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Regulatory Oversight Report

Canadian Nuclear Laboratories

Regulatory Oversight Report for Canadian Nuclear Laboratories Sites: 2022

Public Meeting

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Laboratoires Nucléaires Canadiens

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Summary

This Commission member document (CMD) concerns the regulatory oversight report for sites operated by Canadian Nuclear Laboratories (CNL) for the 2022 calendar year. CNL is the licensee for each of these sites.

No actions are required of the Commission. This CMD is for information only.

Résumé

Le présent document à l'intention des commissaires (CMD) porte sur le rapport de surveillance réglementaire des sites exploités par les Laboratoires Nucléaires Canadiens (LNC) durant l'année civile 2022. Les LNC sont le titulaire de permis pour chacun de ces sites.

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

Signed/Signé le

02 August 2023/2 août 2023

_____

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Director General

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PLAIN LANGUAGE SUMMARY

The *Regulatory Oversight Report for Canadian Nuclear Laboratories Sites: 2022* describes the safety performance of the sites that are licensed to Canadian Nuclear Laboratories (CNL) by the Canadian Nuclear Safety Commission (CNSC). It also provides details on CNSC staff's work to ensure the safety and protection of the people and the environment around the sites.

CNSC staff evaluated CNL's performance across the CNSC's standard set of 14 safety and control areas (SCAs). This report provides the resulting performance ratings for the following sites for the 2022 calendar year:

- Chalk River Laboratories (CRL) – an operating nuclear research laboratory
- Whiteshell Laboratories (WL) – a nuclear research laboratory undergoing decommissioning
- Port Hope Area Initiative
    - Port Hope Project (PHP) – a long-term low-level radioactive waste remediation project
    - Port Granby Project (PGP) – a long-term low-level radioactive waste remediation project
    - Port Hope Pine Street Extension Temporary Storage Site – a temporary storage site for low-level radioactive waste
    - Port Hope Radioactive Waste Management Facility – a temporary storage facility for low-level radioactive waste
- Douglas Point Waste Facility – a shutdown prototype power reactor
- Gentilly-1 Waste Facility – a shutdown prototype power reactor
- Nuclear Power Demonstration Waste Facility – a shutdown prototype power reactor

The CNL sites continued to operate safely in 2022, and monitoring data demonstrates that both the water and any food grown in proximity to these sites are safe to consume. There were no releases that could have harmed the health or safety of people or the environment.

Each year, CNSC inspectors conduct inspections at CNL sites. The number of inspections and their focus depend on the individual site and its performance. The CNSC uses a risk-informed approach when planning inspections. In 2022, CNSC staff performed a total of 21 inspections at the CNL sites; those inspections are covered in this report. The inspections resulted in the issuance of 73 notices of non-compliance (NNCs), which all related to issues identified as being of low safety significance. All NNCs have been closed or have an appropriate corrective action plan in place to prevent recurrence.

The CNSC assesses the safety performance of licensees by conducting regulatory oversight activities, including inspections, technical assessments of licensee reports, reviews of events and incidents, and general communication and exchanges of

information with licensees. While the CNSC evaluates licensees across all 14 SCAs, the main focus of this report is the following 3 SCAs, as these provide a good overview of safety performance at CNL sites:

- **Radiation protection:** In 2022, the maximum individual effective radiation dose to a worker at any of the CNL sites occurred at the CRL site and was 5.48 mSv, which is 11% of the CNSC's regulatory limit for effective dose of 50 mSv in a 1-year dosimetry period. The maximum estimated dose to the public from a CNL site was from the PGP, at 0.033 mSv/year (3.3% of the 1 mSv/year prescribed dose limit).
- **Conventional health and safety:** All CNL sites must report any workplace-related lost-time injuries to the CNSC and to federal/provincial agencies. In 2022, there were a total of 4 lost-time injuries reported, 1 less than in the previous year and well below the frequency in comparable industries.
- **Environmental protection:** CNSC licensees are required to report to the CNSC and other regulatory authorities any unauthorized releases of hazardous substances or nuclear materials to the environment. In 2022, in the composite effluent sample from the PHP waste water treatment plant, there was 1 exceedance of the weekly release limit for copper, 1 exceedance of the weekly action level limit for zinc, and 1 exceedance of the weekly action level limit for arsenic. These exceedances did not pose a risk to human health or the environment. Airborne and waterborne releases of radioactive and hazardous substances at all other CNL sites remained below their respective regulatory limits and action levels in 2022. In compliance with applicable regulatory requirements, CNL has implemented environmental protection programs at its licensed facilities in Canada that are protective of the environment and the public.

