior Notification
Near Surface Disposal Facility Project Consolidated Commitments Report, 232-513440-REPT-001	CIAR 80122, reference number 279	Y*

* The licensee shall update and report on the progress of the implementation of the EA regulatory commitments to CNSC staff on an annual basis or as required by the Commission.

Guidance

None provided

1. SCA – MANAGEMENT SYSTEM

Licence Condition 1.1: Management System

The licensee shall implement and maintain a management system.

Preamble:

Safe and reliable operation of nuclear facilities requires a commitment and adherence to a set of management system principles and, consistent with those principles, the implementation of planned and systematic processes that achieve expected results. The management system focuses on safety in all business activities and supports the safe conduct of licensed activities at CRL.

The *Class I Nuclear Facilities Regulations* require that an application for a licence shall contain the proposed management system for the activity to be licensed, including measures to promote and support safety culture.

The *General Nuclear Safety and Control Regulations* require that a licence application contain the applicant's organizational management structure, including the internal allocation of functions, responsibilities and authority.

The management system is in place to satisfy the requirements set out in the NSCA, regulations made pursuant to the NSCA, the licence and the measures necessary to ensure that safety is of paramount consideration in the implementation of the management system. The management system promotes and supports a healthy safety culture by integrating the characteristics of a healthy safety culture:

- Safety is a clearly recognized value
- Accountability for safety is clear
- Safety is integrated into all activities
- A safety leadership process exists
- Safety culture is learning driven

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Version	Effective Date
REGDOC-2.1.2	Safety Culture	2018	May 31, 2019
CSA N286	Management system requirements for nuclear facilities	2012 (R2017)	April 1, 2018

MANAGEMENT SYSTEM

Licence Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-514100-MAN-001	CNL Management System	5507946	Y
900-514200-PDD-001	Quality	5507946	N
900-514200-PRD-001	Quality	5507946	Y
900-505210-PDD-001	Supply Chain	5507946	N
900-505210-PRD-001	Supply Chain	5507946	Y
900-514100-LST-001	Functional Authorities	5507946	N
900-514300-LST-001	Site Licences, Certificates, Permits, Building/Facility Contacts, & Licence Representatives	5507946	N
900-514100-LST-002	Codes, Regulations, Standards, and other Documents	5507946	N

Guidance:

Guidance Documents

Document Number	Document Title	Version
CSA N286.0.1	Commentary on N286-12, Management system requirements for nuclear facilities	2014

MANAGEMENT SYSTEM

2. SCA – HUMAN PERFORMANCE MANAGEMENT

Licence Condition 2.1: Human Performance Program

The licensee shall implement and maintain a human performance program.

Preamble:

Human performance is the outcome of human behaviours, functions and actions in a specified environment, reflecting the ability of workers and management to meet the system's defined performance under the conditions in which the system will be employed.

Human factors are factors that influence human performance as it relates to the safety of a nuclear facility or activity over all the phases, including design, operation, maintenance, and decommissioning. These factors may include the characteristics of the person, task, equipment, organization, environment, and training. The application of human factors to issues such as interface design, training, procedures, organization and job design may affect the reliability of humans performing tasks under various conditions.

The human performance program addresses and integrates the range of human factors that influence human performance, including but not limited to:

- The provision of qualified workers
- The reduction of human error
- Organizational support for safe work activities
- The continuous improvement of human performance
- Monitoring hours of work

The *General Nuclear Safety and Control Regulations* require the licensee to: ensure the presence of sufficient number of qualified staff; train the workers; and ensure the workers follow procedures and safe work practices.

The *Class I Nuclear Facilities Regulations* require that an application for a licence shall contain the proposed human performance program for the activity to be licensed, including measures ensure workers fitness for duty.

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Version	Effective Date
REGDOC-2.2.4	Fitness for Duty: Managing Worker Fatigue	2017	April 1, 2019
REGDOC-2.2.4	Fitness for Duty, Volume II: Managing Alcohol and Drug Use, Version 3	2021	January 22, 2022
REGDOC-2.2.4	Fitness for Duty, Volume III: Nuclear Security Officer Medical, Physical, and Psychological Fitness	2018	November 19, 2019

Licensee Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-514000-PDD-001	Performance Assurance	5507946	N
900-514000-PRD-001	Performance Assurance	5507946	Y
ITS 1A-09	Shift Staffing Minimum Requirements	5507949	N

Guidance:

Guidance Documents

Document Number	Document Title	Version
REGDOC-2.2.1	Human Factors	2019
REGDOC-2.2.5	Minimum Staff Complement	2019

Licence Condition 2.2: Training Program

The licensee shall implement and maintain a training program.

Preamble:

This licence condition requires the licensee to develop and implement training programs for workers.

It also provides the requirements regarding the program and processes necessary to support responsibilities of, qualifications and requalification training of persons at the nuclear facility.

As defined by the *General Nuclear Safety and Control Regulations*, a worker is a person who performs work that is referred to in a licence. This includes contractors and temporary employees. Training requirements apply equally to these types of workers as to the licensee's own employees.

The *General Nuclear Safety and Control Regulations* require that licensees ensure that there are a sufficient number of properly trained and qualified workers to safely conduct the licensed activities.

The *Class I Nuclear Facilities Regulations* require that applicants for a Class I facility licence describe the training programs which have been implemented, and that licence applications include the proposed responsibilities, qualification requirements, training program and requalification program for workers; along with the results that have been achieved in implementing the program for recruiting, training and qualifying workers.

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Version	Effective Date
REGDOC-2.2.2	Personnel Training, Version 2	2016	April 1, 2018

Licence Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-510200-PDD-001	Training and Development	5507946	N
900-510200-PRD-001	Training and Development	5507946	Y
900-510200-LST-001	Application of the Systematic Approach to Training (SAT) at CNL	5507946	N

The licensee shall ensure that all workers are qualified to perform the duties and tasks required of their position.

Guidance:

None provided.

Licence Condition 2.3: Staffing and Certification

Persons appointed to the following positions shall be certified

- (a) Senior Reactor Shift Engineer; and**
- (b) NRU Health Physicist.**

Preamble:

This condition requires that any person that the licensee appoints to the positions of Senior Reactor Shift Engineer or NRU Health Physicist must hold a certification issued pursuant to the NSCA. In addition, the certified persons must maintain their competency through continuing training and experience carrying out the duties of the position for which they have been certified. Note that after the permanent shut-down of NRU in March 2018 and its subsequent defueling and dewatering, CNSC staff have agreed that the position of Senior Reactor Shift Engineer may be replaced by that of Facility Supervisor and that there is no requirement for the certification of the Facility Supervisor (e-Doc 5646641).

Compliance Verification Criteria:

Licence Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
NRU-510000-REQ-002	NRU HP Roles and Responsibilities	5507949	N

The licensee shall ensure persons appointed to the position of NRU Health Physicist (NRU HP) hold a certification for the position to which they have been appointed, in accordance with the requirements of the *Class I Nuclear Facilities Regulations*.

The licensee shall ensure that each certified NRU HP perform the duties of their certified position in accordance with the approved Roles and Responsibilities documents for these positions.

Any person appointed to the position of NRU HP shall only delegate the authorities or responsibilities of their position to another person who holds a certification issued pursuant to the NSCA for the same position.

- When applying for certification or renewal of certification of a person as NRU HP, the licensee shall meet the requirements specified by CNSC staff (e-Doc 5390788)
- The licensee shall ensure that certified NRU HPs complete the continuing training requirements, complete the requalification tests and perform the duties of the position for the minimum time as specified by CNSC staff (e-Doc 5390788)
- The licensee shall immediately remove a person from the duties of NRU HP under any of the conditions specified by CNSC staff (e-Doc 5390788)

Guidance:

None provided.

DRAFT

3. SCA – OPERATING PERFORMANCE

Licence Condition 3.1: Operating Program

The licensee shall implement and maintain an operating program, which includes a set of operating limits.

Preamble:

The *Class I Nuclear Facilities Regulations* require that a licence application contain the proposed measures, policies, methods and procedures for safely operating and maintaining the nuclear facility.

The operational limits and conditions for CRL facilities are currently documented in

- facility authorizations documents (for Class I and Class II nuclear facilities);
- MAPLE Reactors operational limits and conditions;
- New Processing Facility operational limits and conditions;
- laboratory protocols, criticality safety documents and other documents for other workplaces where operations with fissionable materials are performed involving handling, use, processing, movement and storage; and
- storage with surveillance plans.

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Version	Effective Date
REGDOC-2.3.1	Conduct of Licensed Activities: Construction and Commissioning Programs	2016	April 1, 2018

Licence Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-508200-PDD-001	Conduct of Operations	5507946	N
900-508200-PRD-001	Conduct of Operations	5507946	Y
900-505240-PDD-001	Construction	5507946	N
900-505240-PRD-001	Construction	5507946	Y
900-505250-PDD-001	Commissioning	5507946	N
900-505250-PRD-001	Commissioning	5507946	Y
900-508130-PDD-001	Configuration Management	5507946	N
900-508130-PRD-001	Configuration Management	5507946	Y
See e-Doc 5507949	Facility Authorizations	5507949	Y ¹
See e-Doc 5507949	Storage with Surveillance Plans	5507949	Y ¹

¹ Notification is required only for non-administrative changes. If administrative changes are made, the licensee shall provide updated facility authorizations and storage-with-surveillance plans to CNSC staff at the end of the next quarter.

REGDOC-2.3.1, *Conduct of Licensed Activities: Construction and Commissioning Programs*, is only applicable to reactor facilities.

CRL Facilities Operations

The operational limits and conditions shall define the conditions that must be met to prevent situations or events that might lead to accidents, or to mitigate the consequences of accidents should they occur. The updated operational limits and conditions shall be based on safety analyses.

Limits and conditions for normal operation shall include limits on operating parameters, stipulation for minimum amount of operable equipment, actions to be taken by the operating staff in the event of deviations from the operational limits and conditions, and the time allowed for completing these actions.

OPERATING PERFORMANCE

The licensee shall review, revise and reissue as appropriate the operational limits and conditions when required due to changes in technologies, regulations, operational information or physical configuration.

Construction and operation of New Nuclear Facilities

The licensee may construct or install facilities, buildings, structures, components or equipment only if that construction or installation is compliant with the licensing basis.

Facilities in Permanent Safe Shutdown State

The licensee shall develop and maintain storage-with-surveillance plans (SWS plans) for Class I and Class II nuclear facilities in permanent safe shutdown state. The licensee shall maintain those facilities in permanent safe shutdown state according to the SWS plan for the facility. The SWS plans may also be combined with Detailed Decommissioning Plans (DDP) when the decommissioning is taking place in several phases.

Facilities under Decommissioning

See subsection 11.2 for details regarding the decommissioning of individual facilities at CRL.

Release from Regulatory Control

See Subsection 11.2 for details regarding the release from regulatory control of individual facilities at CRL.

Modifications to Facilities and Processes

The licensee shall ensure that modifications to CRL facilities do not negatively impact safe operation of the facility. The licensee shall define the process for making permanent or temporary modifications to operational limits and conditions. Such modifications shall be justified by analyses and safety reviews.

The licensee may only modify facilities, buildings, structures, components or equipment in compliance with the licensing basis.

The licensee shall ensure that:

- (a) all temporary modifications are identified at the point of application and at any relevant control positions;
- (b) operating personnel are informed of any modifications and their consequences for facility operations;
- (c) the temporary modifications are reviewed and approved before installation; the review shall be documented to demonstrate the scope and conclusion of the review;
- (d) the number of simultaneous temporary modifications is kept to a minimum;
- (e) the duration of temporary modifications is limited and specified prior to implementation;
- (f) testing is performed after installation and removal of the temporary modification;
- (g) temporary modifications are shown on affected documents; and
- (h) the facility is returned to the original state when the temporary modification is no longer needed.

Sealed Sources

The licensee shall ensure the sealed sources are controlled (by maintaining an inventory of sealed sources, and tracking and reporting their transfer) in order to achieve the objectives stated in paragraph 5.(a) of section II of IAEA's *Code of Conduct on the Safety and Security of Radioactive Sources*.

The inventory of sealed sources shall contain all sealed sources, both in use and in storage, of any category of sources as defined in table 1 of the IAEA safety guide RS-G-1.9 *Categorization of Radioactive Sources*. The licensee shall provide details of their inventory at the CNSC staff's request.

Unless otherwise permitted by the prior approval of the CNSC, the licensee shall, in respect of a radioactive nuclear substance set out in column 1 of the table 3-1, report in writing to the CNSC staff any transfer or receipt of a sealed source whose corresponding activity is equal to or greater than the value set out in column 2 of the table:

- (a) at least seven business days before any transfer, and
- (b) within two business days of any receipt of a transfer.

Table 3-1: Activity Limits for Reporting the Transfer of Sealed Sources

Column 1	Column 2
Nuclear Substance	(TBq)
Americium 241	0.6
Americium 241/Beryllium	0.6
Californium 252	0.2
Curium 244	0.5
Cobalt 60	0.3
Cesium 137	1
Gadolinium 153	10
Iridium 192	0.8
Promethium 147	400
Plutonium 238	0.6
Plutonium 239/Beryllium	0.6
Radium 226	0.4
Selenium 75	2
Strontium 90 (Yttrium 90)	10
Thulium 170	200
Ytterbium 169	3

The written report shall be in a form acceptable to the CNSC staff and shall include:

1. on transfer of a sealed source(s),
 - (a) the date of transfer,
 - (b) the name of the recipient and licence number,
 - (c) the address of the recipient's authorized location,
 - (d) the nuclear substance (radionuclide),
 - (e) activity (radioactivity) (Bq) per sealed source on the reference date,

OPERATING PERFORMANCE

- (f) the reference date,
 - (g) the number of sealed source(s),
 - (h) the aggregate activity (Bq),
 - (i) the sealed source unique identifiers (if available), and
 - (j) where the sealed source is incorporated in prescribed equipment,
 - (i) the name and model number of the equipment, and
 - (ii) the equipment serial number (if available);
2. on receipt of a sealed source(s),
- (a) the date of receipt of a transfer,
 - (b) the name of the shipper and licence number,
 - (c) the address of the shipper's authorized location,
 - (d) the nuclear substance (radionuclide),
 - (e) activity (radioactivity) (Bq) per sealed source on the reference date,
 - (f) the reference date,
 - (g) the number of sealed source(s),
 - (h) the aggregate activity (Bq),
 - (i) the sealed source unique identifiers (if available), and
 - (j) where the sealed source is incorporated in prescribed equipment,
 - (i) the name and model number of the equipment, and
 - (ii) the equipment serial number (if available).

In this subsection, "transfer" means movement of sealed sources from CRL to locations outside CRL site, or from locations outside CRL site to CRL. It does not include the movement of sealed sources between various CRL facilities/locations.

Guidance:

Facilities in Safe Shutdown State

Typical steps taken to transition the facility from operation to a permanent safe shutdown state are:

During the Operational Phase

1. The licensee defines and documents the activities needed to transition the facility from operation to a permanent safe shutdown state.
2. The licensee prepares the SWS plans.
3. The licensee submits the documentation prepared during steps 1 and 2 to CNSC staff.

During the Transition Phase

4. The licensee performs the activities needed to put the facility in a long-term safe shutdown state, updates the SWS plans, and resubmit to CNSC staff if needed.

During the Permanent Safe Shutdown State

5. The licensee carries out actions as documented in the SWS plans.

Modifications to Facilities and Processes

The licensee should review outstanding temporary modifications to determine whether they are still needed.

Licence Condition 3.2: Reporting Requirements

The licensee shall implement and maintain a program for reporting to the Commission or a person authorized by the Commission.

Preamble:

This licence condition sets the requirements for reporting information to CNSC, including compliance monitoring and operational performance, event reporting, and various types of notifications.

Many reportable occurrences included in REGDOC-3.1.2 do not necessarily show a degradation of licensee's performance, and do not fall under CNSC definition of a "reportable event" as included in REGDOC-3.6 Glossary of CNSC Terminology. An exercise of judgment is needed to select from all occurrences reported to CNSC those that really constitute "reportable events".