Indigenous Nations and community engagement

CNL sites are located on the traditional and/or treaty territories of many Indigenous peoples. The CNSC is committed to building relationships and trust with Indigenous Nations and communities interested in CNSC-regulated facilities. In 2022, CNSC staff undertook ongoing and meaningful engagement activities with Indigenous Nations and communities in relation to the facilities covered by this regulatory oversight report. These engagement activities support the CNSC's commitment to meeting its consultation responsibilities and to continuing to build and strengthen positive relationships with Indigenous Nations and communities and respond to their issues and concerns. The CNSC is also making efforts to follow up with public stakeholders and previous intervenors to explore how to address issues raised.

Summary

For this reporting year, CNSC staff rated all SCAs as "satisfactory", with the exception of the emergency management and fire protection SCA at WL and the security SCA at CRL (these were rated as "below expectations"). Details on these ratings can be found in sections 4.10.3 and 4.12.2, respectively.

Despite the 2 ratings of below expectations, CNSC staff conclude that the CNL sites continued to perform licensed activities safely in 2022. This conclusion was supported by safety performance measures and observations, including the fact that CNL:

- operated within the bounds of its operating policies and principles
- followed approved procedures and took adequate corrective actions for all events reported to the CNSC

And CNL confirmation that:

- the health and safety of Indigenous Nations and communities and the public near the CNL sites, as well as the surrounding environment, continue to be protected
- workers at each CNL site have conducted the licensed activities safely and are properly protected
- there were no releases from CNL sites that could have harmed the environment or the health and safety of people

The referenced documents in this Commission member document are available to the public upon request, subject to confidentiality considerations.

1 INTRODUCTION

In accordance with the *Nuclear Safety and Control Act* [1], and its associated regulations, the Canadian Nuclear Safety Commission (CNSC) regulates Canada's nuclear industry to protect the health, safety of the people, security and the environment; to implement Canada's international commitments on the peaceful use of nuclear energy; and to disseminate objective scientific, technical and regulatory information to the public. Licensees are responsible for operating their facilities safely and are required to implement programs that make adequate provision for meeting legislative and regulatory requirements.

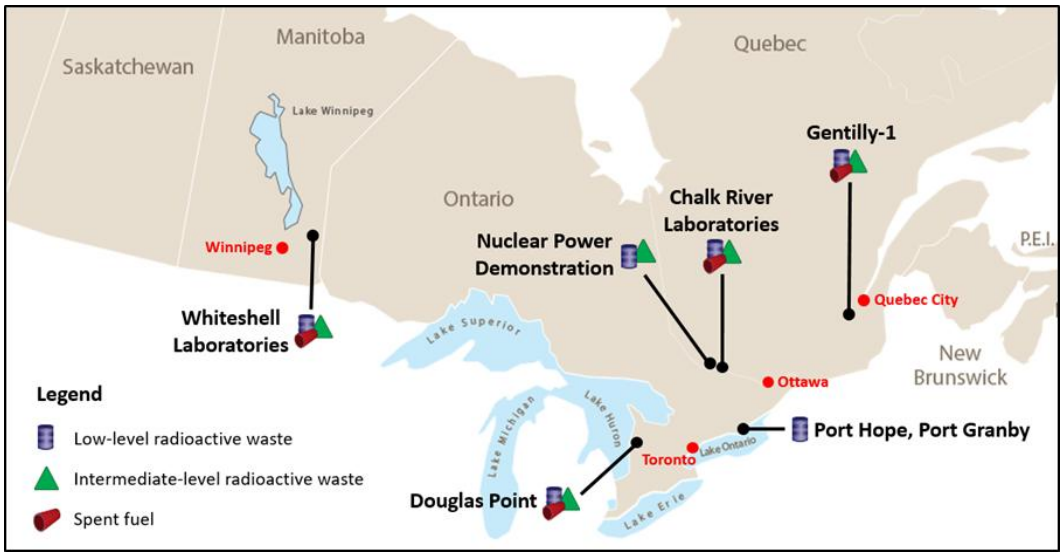
The Commission has directed CNSC staff to report to the Commission annually on the safety performance of sites operated by Canadian Nuclear Laboratories (CNL) in the form of a regulatory oversight report (ROR). This ROR provides an overview of CNSC regulatory effort and staff's assessment of licensee performance at sites operated by CNL for the 2022 calendar year.

The CNL sites covered by this report are located in many different parts of the country (Figure 1). CNSC staff would like to acknowledge the Indigenous Nations and communities (Appendix A) whose traditional and/or treaty territories are within proximity to the CNL sites covered by this report.

These CNL sites include:

- Chalk River Laboratories (CRL)
- Whiteshell Laboratories (WL)
- Port Hope Area Initiative (PHAI)
    - Port Hope Project (PHP)
    - Port Granby Project (PGP)
    - Port Hope Pine Street Extension Temporary Storage Site
    - Port Hope Radioactive Waste Management Facility
- Douglas Point Waste Facility (DPWF)
- Gentilly-1 Waste Facility (G1WF)
- Nuclear Power Demonstration Waste Facility (NPDWF)

Figure 1: Sites covered by this report



This ROR discusses all safety and control areas (SCAs), but focuses on radiation protection, conventional health and safety and environmental protection. The report also provides an overview of licensee operations, licence changes, major developments at licensed facilities and sites, and reportable events. In addition, the report includes information on the CNSC's and CNL's engagement with Indigenous Nations and communities, and the public.