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Version	Effective Date
REGDOC-3.1.2	Reporting Requirements, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills	2018	January 1, 2019

Licence Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-514300-MCP-006	CNL Reporting to Regulatory Agencies	5507946	N

Compliance Monitoring: Annual Reporting

The licensee shall prepare and submit to the CNSC staff, at the intervals specified below, written reports that cover

OPERATING PERFORMANCE

- (a) the operation and maintenance of the facilities listed in subsections 5.1.1 to 5.1.6 of CNL document 900-514300-LST-001, *Site Licences, Certificates, Permits, Building/Facility Contacts, & Licence Representatives*, summarizing facility and equipment performance and changes, changes to operating policies, changes in organization, personnel radiation exposures, releases of nuclear substances from the facilities, and releases of hazardous substances from the facilities;
- (b) the status of the facilities listed in subsections 5.1.7 and 5.1.8 of CNL document 900-514300-LST-001, *Site Licences, Certificates, Permits, Building/Facility Contacts & Licence Representatives*, summarizing facility and equipment performance and changes, changes to operating policies, changes in organization, personnel radiation exposures, releases of nuclear substances from the facilities, and releases of hazardous substances from the facilities;
- (c) changes to the emergency authorities and organization, updates or changes to the radiation emergency procedures, status of and changes in other program documentation, training activities, drill and exercise activities, status of emergency resources and facilities, interactions with outside agencies, and unplanned events that tested the emergency response organization;
- (d) the results of the effluent monitoring for radioactive nuclear substances, the effluent monitoring for hazardous substances, and personnel radiation exposures for CRL;
- (e) the results of environmental monitoring for nuclear substances and hazardous substances;
- (f) the evaluation of the adequacy of the existing or proposed physical protection system;
- (g) changes to security provisions;

The licensee shall, by April 30 of each calendar year, submit to the CNSC staff the reports described in criteria (a), (b), (c), (d), (f), and (g) covering the preceding calendar year.

The licensee shall, by June 30 of each calendar year, submit to the CNSC staff the reports described in criterion (e) of the LCH covering the preceding calendar year.

The licensee shall, by July 31 of each calendar year, submit to CNSC staff an annual status report on open environmental assessment follow-up actions covering the preceding calendar year.

Guidance:

Event Reporting

To encourage reporting of situations or events that may result in improvement actions, event reporting should not be used as a tool for assessing or measurement of nuclear safety, or as a basis for assessing the licensee's performance.

For low safety significance events where CNL has already provided a preliminary report verbally and where no significant additional information is likely to be determined from further investigation, CNL may elect to combine the submission of a written preliminary report with a written full report. CNSC staff may request additional information to be provided in order to achieve regulatory close out.

OPERATING PERFORMANCE

For any event, the licensee should notify the CNSC whenever an extension is necessary to provide missing detailed information and should provide a date when the information will be submitted.

Compliance Monitoring: Annual Reporting

The annual reports should follow, where appropriate, the format and content presented in Appendix B of REGDOC-3.1.2.

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4. SCA – SAFETY ANALYSIS

Licence Condition 4.1: Safety Analysis Program

The licensee shall implement and maintain a safety analysis program.

Preamble:

All event sequences which can occur in a nuclear facility must be analyzed to ensure safe operation. A deterministic safety analysis evaluates the facility's responses to such events by using predetermined rules and assumptions. The objectives of the deterministic safety analysis are stated in REGDOC-2.4.1.

The *General Nuclear Safety and Control Regulations* require that a licence application contain a description and the results of any analyses performed.

The *Class I Nuclear Facilities Regulations* require, amongst other requirements, that an application for a licence to operate a Class I nuclear facility contains a final safety analysis report, and additional supporting information.

The licensee holds the responsibility for ensuring that the safety analysis is accurate and meets the regulatory requirements, and shall maintain adequate capability to perform or procure safety analysis and to train safety analysts.

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Version	Effective Date
REGDOC-2.4.1	Deterministic Safety Analysis	2014	April 1, 2018

Licence Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-508770-PDD-001	Safety Analysis	5507946	N
900-508770-PRD-001	Safety Analysis	5507946	Y
CRL-03510-SAB-001	CRL Site Characteristics	5507949	N
See e-Doc 5507949	Safety Analyses	5507949	N ¹

¹ Notification is required only for non-administrative changes. If administrative changes are made, the licensee shall provide updated safety analyses to CNSC staff at the end of the next quarter.

SAFETY ANALYSIS

Part II and Appendix C of REGDOC-2.4.1 are applicable to research reactors at CRL. It may be used as guidance for performing the safety analysis for other CRL facilities.

Where probabilistic safety assessments (PSA) are performed, the licensee shall ensure that

- (a) the limitations of the PSA are understood, recognized and taken into account in all its use, and the adequacy of a particular probabilistic safety assessment application is always checked with respect to these limitations;
- (b) when the PSA is used for evaluating or changing the requirements on periodic testing and allowed outage time for a system or component, all relevant items, including states of the systems and components and safety functions they participate in, are included in the analysis; and
- (c) the operability of components, that have been found by the PSA to be important to safety, is ensured and their role is recorded in the safety analysis report.

Guidance:

Guidance Documents

Document Number	Document Title	Version
REGDOC-2.4.2	Probabilistic Safety Assessment (PSA) for Nuclear Power Plants	2014
IAEA SSR-4	Safety of Nuclear Fuel Cycle Facilities	2017

Licence Condition 4.2: Nuclear Criticality Safety Program

The licensee shall implement and maintain a nuclear criticality safety program.

Preamble:

This licence condition requires the licensee to develop, implement and maintain a nuclear criticality safety program to ensure that the upper subcritical limits established in the criticality safety documents will not be exceeded under both normal and credible abnormal conditions (events or event sequences having the frequency of occurrence equal to or more than 10^{-6} /year) during operations with fissionable materials outside reactors.

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Version	Effective Date
REGDOC-2.4.3	Nuclear Criticality Safety, Version 1.1	2020	September 30, 2020

SAFETY ANALYSIS

Licensee Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-508550-PDD-001	Nuclear Criticality Safety	5507946	N
900-508550-PRD-001	Nuclear Criticality Safety	5507946	Y
See e-Doc 5507949	Criticality Safety Documents	5507949	N ¹

¹ Notification is required only for non-administrative changes. If administrative changes are made, the licensee shall provide updated criticality safety documents to CNSC staff at the end of the next quarter.

For legacy activities or projects, the licensee may implement the requirements of the nuclear criticality safety on a graded approach with appropriate criteria for categorization according to their safety significance. The legacy items are those nuclear criticality safety related activities and projects where work has begun prior to November 1, 2011.

5. SCA – PHYSICAL DESIGN

Licence Condition 5.1: Design Program

The licensee shall implement and maintain a design program.

Preamble:

The *Class I Nuclear Facilities Regulations* require that a licence application contain a description of the structures, systems and components, and relevant documentation of the facility design.

A design program ensures that the facility design is managed using a well-defined systematic approach.

Implementing and maintaining a design program confirms that safety-related structures, systems and components (SSCs) and any modifications to them continue to meet their design bases given new information arising over time and taking changes in the external environment into account. It also confirms that SSCs continue to be able to perform their safety functions under all facility states. An important cross-cutting element of a design program is design basis management.

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Version	Effective Date
RD-367	Design of Small Reactor Facilities	2011	April 1, 2018
REGDOC-2.5.7	Design, Testing and Performance of Exposure Devices	2017	April 1, 2018
	National Building Code of Canada	2015	April 1, 2018

Licence Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-508120-PDD-001	Design Authority and Design Engineering	5507946	N
900-508120-PRD-001	Design Authority and Design Engineering	5507946	Y

RD-367 is only applicable to water-cooled small reactors less than 200MWth.

PHYSICAL DESIGN

Guidance:

Guidance Documents

Document Number	Document Title	Version
REGDOC-2.5.1	General Design Considerations: Human Factors	2019
REGDOC-2.5.2	Design of Reactor Facilities: Nuclear Power Plants	2014
GD-52	Design Guide for Nuclear Substances Laboratories and Nuclear Medicine Rooms	2010

Licence Condition 5.2: Pressure Boundary Program and Authorized Inspection Agency

The licensee shall implement and maintain a pressure boundary program and shall have in place a formal agreement with an authorized inspection agency.

Preamble:

A pressure boundary program is comprised of the many programs, processes and procedures and associated controls that are required to ensure compliance with CSA standard N285.0, which defines the technical requirements for the design, procurement, fabrication, installation, modification, repair, replacement, testing, examination and inspection of pressure-retaining and containment systems, including their components and supports.

This licence condition also ensures that an authorized inspection agency (AIA) will be contracted directly by the licensee. An AIA is an organization recognized by the CNSC as authorized to register designs and procedures, perform inspections, and other functions and activities as defined by N285.0 and its applicable referenced publications (e.g. CSA standard B51 *Boiler, pressure vessel, and pressure piping code*). The AIA is accredited by the American Society of Mechanical Engineers (ASME) as stipulated by NCA-5121 of the *ASME Boiler & Pressure Vessel Code*.