2 CANADIAN NUCLEAR LABORATORIES

CNL is responsible for the operation and management of nuclear sites owned by Atomic Energy of Canada Limited (AECL) under a Government-Owned, Contractor-Operated model. While AECL owns the sites and nuclear substances, CNL is the CNSC licensee for activities at those sites.

A brief overview of each CNL site is provided below, with a link to the CNSC web page that contains more details such as facility information, announcements, regulatory reporting and other key topics.

2.1 Chalk River Laboratories

Chalk River Laboratories (CRL) is located in Chalk River, Ontario, 160 kilometers northwest of Ottawa (Figure 2), on the traditional unceded territory of the Algonquin Anishinabeg People. CRL operates under a single licence that includes Class I and Class II nuclear facilities, waste management areas, radioisotope laboratories, support facilities and offices. CNL safely manages low-, intermediate- and high-level radioactive waste at the site. The CRL site continues to undergo a period of change. Where permitted by the current licensing basis, CNL is continuing to shut down and decommission legacy facilities and constructing and commissioning replacement facilities throughout the site. Further information on CRL is available on the CNSC's website at: Chalk River Laboratories (nuclearsafety.gc.ca).

Figure 2: View of the CRL built-up area *(Source: CNL)*

2.1.1 Major Activities at CRL

The National Research Universal (NRU) reactor ceased operating on March 31, 2018, and remains in a permanently shut down, defueled and dewatered state in 2022. CNL continues its work in the NRU reactor and its associated systems to place the facility in a permanently safe shut down state. CNL performed a total of 63 work packages since 2018, however no additional work packages were completed in 2022 due to ongoing electrical and ventilation projects needed to support the shutdown. Further activities will continue until the NRU reactor and facility can be placed in a state of storage with surveillance.

In September 2022, construction officially began on the Advanced Nuclear Materials Research Centre (ANMRC) and included mass excavation and shoring work. The detailed design for ANMRC is ongoing and construction of the main building elements has commenced. The ANMRC will consolidate existing laboratories and hot cells located at CRL and is anticipated to be one of the largest active research laboratories in Canada.

CNL continued work on the proposal to construct a Near Surface Disposal Facility (NSDF) at the CRL site. This project underwent a review by CNSC staff and was subject to an Environmental Assessment (EA) [2] pursuant to the *Canadian Environmental Assessment Act, 2012* (CEAA, 2012) [3]. CNSC accepted the Final Environmental Impact Statement [4], leading to a two-part public hearing to consider CNL's application to authorize the construction of the proposed NSDF. The public hearings occurred on February 22, 2022 (Part I) and May 30 to June 3, 2022 (Part II). On July 5, 2022, the Commission announced its direction to leave the NSDF hearing record open to allow more time for engagement and consultation with Kebaowek First Nation (KFN) and the Kitigan Zibi Anishinabeg (KZA), and for the filing of additional information about these consultative efforts. In response to requests from KFN [5] and the KZA [6] in December 2022, the Commission extended the deadline for filing submissions to May 1, 2023 and final submissions will be considered during an oral public hearing. On May 17, 2023, the Commission announced that it reviewed the additional submissions from KFN, KZA, AECL, CNL and CNSC staff and is satisfied with the information received and does not require any additional information. The Commission announced that it is ready to receive final written submissions from intervenors and CNL by June 6 and June 21, 2023, respectively, with an oral public hearing scheduled for August 10, 2023.

2.2 Whiteshell Laboratories

Whiteshell Laboratories (WL) is a former nuclear research and test facility located near Pinawa, Manitoba that was established in the early 1960s (Figure 3). It is located in the homeland of the Red River Métis, Treaty 1 and Treaty 3 territories, and the traditional territory of Anishinaabe and Ojibway Peoples. The WL site is also located in the vicinity of Treaty 5 territory. The site hosts the 60-megawatt thermal (MWth) Whiteshell Reactor No. 1 (WR-1), a SLOWPOKE demonstration reactor, other research and support facilities, and a waste management area that contains low-, intermediate- and high-level radioactive waste. The WR-1 and

SLOWPOKE reactors were permanently shut down in 1985 and 1990, respectively. Decommissioning activities at WL commenced in 2003. Further information on WL is available on the CNSC's website at: http://nuclearsafety.gc.ca/eng/reactors/research-reactors/other-reactor-facilities/whiteshell-laboratories.cfm.