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Revision	Effective Date
CSA N285.0	General requirements for pressure-retaining system and components in CANDU nuclear power plants	2008	April 1, 2018
CSA N285.0	General requirements for pressure-retaining system and components in CANDU nuclear power plants	2017	April 1, 2021

Licensee Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-508140-PDD-001	Pressure Boundary	5507946	N
900-508140-PRD-001	Pressure Boundary	5507946	Y
CRL-508140-PRO-002	Classification and Design Registration of Pressure Retaining Systems/Components	5507949	N
CRL-508140-QAP-001	CRL Nuclear Pressure Boundary Quality Assurance	5507949	N
CRL-508140-QAP-003	CRL CSA B51 Pressure Boundary Quality Control Manual	5507949	N
	Authorized Inspection Agency Services Agreement between Technical Standards and Safety Authority and Canadian Nuclear Laboratories Limited	5507949	N ¹

¹ Termination of the agreement is considered a change that requires prior notification to CNSC.

Pressure Boundary Program

Where CSA standard N285.0 requires items to be submitted to CNSC for approval before implementation, the licensee shall: (a) document the item in sufficient detail to ensure it is safe to proceed; and (b) submit the item to AIA for assessment and acceptance (if required by CSA standard N285.0 or its referenced publications). The licensee may implement that item and notify CNSC staff if the AIA has given its acceptance.

PHYSICAL DESIGN

Licensee documents describing the classification, registration and reconciliation processes and the associated controls are considered part of the pressure boundary program.

Formal Agreement with an Authorized Inspection Agency

The licensee shall have in place a formal agreement with an AIA acceptable to the CNSC to provide services for the pressure boundaries of the nuclear facility as defined by CSA standard N285.0 and its applicable referenced publications.

The licensee shall always have a valid AIA agreement, and shall adhere to the following:

- (a) The licensee shall arrange for the AIA inspectors to have access to all areas of the CRL's facilities and records, and to the facilities and records of the CRL's pressure boundary contractors and material organizations, as necessary for the purposes of performing inspections and other activities required by the standards;
- (b) The licensee shall provide the inspectors of the AIA with: information, reasonable advance notice and time necessary to plan and perform inspections and other activities required by the standards;
- (c) Where a variance or deviation from the standard exists, the licensee shall submit the proposed resolution to the AIA for evaluation; and
- (d) Design registration services shall be provided by an AIA legally entitled under the applicable provincial boilers and pressure vessels acts and regulations to register designs in the province of installation.

The licensee shall obtain AIA acceptance for implementation of the licensee's programs and procedures for:

- (a) calibration, repair and maintenance of overpressure protection devices;
- (b) repair and maintenance of mechanical joints; and
- (c) periodic inspection of boilers and pressure vessels designed according to CSA standard B51.

Guidance:

Guidance Documents

Document Number	Document Title	Version
CSA N285.0.1	Commentary on CSA N285.0-17, General requirements for pressure-retaining systems and components in CANDU nuclear power plants	2018

6. SCA – FITNESS FOR SERVICE

Licence Condition 6.1: Fitness for Service Program

The licensee shall implement and maintain a fitness for service program.

Preamble:

The *Class I Nuclear Facilities Regulations* requires that a licence application contain the proposed measures, policies, methods and procedures to maintain the nuclear facility.

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Version	Effective Date
REGDOC-2.6.3	Aging Management	2014	April 1, 2018

Licence Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-508230-PDD-001	Maintenance	5507946	N
900-508230-PRD-001	Maintenance	5507946	Y
900-508230-PDD-002	Equipment Reliability	5507946	N
900-508230-PRD-002	Equipment Reliability	5507946	Y

Guidance:

Guidance Documents

Document Number	Document Title	Version
REGDOC-2.6.2	Maintenance Programs for Nuclear Power Plants	2017

7. SCA – RADIATION PROTECTION

Licence Condition 7.1: Radiation Protection Program

The licensee shall implement and maintain a radiation protection program, which includes a set of action levels. When the licensee becomes aware that an action level has been reached, the licensee shall notify the Commission within seven days.

Preamble:

The *Radiation Protection Regulations* requires that the licensee implement a radiation protection program and also ascertain and record doses for each person who performs any duties in connection with any activity that is authorized by the NSCA or is present at a place where that activity is carried out. This program must ensure that doses to workers do not exceed prescribed dose limits and are kept as low as reasonably achievable (ALARA), social and economic factors being taken into account. Also, the program ensures that occupational exposures are ascertained and recorded in accordance with the *Radiation Protection Regulations* through the establishment of dosimetry requirements.

The regulatory dose limits to workers and the public are explicitly provided in the *Radiation Protection Regulations*. The *Radiation Protection Regulations* also specify the requirements related to action levels (ALs) and indicate that the licence will be used to identify their notification timeframes. ALs relate to the parameters of dose to workers.

ALs are designed to alert licensees before regulatory dose limits are reached. By definition, if an action level is reached, a loss of control of some part of the associated radiation protection program may have occurred, and specific action is required as defined in the *Radiation Protection Regulations* and the licence. ALs are not intended to be static and are to reflect operating conditions at the CRL site.

Compliance Verification Criteria:

Licensee Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-508740-PDD-001	Radiation Protection	5507946	N
900-508740-PRD-001	Radiation Protection	5507946	Y
900-508740-MCP-006	Action Levels for Internal and External Exposures	5507946	Y
900-508740-MCP-007	Dose Control Points	5507946	N
900-508740-MCP-026	ALARA Review and Assessment - Planning and Control of Radiation Work	5507946	N
900-508740-STD-005	Design and Modification Considerations	5507946	N
900-508740-STD-012	Contamination Levels	5507946	N

ALs for radiation protection are included in table 7-1. In the event of a discrepancy between the table and the licensee documentation upon which they are based, the licensee documentation shall be considered the authoritative source considering that the licensee has followed its own change control process.

Table 7-1: CRL Action Levels

Type of Dose	Action Level	
	mSv (rem) per four week or longer monitoring period ^[1]	mSv (rem) per year
Effective Dose	6 (0.6) ^[2]	20 (2)
Shallow Dose	100 (10)	200 (20)
Extremity Dose ^[3]	100 (10)	N/A
Internal Contamination	0.05 x ALI ^[4]	
Localized area of the skin due to a single skin contamination incident ^[3, 5]	50 (5)	

Notes:

1. The monitoring period is normally four weeks, but may be longer if justified. The monitoring period shall not exceed 3 months.
2. Action levels for pregnant women shall be 0.3 mSv (0.03 rem) per four weeks to the abdomen.
3. Extremity dose action level applies in situations where an extremity thermoluminescent Dosimeter (TLD) has measured a dose exceeding 100 mSv. All contamination events that result in a dose to the skin, irrespective of the location on the body of the exposed skin, will be recorded and reported as appropriate as a skin dose (with the associated action level being 50 mSv).
4. The Annual Limit of Intake (ALI) is defined as the activity of a radionuclide that, when taken into the body, will deliver an effective dose of 20 mSv over the next 50 years following the intake.
5. The averaging area shall never be less than 1 cm², even in case of hot particles. When skin is unevenly irradiated, the equivalent dose received by the skin is the average equivalent dose over the 1 cm² area that received the highest equivalent dose. When the contamination is relatively uniform over the skin, the averaging area of 100 cm² may be used for operational convenience but not if significantly lowers the average dose.

Guidance:

Guidance Documents

Document Number	Document Title	Version
G-129, Rev. 1	Keeping Radiation Exposures and Doses “As Low as Reasonably Achievable (ALARA)”	2004
G-228	Developing and Using Action Levels	2001

The licensee should conduct a documented review and, if necessary, revise the ALs at least once every five years in order to validate their effectiveness. The results of such reviews should be provided to CNSC staff.

8. SCA – CONVENTIONAL HEALTH AND SAFETY

Licence Condition 8.1: Conventional Health and Safety Program

The licensee shall implement and maintain a conventional health and safety program.

Preamble:

The *Class I Nuclear Facilities Regulations* requires that a licence application contain the proposed worker health and safety policies and procedures.

As a federal regulated site, CRL is also subject to the requirements of *Canada Labour Code* and *Canada Occupational Health and Safety Regulations*.

Compliance Verification Criteria:

Licensee Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-510400-PDD-001	Occupational Safety and Health	5507946	N
900-510400-PRD-001	Occupational Safety and Health	5507946	Y

The *Ministry of Employment, Workforce Development and Labour* is mandated with overseeing and enforcing compliance with the *Canada Labour Code* and its regulations.

Guidance:

None provided.

9. SCA – ENVIRONMENTAL PROTECTION

Licence Condition 9.1: Environmental Protection Program

The licensee shall implement and maintain an environmental protection program, which includes a set of action levels. When the licensee becomes aware that an action level has been reached, the licensee shall notify the Commission within seven days.