Figure 3: Whiteshell Laboratories main campus *(Source: CNL)*

2.2.1 Major Activities at WL

Demolition of the Active Liquid Waste Treatment Centre and the Health and Safety Facilities began in 2021 and was completed in early 2022. The Shielded Modular Above Ground Storage facility is being converted to the Cask Loading Facility. The Cask Loading Facility will be used to handle, stage and load waste into appropriate shipping packages for transportation off-site. The removal, characterization and packaging of low-level radioactive waste packages from storage facilities in the waste management area continues.

CNL also prepared a Recoverable Surface Storage and Staging Area (RSSSA) consisting of an outdoor, above ground storage pad to enable the storage and loading of solid low-level waste in sea land containers and storage of oversized low-level waste items awaiting further processing, characterization and/or packaging prior to off-site disposition. The RSSSA was placed into service in early 2022.

A safety-stand down was performed at the WL site following a near-miss in which equipment was not properly electrically isolated prior to work. The safety-stand down. began on June 13, 2022. Activities at the site resumed in a phased manner, with the stand-down officially ending on December 9, 2022.

In April 2023, CNL performed a planned self-assessment of the WL fire protection program, which included the review of fire protection records for calendar years 2020, 2021 and 2022. Through the self-assessment, CNL identified a number of non-compliances and reported this to the CNSC. CNL immediately placed the WL site into a safe shutdown state, where only essential compliance and maintenance work could be conducted. As a result of this event, CNL has received a below expectations rating for the emergency management and fire protection SCA. Further details on this can be found in section 4.10.3 of this report.

CNL continues to work on the proposal to change the decommissioning approach for WR-1 from full dismantlement to in-situ decommissioning. This proposed approach is currently under review by CNSC staff, and is subject to an EA [7] pursuant to CEAA, 2012 [3], which will require authorization from the Commission. As these are not currently CNSC-licensed activities and will be the subject of separate Commission decisions, they are not specifically discussed further in this report.

2.3 Port Hope Area Initiative

The Port Hope Area Initiative (PHAI) is a federal government initiative based on a community proposal, which includes the Port Hope Long-Term Low-Level Waste Management Project (Port Hope Project) and Port Granby Long-Term Low-Level Waste Management Project (Port Granby Project) (Figure 4 and Figure 5). The Government of Canada, through Natural Resources Canada, has committed to clean up low-level radioactive waste in the Port Hope area and provide long-term safe management of the historic low-level radioactive wastes in the Port Hope area. These wastes arose from the activities of a former federal Crown Corporation (Eldorado Nuclear) and its private sector predecessors. The PHAI is on the traditional territory of the Michi Saagig Anishinaabe People. These lands are covered by the Williams Treaty between Canada and the Mississauga and Chippewa Nations.

Through its Historic Waste Program Management Office, CNL is implementing the PHAI on behalf of AECL.

For the 2022 reporting period CNL had 4 licences associated with the PHAI. The 4 licences include:

- WNSL-W1-2310.02/2022 for the Port Hope Project (PHP)
- WNSL-W1-2311.00/2022 for the Port Granby Project (PGP)
- WNSL-W1-182.0/2022 for the Port Hope Pine Street Extension Temporary Storage Site
- WNSL-W1-344-1.8/ind. for the Port Hope Radioactive Waste Management Facility

Following a one-day hearing on November 22, 2022, the Commission announced its decision, which can be found in DEC 22-H13 [8], to renew the PHP licence, for a 10-year period beginning January 1, 2023. As part of the decision, a single licence that consolidates the licensed activities previously authorized under CNL's 4 waste nuclear substance licences was issued. The new licence, Port Hope Area Initiative Waste Management Project, WNSL-W1-2310.00/2032 is valid from January 1, 2023 until December 31, 2032.

Further information on the PHAI is available on the CNSC's Website at: http://nuclearsafety.gc.ca/eng/waste/historic-nuclear-waste/port-hope-area-initiative/index.cfm.

Figure 4: Work in Port Hope - Waterfront Sites *(Source: CNL)*

Figure 5: Port Granby – Remediation Completed *(Source: CNL)*

2.3.1 Major Activities at PHAI

In 2022, the PHP and PGP Long-Term Waste Management Facilities (LTWMF) and associated Waste Water Treatment Plants (WWTP) continued their operations safely and as required by their respective licences.

In 2022, the PHP LTWMF remained open to receive offsite shipments of PHAI related low-level radioactive waste (LLRW). This included LLRW from residential properties, municipal road allowances, temporary storage sites, waterfront sites, industrial sites and locations within the municipality known to have LLRW from historical records.

CNL announced in May 2022 that the PGP is now in long-term maintenance and monitoring following the emplacement of 1.3 million tonnes of LLRW into the LTWMF that was capped and closed in late 2021. Final grading, erosion control measures and the construction of the east gorge groundwater collection system were completed in the fall of 2022. CNSC staff continue its regulatory oversight of the PGP to ensure the protection of the public and environment.

2.4 Prototype Power Reactors

The Douglas Point Waste Facility (DPWF), Gentilly-1 Waste Facility (G1WF) and Nuclear Power Demonstration Waste Facility (NPDWF) are 3 prototype power reactors. They are currently in a safe shutdown state and undergoing decommissioning activities. G1WF and NPDWF are in storage with surveillance, which includes hazard reduction and waste characterization. DPWF has started active decommissioning of the non-nuclear structures, in line with plans reviewed and accepted by CNSC staff. For these prototype reactors, CNL continues to implement and maintain programs such as radiation protection, conventional health and safety, security and emergency management and fire protection.

2.4.1 Douglas Point Waste Facility

Douglas Point Waste Facility (DPWF) located in Tiverton, Ontario on the Bruce nuclear site is a partially decommissioned prototype power reactor (Figure 6). The DPWF is located within the traditional territory of the Saugeen Ojibway Nation (SON), and the harvesting areas of the Georgian Bay Métis Nation of Ontario (MNO) and the Historic Saugeen Métis (HSM) Peoples. The 200-megawatt electric (MWe) prototype Canada deuterium uranium (CANDU) power reactor was put into service in 1968 and permanently shut down in 1984. CNL safely manages low- and intermediate-level radioactive wastes, as well as spent nuclear fuel stored in concrete dry storage canisters at the DPWF site. CNL is also undertaking decommissioning activities. Further information on DPWF is available on the CNSC's website at: http://nuclearsafety.gc.ca/eng/reactors/research-reactors/other-reactor-facilities/douglas-point-waste-facility.cfm.

In its Record of Decision DEC 20-H4, *Application to amend the Waste Facility Decommissioning Licence for the Douglas Point Waste Facility to include phase 3 decommissioning activities* [9], the Commission granted a licence amendment effective March 12, 2021 authorizing the phase 3 decommissioning activities, including the decommissioning and dismantlement of certain facilities and structures at the DPWF site. Decommissioning work is ongoing on the non-nuclear buildings to facilitate the safe dismantling and demolition of the buildings.

Figure 6: Douglas Point Waste Facility *(Source: CNL)*

2.4.2 Gentilly-1 Waste Facility

Gentilly-1 (G1WF), located in Bécancour, Québec within Hydro-Québec's Gentilly-2 site, is a partially decommissioned prototype power reactor (Figure 7). The site is located on the traditional and unceded territory of the Abenaki People and the Wabanaki Confederacy and the traditional land of the Huron-Wendat. The 250 MWe boiling water reactor was put into service in 1972 and shut down in 1984. At G1WF, CNL safely manages low- and intermediate-level radioactive wastes, as well as spent nuclear fuel in concrete dry storage canisters. Additionally, CNL is undertaking decommissioning planning activities. Further information on G1WF is available on the CNSC's website at: http://nuclearsafety.gc.ca/eng/reactors/research-reactors/other-reactor-facilities/gentilly-1-facility.cfm.

Figure 7: Gentilly-1 Waste Facility, outlined in yellow *(Source: CNL)*

2.4.3 Nuclear Power Demonstration Waste Facility

The Nuclear Power Demonstration Waste Facility (NPDWF) is a partially decommissioned prototype power reactor located in Rolphton, Ontario (Figure 8) on the traditional unceded territory of the Algonquin Anishinabeg Peoples. The 20 MWe prototype CANDU power reactor was placed into service in 1962 and operated until 1987. At NPDWF, CNL safely manages low- and intermediate-level radioactive wastes. Additionally, CNL is undertaking decommissioning planning activities. Further information on NPDWF is available on the CNSC's website at: http://nuclearsafety.gc.ca/eng/reactors/research-reactors/other-reactor-facilities/nuclear-power-demonstration.cfm.

CNL continues to work on the proposal to modify the decommissioning approach for NPDWF from full dismantling to in-situ decommissioning. This application is under review by CNSC staff, and is subject to both an EA [10] pursuant to CEAA, 2012 [3] and a licence amendment. As CNL's proposal will be the subject of future Commission decisions on the EA and licence amendment, they are not discussed further in this report.

Figure 8: Nuclear Power Demonstration Waste Facility *(Source: CNL)*

3 CNSC'S REGULATORY OVERSIGHT OF CNL

The CNSC performs regulatory oversight of licensed facilities to verify compliance with the requirements of the *Nuclear Safety and Control Act* [1] and associated regulations, each site's conditions of licence and licence conditions handbook (LCH), and any other applicable standards and regulatory documents (REGDOCs) forming part of the licensing basis.

CNSC staff use the safety and control area (SCA) framework to assess, evaluate, review, verify and report on licensee performance. The SCA framework includes 14 SCAs, which are subdivided into specific areas that define its key components. Further information on the CNSC's SCA framework can be found on the CNSC's website at:
http://www.nuclearsafety.gc.ca/eng/resources/publications/reports/powerindustry/safety-and-control-areas.cfm.

http://www.nuclearsafety.gc.ca/eng/resources/news-room/feature-articles/safety-and-control-areas.cfm.