Preamble:

The *Class I Nuclear Facilities Regulations* requires that a licence application contain information related to environmental protection. The *General Nuclear Safety and Control Regulations* requires every licensee to take all reasonable precautions to protect the environment. The *Radiation Protection Regulations* prescribe the radiation dose limits for the general public of 1 mSv per calendar year.

The *Radiation Protection Regulations* specify requirements related to “Action Levels” and indicate that the licence will be used to identify the action levels and the notification timeframes.

The release of hazardous substances is regulated by Environment Canada and Climate Change (ECCC) through various acts and regulations, as well as by the CNSC.

Action levels (ALs) for environmental releases are calculated by the licensees and aim to alert licensees of a potential loss of control of their environmental protection program. By definition, if an action level is reached, a loss of control of some part of the associated environmental protection program may have occurred, and specific action is required. ALs are not intended to be static and are to reflect operating conditions at the CRL site.

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Version	Effective Date
REGDOC-2.9.1	Environmental Principles, Assessments and Protection Measures, Version 1.1	2017	Dec 31, 2020
N288.4	Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills	2010 (R2015)	April 1, 2018
N288.5	Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills	2011 (R2016)	April 1, 2018
N288.6	Environmental risk assessment at Class I nuclear facilities and uranium mines and mills	2012 (R2017)	April 1, 2018
N288.7	Groundwater protection programs at Class I nuclear facilities and uranium mines and mills	2015	Dec 31, 2020
N288.8	Establishing and implementing action levels to control releases to the environment from nuclear facilities	2017	Dec 31, 2019

Licensee Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-509200-PDD-001	Environmental Protection	5507946	N
900-509200-PRD-001	Environmental Protection	5507946	Y
CRL-509200-OV-126	Chalk River Laboratories' Integrated Environmental Monitoring Program Framework	5507949	N
900-509200-STD-008	Administrative Levels and Action Levels for CRL Air and Liquid Radioactive Effluents	5507949	Y
CRL-509200-RRD-001	Derived Release Limits (DRLs) for AECL's Chalk River Laboratories	5507949	Y
CRL-509200-PLA-005	CRL Radioactive Environmental Monitoring Plan	5507949	Y
CRL-509200-PLA-002	CRL Non-Radioactive Environmental Monitoring Plan	5507949	Y
CRL-509200-PLA-003	CRL Non-Radioactive Effluent Verification Monitoring Plan	5507949	Y
CRL-509200-PLA-004	CRL Radioactive Effluent Verification Monitoring Plan	5507949	Y
900-509200-STD-014	Effluent Levels for CRL Air and Liquid Non-Radioactive Effluents	5507949	Y

The licensee shall control, monitor and record releases of radioactive and/or hazardous substances such that the releases do not exceed the reference levels (limits) specified in tables 9-1 and 9-2.

The dose to the critical group due to the sum of all radioactive releases in any period of 12 consecutive months shall not exceed 0.3 mSv.

Action levels for environmental releases are included in tables 9-3 and 9-4. In the event of a discrepancy between the tables and the licensee documentation upon which they are based, the licensee documentation shall be considered the authoritative source considering that the licensee has followed its own change control process.

ENVIRONMENTAL PROTECTION

The licensee shall implement all follow-up actions identified as a result of environmental assessments, and shall report the progress to CNSC staff on an annual basis.

Table 9-1: Annual Release Limits for the Releases of Radioactive Substances to the Environment from Chalk River Laboratories

Release Path	Radionuclide	Release Limit ^(a) (Bq/year)
Airborne Releases		
NRU Stack, NRU Vents, WTC Vents	Tritium Oxide	6.21E+15
Liquid Releases		
Process Outfall, Storm Outfall 4F6, Duke Stream Weir	Tritium Oxide	3.96E+17
Process Outfall	Gross Alpha	2.40E+11
Process Outfall	Total Beta/Gamma	1.86E+13

^(a) The respective release limits for each release path in CRL-509200-RRD-001 will be considered for compliance verification. The sum of releases from all release paths for a given radionuclide shall be compared to the release limit (based on dose constraint of 0.3 mSv per year).

Table 9-2: Reference Limits for Liquid Releases from Waste Treatment Centre Liquid Waste Evaporator (WTC_LWE) and Process Outfall

Parameter	Monitoring Point	Reference Limits (Monthly Averages)
pH	Process Outfall	6-9
Total Phosphorus	WTC_LWE	1 mg/L
Total Suspended Solids	WTC_LWE	25 mg/L
Oil/Grease (Solvent Extractable Substances)	WTC_LWE	15 mg/L
Chromium	WTC_LWE	0.5 mg/L
Copper	WTC_LWE	0.5 mg/L
Lead	WTC_LWE	0.1 mg/L
Mercury	WTC_LWE	0.001 mg/L
Nickel	WTC_LWE	0.5 mg/L
Zinc	WTC_LWE	0.5 mg/L

Table 9-3: Action Levels for Airborne Effluents Released from CRL

Radionuclide	Facility	Release Path	Action Level (Bq/week)
Tritium Oxide	NRU Reactor	Reactor Stack	3.70E+13
Tritium Oxide	NRU Reactor	Fan 12	3.51E+13
Tritium Oxide	NRU Reactor	Fan 15	6.83E+12
Tritium Oxide	NRU Reactor	Fan 24	3.88E+12
Tritium Oxide	NRU Reactor	Fan 39	5.00E+12
Tritium Oxide	NRU Reactor	Fan 71	7.56E+12
Tritium Oxide	Waste Treatment Centre	B574 Fan E2	2.17E+12

Table 9-4: Action Levels for Liquid Effluents from CRL

Radionuclide	Release Path	Action Level (Bq/month)
Tritium Oxide	Process Outfall	2.18E+13
Gross Alpha	Process Outfall	8.96E+09
Gross Beta	Process Outfall	2.87E+11

Guidance:

Guidance Documents

Document Number	Document Title	Version
CSA N288.1	Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities	2014 (Update 1)
CSA N288.2	Guidelines for calculating the radiological consequences to the public of a release of airborne radioactive material for nuclear reactor accidents	2014
CSA N288.9	Guideline for design of fish impingement and entrainment programs at nuclear facilities	2018

ENVIRONMENTAL PROTECTION

10. SCA – EMERGENCY MANAGEMENT AND FIRE PROTECTION

Licence Condition 10.1: Emergency Preparedness Program

The licensee shall implement and maintain an emergency preparedness program.

Preamble:

This licence condition requires the licensee to establish an emergency preparedness program to prepare for, to respond to, and to recover from the effects of accidental radiological/nuclear and/or hazardous substance release. As part of the emergency preparedness program, the licensee establishes an onsite emergency response plan and an emergency response organization and makes arrangements for coordinating off-site activities and cooperating with external response organizations throughout all phases of an emergency.

The Class I *Nuclear* Facilities Regulations requires measures to prevent or mitigate the effects of accidental releases of nuclear substances and hazardous substances on the environment, the health and safety of persons and the maintenance of national security, including measures to assist, notify, report to off-site authorities including the testing of the implementation of these measures.

A security response to malevolent acts is governed by a separate plan under the Nuclear Security program (see LCH Section 12.1) but provisions of the licensee site security report apply to any associated potential threat of release of radioactive material - for example, the need for off-site notification, situation updates and confirmation of any radioactive releases.

Liquid release response and radioactive materials transportation emergency response plan are also governed by separate plans (See LCH Sections 9.1 and 14.1, respectively).

CRL has a communication program that covers a broad spectrum – community interface meetings, newsletters, websites, committees and various panels. Panels and committees that are a direct link between Emergency Preparedness and the community include: The Safety Review Committee, the provincial Nuclear Emergency Management Coordinating Committee and the local municipal/licensee Nuclear Emergency Preparedness Committee.

CRL provides the local municipalities and the province (as required, federal) with hazard information that can be used for community communications during an emergency.

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Version	Effective Date
REGDOC-2.10.1	Nuclear Emergency Preparedness and Response, Version 2	2016	April 1, 2018

EMERGENCY MANAGEMENT AND FIRE PROTECTION

Licence Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-508730-PDD-001	Emergency Preparedness	5507946	N
900-508730-PRD-001	Emergency Preparedness	5507946	Y
CRL-508730-ERP-001	Chalk River Laboratories Site Emergency Response Plan	5507949	N

REGDOC-2.10.1 shall be applied to CRL site as a whole, not to individual facilities on site. Note that with the permanent shutdown of NRU, requirements for reactor facilities with a thermal capacity greater than 10MW no longer apply.