3.1 Regulatory Activities

CNSC staff conducted many risk-informed regulatory oversight activities in 2022.

Licensing

CNSC staff activities for licensing includes drafting new licences, preparing Commission Member Documents (CMDs), and drafting or revising LCHs. Appendix B provides a summary of licensing activities for 2022.

As CNSC REGDOCs are published, CNSC staff request implementation plans for each site and update the LCHs as applicable. CNSC staff verify REGDOC implementation as part of ongoing compliance verification activities. Appendix C provides a list of CNSC REGDOCs implemented at CNL sites and used by CNSC staff for compliance verification.

Compliance

The CNSC ensures licensee compliance through verification, enforcement and reporting activities. CNSC staff implement compliance plans for each site by conducting regulatory activities including inspections, desktop reviews, and technical assessments of licensee programs, processes, and reports.

Appendix D contains a list of CNSC inspections carried out at each CNL site in 2022. All notices of non-compliance (NNCs) resulting from non-compliance with legislation, regulations and licensing basis requirements noted during these inspections were considered low-risk and did not have an impact on the health, safety and environment. CNSC staff determined that all NNCs were adequately addressed either through closure or an appropriate corrective action plan. Appendix E contains a list of reportable events at each CNL site in 2022. For these events, CNSC staff were satisfied with CNL's corrective actions to prevent recurrence.

3.2 Performance Ratings

The safety assessments presented in this report are based on the results of activities planned through the CNSC compliance verification program. In 2022, these activities included inspections as well as technical assessments of submissions. CNSC staff use the results of these activities to assign performance ratings to licensees. CNSC staff use the following 3 ratings to grade licensee performance in each applicable SCA:

- satisfactory (SA)
- below expectations (BE)
- unacceptable (UA)

The definitions of the ratings can be found in Appendix F.

For 2022, CNSC staff have rated CNL's performance in each SCA as satisfactory, with the exception of the emergency management and fire protection SCA at WL and security SCA at CRL, which are rated as below expectations. Details on these ratings can be found in sections 4.10.3 and 4.12.2, respectively. Appendix G provides SCA ratings for each site from 2018 to 2022.

4 THE CNSC'S ASSESSMENT OF SAFETY AT CNL SITES

The CNSC regulates all aspects of safety at nuclear sites in Canada, including risks to workers, the public and the environment. CNSC staff assess performance in all SCAs by verifying licensee compliance through planned or reactive desktop reviews and inspections. Although all 14 SCAs are covered in the following sections, the radiation protection, conventional health and safety, and environmental protection SCAs are considered the most relevant in determining CNL's overall safety performance. In particular, the SCAs of radiation protection, and conventional health and safety are a good measure of the safety of workers at CNL sites, while the SCA of environmental protection is a good measure of the safety of the public and the environment. If the performance of a specific CNL site is not discussed under a particular SCA in this report, that means there were no findings related to this SCA in 2022 as a result of CNSC staff's oversight activities.

CNSC staff have determined that all NNCs from inspections were adequately addressed either through closure or an appropriate corrective action plan, and that the NNCs did not impact safety at CNL sites. CNSC staff conclude that CNL has met regulatory requirements and for 2022 have rated all SCAs at all CNL licensed sites as satisfactory, with the exception of the emergency management and fire protection SCA at WL and security SCA at CRL, which are rated as below expectations.

For both the radiation protection and environmental protection SCAs action levels (ALs) are used. ALs are a specific dose of radiation or other parameter that serve as an early warning to safeguard against exceedances of radiation dose limits and environmental release limits. AL exceedances are reportable to the CNSC. Further information on ALs is available on the CNSC's website at: http://www.nuclearsafety.gc.ca/eng/resources/news-room/feature-articles/radiation-dose-limits-release-limits-and-action-levels.cfm.

4.1 Management System

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

CNSC staff assess CNL's performance in the management system SCA through desktop reviews of program documents, reportable events (Appendix E) and through the course of inspections (Appendix D). There were no management system focused inspections conducted by CNSC staff at CNL sites in 2022. However, there were some findings related to the management system SCA found through regular licensing and compliance activities conducted at WL, DPWF and PHAI.

4.1.1 Whiteshell Laboratories

In an inspection conducted at WL in October 2022, CNSC staff identified 2 NNCs pertaining to the management system SCA. During this inspection, CNSC staff reviewed a selection of waste management daily operating logs to ensure they contained the required information. CNSC staff found the operating logs to be inconsistent in the information they contained, not following a prescribed format, not containing a CNL identification number and difficult to read. As a result of this finding, CNSC staff requested CNL to take corrective action to ensure that operating logs are compliant with the necessary requirements. Additionally, CNSC staff reviewed governing documents for the waste management program and found that several documents were beyond the required 5-year revision cycle. As a result, CNSC staff issued a second NNC requesting that CNL take corrective action to ensure their waste management suite of documents are reviewed and revised based on current practices and site operations. These findings were of low safety significance and did not pose an imminent risk to people or the environment. CNSC staff is satisfied with the corrective actions taken by CNL to address these 2 NNCs and they are now considered closed.