Guidance:

Guidance Documents

Document Number	Document Title	Version
CSA N1600	General requirements for nuclear emergency management programs	2016
	<i>Canadian Guidelines for Intervention During a Nuclear Emergency</i>	2003
	<i>Canadian Guidelines for the Restriction of Radioactively Contaminated Food and Water Following a Nuclear Emergency</i>	2000

Licence Condition 10.2: Fire Protection Program

The licensee shall implement and maintain a fire protection program.

Preamble:

Licenses require a comprehensive fire protection program to ensure the licensed activities do not result in unreasonable risk to the health and safety of persons and to the environment due to fire and to ensure that the licensee is able to efficiently and effectively respond to emergency fire situations.

EMERGENCY MANAGEMENT AND FIRE PROTECTION

Fire protection provisions, including response, are required for the design, construction, commissioning, operation, and decommissioning of nuclear facilities, including structures, systems, and components (SSCs) that directly support the plant and the protected area. External events such as an aircraft crash or security threats are addressed in LCH Section 12.1.

The *National Fire Code of Canada* sets out technical provisions regulating (a) activities related to the construction, use or demolition of buildings and facilities; (b) the condition of specific elements of buildings and facilities; (c) the design or construction of specific elements of facilities related to certain hazards; and (d) protection measures for the current or intended use of buildings.

The *National Building Code of Canada* sets out technical provisions for the design and construction of new buildings. It also applies to the alteration, change of use and demolition of existing buildings.

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Version	Effective Date
CSA N393	Fire protection for facilities that process, handle, or store nuclear substances	2013 (R2016)	Dec 31, 2022
	<i>National Fire Code of Canada</i>	2015	April 1, 2018
	<i>National Building Code of Canada</i>	2015	April 1, 2018

Licensee Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-508720-PDD-001	Fire Protection	5507946	N
900-508720-PRD-001	Fire Protection	5507946	Y
900-508720-MCP-006	Impairment, Notification and Compensatory Measures	5507946	N

A fire safe shutdown analysis for ZED-2 reactor is not required.

Where CSA standard N393 requires items to be submitted to CNSC for review and/or acceptance, the licensee shall document the item in sufficient detail to ensure it is safe to proceed. The licensee may implement that item without prior review and/or acceptance from CNSC staff. Changes of use or modifications for which the fire screening assessment indicates no potential impact on fire protection design basis, goals or criteria may not be subject to any further third-party review or require submission to the CNSC.

The licensee shall submit the results of third-party reviews required by CSA N393 (review of modifications, review of performance-based design or operation, fire protection program audit, and evaluation of fire response capability). The results of these reviews shall be submitted to CNSC staff no later than six months after the review together with any corrective action plans with compensatory measures for identified non-compliances.

Fire Response

In accordance with N393, the licensee shall arrange for third party audits of the fire response capability at the frequencies stated in N393. The purpose of a Third Party Audit is to provide an in-depth analysis of the Industrial Fire Brigade (IFB) fire response performance against applicable regulatory criteria. A fire response is a planned, coordinated and controlled activity to provide emergency response to a fire. The audit is to analyze and ensure competencies of the IFB against CSA N393 standard and the referred NFPA 600 and 1081 standards.

An independent third party auditor is required to be an expert in the discipline, normally firefighting and qualified through specific education and relevant experience. The third party auditor is required to be independent or at “arm’s length” from the facility to ensure impartiality. The review shall be of sufficient depth and detail to allow the reviewer to attest with reasonable confidence on the competencies of the IFB at the facility.

Guidance:

Where CSA N393 does not address a fire protection topic or issue in whole, or where additional guidance is beneficial, the standards and recommended practices set out by the NFPA are used as guidance by CNSC staff in determining the adequacy of a fire protection measure. The results of the Third Party Audit report will typically consist of a report which compares the requirements of the applicable codes and standards against the implementation of the fire protection program or the Fire Response exercised (based on the scope of the audit). The report should identify any non-compliance and formulate a conclusion on whether the licensee fire protection program or IFB meets the requirements of N393.

11. SCA – WASTE MANAGEMENT

Licence Condition 11.1: Waste Management Program

The licensee shall implement and maintain a waste management program.

Preamble:

The scope of this licence condition covers internal waste-related programs that form part of the CRL operations.

The *Canadian Nuclear Laboratories Integrated Waste Strategy* forms the basis for CNL's approach to waste management and decommissioning.

The *General Nuclear Safety and Control Regulations* require that a licence application contain information related to the management of radioactive waste or hazardous waste resulting from the licensed activities.

The *Class I Nuclear Facilities Regulations* require that a licence application contain the proposed procedures for handling, storing, loading and transporting nuclear substances and hazardous substances.

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Version	Effective Date
CSA N292.0	General principles for the management of radioactive waste and irradiated fuel	2014	April 1, 2018
CSA N292.1	Wet storage of irradiated fuel and other radioactive materials	2016	April 1, 2018
CSA N292.2	Interim dry storage of irradiated fuel	2013 (R2015)	April 1, 2018
CSA N292.3	Management of low- and intermediate-level radioactive waste	2014	April 1, 2018

Licence Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-508600-PDD-001	Waste Management	5507946	N
900-508600-PRD-001	Waste Management	5507946	Y

The licensee shall not produce, in the course of the licensed activities, or accept from outside clients, waste for which there is no identified treatment, or storage, or disposal facility.

Guidance:

Guidance Documents

Document Number	Document Title	Version
REGDOC-2.11	Framework for Radioactive Waste Management and Decommissioning in Canada	2018
REGDOC	Waste Management, Volume III: Assessing the Long-Term Safety of Radioactive Waste Management	2018
CSA N292.5	Guideline for the exemption or clearance from regulatory control of materials that contain, or potentially contain, nuclear substances	2011 (R2016)
CSA N292.6	Long-term management of radioactive waste and irradiated fuel	2018

Licence Condition 11.2: Decommissioning Plan

The licensee shall maintain a decommissioning plan.

Preamble:

Class I Nuclear Facilities Regulations requires that a licence application contain the proposed plan for decommissioning of the nuclear facility or of the site. The decommissioning plan for CRL site is documented in the comprehensive preliminary decommissioning plan and the associated cost estimate.

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Version	Effective Date
CSA N294	Decommissioning of facilities containing nuclear substances	2009 (R2014)	April 1, 2018

Licensee Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-508300-PDD-001	Decommissioning and Demolition	5507946	N
900-508300-PRD-001	Decommissioning and Demolition	5507946	Y
CPDP-508300-PDP-001	Comprehensive Preliminary Decommissioning Plan	5507949	N
See e-Doc 5507949	Detailed Decommissioning Plans	5507949	N

Facilities under Decommissioning

For Class I and Class II nuclear facilities at CRL, the licensee shall prepare detailed decommissioning plans (DDP) and procedures as needed, and submit the DDPs to CNSC staff for review for compliance with the licensing basis. Further revisions of DDPs shall be notified to CNSC as required by the licence condition G.2.

For the decommissioning of radioisotope laboratories, storage rooms, contaminated buildings, support facilities, low-hazard nuclear structures and non-contaminated buildings, the licensee shall prepare facility/building clean-up (removal) plans, notify CNSC staff and submit the facility/building clean-up (removal) plans to CNSC staff for review for compliance with the licensing basis.

Release from Regulatory Control

The licensee shall only release the decommissioned property, or any part thereof, for reuse upon the acceptance of the final end-state report by the CNSC.

Guidance:

Guidance Documents

Document Number	Document Title	Version
G-219	Decommissioning Planning for Licensed Activities	2000

WASTE MANAGEMENT

12. SCA – SECURITY

Licence Condition 12.1: Security Program

The licensee shall implement and maintain a security program.

Preamble:

The *General Nuclear Safety and Control Regulations* require that a licence application contain information related to site access control and measures to prevent loss or illegal use, possession or removal of the nuclear substance, prescribed equipment or prescribed information.

The *Class I Nuclear Facilities Regulations* require that a licence application contain the proposed measures to prevent acts of sabotage or attempted sabotage at the nuclear facility.

The *Nuclear Security Regulations* require that a licence application contain specific information related to nuclear security, stipulates the requirements for high-security sites, and contains specific requirements pertaining to the transportation of Category I, II or III nuclear material.

The *Nuclear Security Regulations* require that a licensee of a high security site:

- maintain at all times a qualified onsite nuclear response force
- obtain the applicable certifications, before issuing an authorization to a nuclear security officer
- prevent and detect unauthorized entry into a protected area or inner area
- prevent unauthorized entry of weapons and explosive substances into a protected area or inner area

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Version	Effective Date
REGDOC-2.12.1 (prescribed information)	High-Security Sites, Volume I: Nuclear Response Force, Version 2	2018	November 19, 2019
REGDOC-2.12.1 (prescribed information)	High-Security Facilities, Volume II: Criteria for Nuclear Security Systems and Devices	2018	April 1, 2018
REGDOC-2.12.2	Site Access Security Clearance	2013	April 1, 2018
REGDOC-2.12.3	Security of Nuclear Substances: Sealed Sources and Category I, II and III Nuclear Material, Version 2.1	2020	September 30, 2020
CSA N290.7	Cyber-security for nuclear power plants and small reactor facilities	2014 (R2015)	April 1, 2018

Licensee Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-508710-PDD-001	Security	5507946	N
900-508710-PRD-001	Security	5507946	Y
900-511400-PDD-001	Cyber Security	5507946	N
900-511400-PRD-001	Cyber Security	5507946	Y
EPS-14000-RPT-17 (prescribed information)	Chalk River Laboratories Site Security Report	5507949	N

SECURITY

The CSA standard N290.7 covers the cyber security of new and existing nuclear power plants (NPPs) and small reactor facilities.

The CNL document EPS-14000-RPT-17 *Chalk River Laboratories Site Security Report* document is required to be updated periodically and resubmitted to the CNSC staff. The site security report shall be updated and resubmitted when there are significant changes to the program.

Guidance:

None provided.

DRAFT

13. SCA – SAFEGUARDS AND NON-PROLIFERATION

Licence Condition 13.1: Safeguards Program

The licensee shall implement and maintain a safeguards program.

Preamble:

Safeguards is a system of inspection and other verification activities undertaken by the International Atomic Energy Agency (IAEA) in order to evaluate a Member State's compliance with its obligations pursuant to its safeguards agreements with the IAEA.

The *General Nuclear Safety and Control Regulations* requires the licensee to take all necessary measures to facilitate Canada's compliance with any applicable safeguards agreement.

The *Class I Nuclear Facilities Regulations* requires that a licence application contain information on the licensee's proposed measures to facilitate Canada's compliance with any applicable safeguards agreement.

Canada has entered into a safeguards agreement with the IAEA pursuant to its obligations under the Treaty on the Non-Proliferation of Nuclear Weapons. The objective of the Canada/IAEA Safeguards Agreement is for the IAEA to provide assurance on an annual basis to Canada and to the international community that all declared nuclear materials are in peaceful, non-explosive uses and that there is no indication of undeclared nuclear materials or activities. This conclusion confirms that Canada is in compliance with its obligations under the following Canada/IAEA Safeguards Agreement:

- [Treaty on the Non-Proliferation of Nuclear Weapons](#)
- [Agreement Between the Government of Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons](#)
- [Protocol Additional to the Agreement Between Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons](#)

These are reproduced in information circulars INFCIRC/140, INFCIRC/164, and INFCIRC/164/Add. 1.

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Version	Effective Date
REGDOC-2.13.1	Safeguards and Nuclear Material Accountancy	2018	April 1, 2018

SAFEGUARDS AND NON-PROLIFERATION

Licensee Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-508510-PDD-001	Nuclear Materials and Safeguards Management	5507946	N
900-508510-PRD-001	Nuclear Materials and Safeguards Management	5507946	Y

The licensee shall obtain prior written approval of the CNSC, for any changes to operation, equipment or procedures requested by the licensee that would affect the implementation of safeguards measures.

Guidance:

None Provided.

14. SCA – PACKAGING AND TRANSPORT

Licence Condition 14.1: Packaging and Transport Program

The licensee shall implement and maintain a packaging and transport program.

Preamble:

The *Class I Nuclear Facilities Regulations* require that a licence application contain information on the proposed procedures for transporting nuclear substances and hazardous substances.

The transport of nuclear substances or hazardous substances must be done in accordance with the requirements of the *Packaging and Transport of Nuclear Substances Regulations, 2015*, (PTNSR) and *Transportation of Dangerous Goods Regulations* (TDGR) set out by Transport Canada.

IAEA document SSR-6 *Regulations for the Safe Transport of Radioactive Material (2012 Edition)* is incorporated by reference in PTNSR. These Regulations establish standards of safety which provide an acceptable level of control of the radiation, criticality and thermal hazards to persons, property and the environment that are associated with the transport of radioactive material.

Compliance Verification Criteria:

Licensing Basis Publications

Document Number	Document Title	Version	Effective Date
IAEA SSR-6	Regulations for the Safe Transport of Radioactive Material (2018 Edition)	2018	July 1, 2020

Licence Documents that Require Notification of Change

Document Number	Document Title	e-Doc	Prior Notification
900-508520-PDD-001	Transportation of Dangerous Goods	5507946	N
900-508520-PRD-001	Transportation of Dangerous Goods	5507946	Y

The licensee shall implement and maintain a packaging and transport program that will be in compliance with all the regulatory requirements set out in the Transport Canada TDGR and in the CNSC PTNSR.

Every person who transports or causes to be transported radioactive nuclear substances (included in Class 7 of the Schedule to the *Transportation of Dangerous Goods Act*) shall act in accordance with the requirements of the TDGR set out by Transport Canada.

As used in the PTNSR, the *IAEA Regulations* means the IAEA requirements document SSR-6 *Regulations for the Safe Transport of Radioactive Material (2012 Edition)* as amended from time to time.

The PTNSR provides specific requirements for the design of transport packages, the packaging, marking and labeling of packages and the handling and transport of nuclear substances.

Shipments of nuclear substances within the CRL site where access to the property is controlled are exempted from the application of the PTNSR.

Based on the current versions of the PTNSR and TDGR, for the packaging and transport of nuclear substances

- (a) to and from the CRL site, both PTNSR and TDGR apply.
- (b) between the CRL facilities:
 - according to paragraph 2(2)(d) of the PTNSR, the PTNSR do not apply to the transport of nuclear substances within the CRL site, except for sections 6 and 7. Sections 6 and 7 refer to the CNSC *Nuclear Security Regulations*, specifically to the transport of Category I, II or III nuclear material
 - TDGR do not apply per subsection 1.25 of those regulations

Guidance:

Guidance Documents

Document Number	Document Title	Version
RD-364	Joint Canada-United States Guide for Approval of Type B(U) and Fissile Material Transportation Packages	2009
REGDOC-2.14.1	Information Incorporated by Reference in Canada's Packaging and Transport of Nuclear Substances Regulations, 2015	2016

APPENDIX A: DEFINITIONS AND ACRONYMS

1. DEFINITIONS

The following is a list of definitions of words or expressions used in the LCH that may need clarification; they are defined for the purpose of the LCH only. All other terms and expressions used in the LCH are consistent with the definitions provided in the NSCA, the regulations made pursuant to the NSCA, or in the CNSC regulatory document REGDOC-3.6 *Glossary of CNSC Terminology*.

Approval – Commission’s permission to proceed, for situations or changes where the licensee would be:

- not compliant with regulatory requirements set out in applicable laws and regulations
- not compliant with a licence condition
- not in the safe direction but the objective of the licensing basis is met

Boundary Conditions – procedural, administrative rules and operating limits for ensuring safe operation of the facility based on safety analyses and any applicable regulatory requirements.

Certified Staff – trained licensee staff, certified by the Commission as qualified to perform the duties of their respective roles.

Compliance Verification Criteria – regulatory criteria used by CNSC staff to verify compliance with the licence conditions.

Design Basis – the entire range of conditions for which the nuclear facility is designed, in accordance with established design criteria, and for which damage to the fuel and/or the release of radioactive material is kept within authorized limits.

Effective Date – the date that a given document becomes effective within the licensing period. The effective date is either set to the licence issue date or to a future date when the given document becomes effective.

Guidance – guidance in the LCH is non-mandatory information, including direction, on how to comply with the licence condition.

Important to Safety – items important to safety include, but are not limited to:

- (a) SSCs whose malfunction or failure could lead to undue radiation exposure of the facility/site personnel, or members of the public;
- (b) SSCs that prevent anticipated operational occurrences from leading to accident conditions;
- (c) those features that are provided to mitigate the consequences of malfunctions or failures of SSCs; and
- (d) tasks, duties, activities, aging mechanisms, findings, or any work that improperly performed could lead to radiation exposure of the facility/site personnel, or members of the public.

Program(s) – a documented group of planned activities, procedures, processes, standards and instructions coordinated to meet a specific purpose.