4.1.2 Douglas Point Waste Facility

During an inspection conducted by CNSC staff at DPWF in February 2022, 2 NNCs pertaining to the management system SCA were identified by CNSC staff, which related to the clarity of storage with surveillance (SWS) records and accuracy of documents. In order to verify that monitoring, testing and surveillance activities were performed in accordance with the SWS, CNSC inspectors requested that CNL map the SWS activities to an Operator Rounds Database (ORD) tag. CNSC staff also reviewed operating procedures that guide SWS activities and noted that monthly inspection instructions did not reference the ORD tags, and that the instructions did not cover the same scope as the SWS document. Overall, CNSC staff found that the tags in the ORD system did not clearly align with activities in the SWS. As a result, CNSC staff issued a NNC requesting that CNL take corrective action to ensure there is a clear link between the field monitoring, testing, and surveillance activities, and the activities listed in the SWS document. Additionally, CNSC staff found that the SWS document and the Detailed Decommissioning Plan Volume 2 did not accurately capture how work was being conducted. As a result, CNSC staff issued a second NNC requesting that CNL take corrective action to ensure that these documents accurately described how work is conducted. Both NNCs were considered of low safety significance and did not pose an imminent risk to people or the environment. CNSC staff is satisfied with the corrective actions taken by CNL to address these 2 NNCs and they are now considered closed.

4.1.3 Port Hope Area Initiative

In 2022, CNSC staff identified, through regular licensing and compliance activities, non-compliances with CNL's management oversight of changes and its adherence to the change control process with respect to the PHAI. CNL is required by each of its licences to implement and maintain a management system, which includes implementing and maintaining adequate measures for change control. Additionally, as per its licences, CNL is required to give written notification of changes to the licensed activities or operation, including deviation from design, operating conditions, policies, programs and methods referred to in the current licensing basis. On 2 separate occasions during the 2022 calendar year, CNSC staff found that CNL failed to provide the required written notification of changes with respect to the PHAI. In addition, it was also found that CNL applied its change control process retroactively in both cases, which CNSC staff finds to be unacceptable as this demonstrates a lack of management oversight for the implementation and maintenance of the change control process.

Previous to these occurrences, in January 2021, CNSC staff conducted inspections at the PHP and PGP with a focus on management system. One of the findings, as a result of these inspections, was that there were no clear criteria when design changes must be submitted to CNSC for acceptance. CNSC staff issued a NNC for CNL to address this finding. In response to this NNC, CNL revised applicable documentation to include clear criteria for when a notification is required, as per its licences. CNSC staff reviewed the revised document and were satisfied with the corrective actions taken by CNL. This NNC was closed by CNSC staff in October 2022. CNSC staff expect CNL to use this document notification process and criteria moving forward to ensure that the change control process is applied correctly. Despite the changes CNL has made to strengthen its process, CNSC staff will continue to monitor procedural adherence in this area. CNSC staff requested CNL to conduct a causal analysis into why these failures occurred, for the management of changes at the PHP and PGP.

In March 2023, CNL submitted a root cause analysis report on its adherence to the change control program. The root cause was determined to be a lack of management direction. Leadership had not defined the accountabilities for having intimate knowledge of the licensing basis and the responsibilities involved in reviewing and approving equipment and process changes. The main corrective actions resulting from the root cause analysis include documenting the accountability for having intimate knowledge of the licensing basis and developing and documenting the skills and competencies and training requirements for management. CNL has committed to completing these corrective actions by October 2023 and conducting an effectiveness review by May 2024.

CNSC staff have reviewed the root cause analysis report and proposed corrective actions and found them to be acceptable. In addition, CNSC staff have planned management system inspections in fiscal year 2023-2024 to ensure CNL's management system program remains effective.

4.1.4 Overall Conclusion

Despite the issues identified with respect to CNL's management oversight of changes and adherence to the change control process with respect to the PHAI, overall, CNSC staff conclude that CNL continues to implement and maintain effective management system programs in accordance with regulatory requirements.

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 a sufficient number of licensee personnel are in all relevant job areas and have the necessary knowledge, skills, procedures and tools in place to safely carry out their duties.

CNSC staff assess CNL's performance in the human performance management SCA through desktop reviews of documents, reportable events (Appendix E) and through the course of inspections (Appendix D). In 2022, CNSC staff conducted focused inspections on the human performance management SCA at both CRL and PHP.