APPENDIX A: DEFINITIONS AND ACRONYMS

Qualified Staff – trained licensee staff, deemed competent and qualified to carry out tasks associated with their respective positions.

Safe Direction – changes in facility safety levels that would not result in:

- (a) a reduction in safety margins;
- (b) a breakdown of barrier;
- (c) an increase (in certain parameters) above accepted limits;
- (d) an increase in risk;
- (e) impairment(s) of safety systems;
- (f) an increase in the risk of radioactive releases or spills of hazardous substances;
- (g) injuries to workers or members of the public;
- (h) introduction of a new hazard;
- (i) reduction of the defence-in-depth provisions;
- (j) reducing the capability to control, cool and contain the reactor while retaining the adequacy thereof; or
- (k) causing hazards or risks different in nature or greater in probability or magnitude than those stated in the safety analysis of the nuclear facility.

Safety and Control Measures – measures or provisions which demonstrate that the applicant:

- (i) is qualified to carry on the licensed activities; and
- (ii) has made adequate provision for the protection of the environment, the health and safety of persons, the maintenance of national security and any measures required to implement international obligations to which Canada has agreed.

Written Notification – a physical or electronic communication between CNSC staff and a person authorized to act on behalf of the licensee.

2. ACRONYMS LIST

Acronym	Definition
AECB	Atomic Energy Control Board
AECL	Atomic Energy of Canada Limited
AIA	Authorized Inspection Agency
AL	Action Levels
ALARA	As Low As Reasonably Achievable
ALI	Annual Limit of Intake
ASME	American Society of Mechanical Engineers
Bq	Becquerel
CEAA	Canadian Environmental Assessment Act
Cm	centimeter
CNEA	Canadian National Energy Alliance
CNL	Canadian Nuclear Laboratories
CNSC	Canadian Nuclear Safety Commission
CRL	Chalk River Laboratories
CSA	Canadian Standards Association
CVC	Compliance Verification Criteria
DDP	Detailed Decommissioning Plan
DRL	Derived Release Limits
ECCEC	Environmental Canada and Climate Control
GDI	Governing Document Indices
HP	Health Physicist
IAEA	International Atomic Energy Agency
IFB	Industrial Fire Brigade
L	Liter

APPENDIX A: DEFINITIONS AND ACRONYMS

Acronym	Definition
LCH	Licence Conditions Handbook
Mg	
MsV	Millisievert
MWth	
NFFF	Nuclear Fabrication Facility
NPP	Nuclear Power Plant
NRU	National Research Universal
NSCA	Nuclear Safety and Control Act
PDD	Program Description Documents
PRD	Program Requirement Document
PSA	Probabilistic Safety Assessment
PTNSR	Packaging and Transport of Nuclear Substances Regulations, 2015
REGDOC	Regulatory Document
RFFL	Recycle Fuel Fabrication Laboratories
SAT	Systematic Approach to Training
SSC	Structures, Systems, Components
SWS	Storage with Surveillance
TDGR	Transportation of Dangerous Goods Regulations
TLD	Thermoluminescent Dosimeter
TBq	
ZED	Zero Energy Deuterium

APPENDIX A: DEFINITIONS AND ACRONYMS

CURRENT LICENCE

e-Doc 4948674 (Word)

e-Doc 5390671 (PDF)



NUCLEAR RESEARCH AND TEST ESTABLISHMENT OPERATING LICENCE CHALK RIVER LABORATORIES

- I) LICENCE NUMBER:** NRTEOL-01.00/2028
- II) LICENSEE:** Pursuant to section 24 of the *Nuclear Safety and Control Act*, this licence is issued to:

**Canadian Nuclear Laboratories Ltd.
Laboratoires Nucléaires Canadiens Ltée
286 Plant Road
Chalk River, Ontario
K0J 1J0**
- III) LICENCE PERIOD:** This licence is valid from April 1, 2018, to March 31, 2028 unless suspended in whole or in part, amended, revoked or replaced.
- IV) LICENSED ACTIVITIES:**

This licence authorizes the licensee to operate the Chalk River Laboratories located in the Town of Deep River, County of Renfrew, Province of Ontario, as further detailed in paragraphs (a) to (d) below:
- (a) prepare a site for, construct, operate, modify, decommission or abandon a nuclear facility;
 - (b) possess, transfer, use or abandon a nuclear substance, prescribed equipment or prescribed information;
 - (c) produce, refine, convert, process, package, manage, store or dispose of a nuclear substance; and
 - (d) produce or service prescribed equipment.
- V) EXPLANATORY NOTES:**
- (a) Nothing in this licence shall be construed to authorize non-compliance with any other applicable legal obligation or restriction.
 - (b) Unless otherwise provided for in this licence, words and expressions used in this licence have the same meaning as in the *Nuclear Safety and Control Act* and associated regulations.

- (c) The Chalk River Laboratories Licence Conditions Handbook provides compliance verification criteria used to verify compliance with the conditions set out in this licence, including information regarding delegation of authority and applicable versions of documents and a process for version control of codes, standards or other documents that are used as compliance verification criteria.

VI) CONDITIONS:

G. General

- G.1 The licensee shall conduct the activities described in Part IV of this licence in accordance with the licensing basis, defined as:
 - (i) the regulatory requirements set out in the applicable laws and regulations;
 - (ii) the conditions and safety and control measures described in the facility's or activity's licence and the documents directly referenced in that licence; and
 - (iii) the safety and control measures described in the licence application and the documents needed to support that licence application;unless otherwise approved in writing by the Canadian Nuclear Safety Commission (hereinafter "the Commission").
- G.2 The licensee shall give written notification of changes to the facility or its operation, including deviation from design, operating conditions, policies, programs and methods referred to in the licensing basis.
- G.3 The licensee shall control the use and occupation of any land within the exclusion zone.
- G.4 The licensee shall provide, at the nuclear facility and at no expense to the Commission, suitable office space for employees of the Commission who customarily carry out their functions on the premises of that nuclear facility (onsite Commission staff).
- G.5 The licensee shall maintain a financial guarantee for decommissioning that is acceptable to the Commission or a person authorized by the Commission.
- G.6 The licensee shall implement and maintain a public information and disclosure program.

1. Management System

- 1.1 The licensee shall implement and maintain a management system.

2. Human Performance Management

- 2.1 The licensee shall implement and maintain a human performance program.
- 2.2 The licensee shall implement and maintain a training program.
- 2.3 Persons appointed to the following positions shall be certified:
 - (a) Senior Reactor Shift Engineer; and
 - (b) NRU Health Physicist.

3. Operating Performance

- 3.1 The licensee shall implement and maintain an operating program, which includes a set of operating limits.
- 3.2 The licensee shall implement and maintain a program for reporting to the Commission or a person authorized by the Commission.

4. Safety Analysis

- 4.1 The licensee shall implement and maintain a safety analysis program.
- 4.2 The licensee shall implement and maintain a nuclear criticality safety program.

5. Physical Design

- 5.1 The licensee shall implement and maintain a design program.
- 5.2 The licensee shall implement and maintain a pressure boundary program and shall have in place a formal agreement with an authorized inspection agency.

6. Fitness for Service

- 6.1 The licensee shall implement and maintain a fitness for service program.

7. Radiation Protection

- 7.1 The licensee shall implement and maintain a radiation protection program, which includes a set of action levels. When the licensee becomes aware that an action level has been reached, the licensee shall notify the Commission within seven days.

8. Conventional Health and Safety

- 8.1 The licensee shall implement and maintain a conventional health and safety program.

9. Environmental Protection

- 9.1 The licensee shall implement and maintain an environmental protection program, which includes a set of action levels. When the licensee becomes aware that an action level has been reached, the licensee shall notify the Commission within seven days.

10. Emergency Management and Fire Protection

- 10.1 The licensee shall implement and maintain an emergency preparedness program.
- 10.2 The licensee shall implement and maintain a fire protection program.

11. Waste Management

- 11.1 The licensee shall implement and maintain a waste management program.
- 11.2 The licensee shall maintain a decommissioning plan.

12. Security

12.1 The licensee shall implement and maintain a security program.

13. Safeguards and Non-Proliferation

13.1 The licensee shall implement and maintain a safeguards program.

14. Packaging and Transport

14.1 The licensee shall implement and maintain a packaging and transport program.

SIGNED at OTTAWA, this 28th day of March, 2018.

A handwritten signature in blue ink, appearing to read "Michael Binder", is written over a horizontal line.

Michael Binder, President
on behalf of the Canadian Nuclear Safety Commission