4.2.1 Chalk River Laboratories

In March 2022, CNSC staff conducted a focused inspection on the human performance management SCA as part of the baseline compliance plan for CRL. The scope of the inspection included an evaluation of CNL's Human Performance Program and Training Program. This inspection resulted in 6 NNCs, which were raised to CNL to address. All findings resulting from this inspection were of low safety significance and did not pose an imminent risk to people or the environment.

Of the 6 NNCs, 2 of them pertained to CNL's Human Performance Program and related to reporting hours of work exceedances and managing worker fatigue. CNSC staff found that hours of work exceedances for safety-sensitive positions were not being routinely reported to the CNSC and were not submitted to CNSC as part of the previous annual compliance monitoring report. This finding was of low safety significance because there is no requirement for CNL to report each instance of an exceedance individually. However, the CNSC expects exceedances to be reported, at minimum, via the annual compliance monitoring report as per CNSC's REGDOC-3.1.2, *Reporting Requirements, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills* [11]. This would allow CNL to demonstrate that regulatory requirements associated with its Human Performance Program are being met. Additionally, CNSC staff found that CNL was maintaining records of work exceedances for safety-sensitive positions and there were no reported incidences of the minimum shift complement not being met for safety-sensitive positions. The second NNC issued was related to managing worker fatigue, as it was not evident from records reviewed of hours of work exceedances and the interviews conducted with CNL staff, what measures were being taken to manage and mitigate the effects of worker fatigue in safety-

sensitive positions and whether workers are aware of the options available to them to manage fatigue at work. CNSC staff requested CNL take corrective action to ensure that safety-sensitive positions at CRL comply with the limits on hours and recovery periods as per CNSC's REGDOC-2.2.4, *Fitness for Duty: Managing Worker Fatigue* [12]. This finding was of low safety significance since it is acknowledged that exceptional circumstances may warrant exceeding the limits on hours of work and recovery periods for workers in safety-sensitive positions to limit the risk to nuclear safety and security may arise if the minimum shift complement was not maintained.

The remaining 4 NNCs pertained to CNL's Training Program and related to job and task analyses and training plans, the training change management process, and application of the Systematic Approach to Training (SAT). CNSC staff requested CNL take corrective actions to update its relevant training program documentation to ensure the identified tasks and required training are valid and accurate for radiation protection surveyors. CNSC staff also requested CNL take corrective actions to update SAT documentation to accurately list all positions/roles that require SAT-based training and ensure the updated SAT documentation adheres to the annual review requirement to make sure that the SAT positions identified in the controlled list are kept up to date.

CNL has addressed 5 out of the 6 NNCs resulting from this inspection. CNSC staff is satisfied with the corrective actions taken by CNL to address the 5 NNCs and they are now considered closed. CNL has identified corrective actions to be taken to address the remaining NNC related to managing worker fatigue. The deadline to address this NNC is by Q4 of the 2023 calendar year. This NNC will remain open until CNL addresses it to CNSC staff's satisfaction.

4.2.2 Port Hope Project

In December 2022, CNSC staff conducted a focused inspection on the human performance management SCA as part of the baseline compliance plan for the PHP. The scope of the inspection focused on CNL's training program, including CNL's implementation of corrective actions in response to a previous CNSC inspection in 2019 and CNL's implementation of actions to address its gap analysis against the requirements of CNSC's REGDOC-2.2.2, *Personnel Training* [13]. This inspection resulted in 6 NNCs, which were raised to CNL to address. The NNCs pertained to the use of a training system, documentation, training analysis and change management, design, development and evaluation of training, and training records. All findings were of low safety significance and did not pose an imminent risk to people or the environment. These findings were of low safety significance, as CNL does have a documented training system that is being implemented for all their training programs. CNSC staff have received the initial responses to the 6 NNCs and the NNCs will remain open until CNL addresses them to CNSC staff's satisfaction. The deadline to address these NNCs is by Q3 of the 2023 calendar year.

4.2.3 Overall Conclusion

CNSC staff conclude that CNL continues to implement and maintain effective human performance management programs in accordance with regulatory requirements.

4.3 Operating Performance

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

CNSC staff assess CNL's performance for the operating performance SCA through desktop reviews of documents, reportable events (Appendix E) and through the course of inspections (Appendix D). CNL also submits annual reports on compliance monitoring and operational performance of facilities.

CNSC staff were notified of revisions to compliance verification criteria documents as outlined in CNL site LCHs. CNL's corporate-wide management system consists of high-level documentation supported by lower-level procedures. CNL maintains a comprehensive suite of procedures across all programs and sites. CNL continually updates the facility-specific procedures relating to operations, maintenance, and emergency response as needed and supports ongoing process improvements across all sites. CNSC staff regularly review procedure level documents as part of ongoing compliance verification activities. At CRL, procedures specifically related to Conduct of Operations, Commissioning, and Configuration Management were reviewed. The procedures were deemed to be acceptable by CNSC staff. CNL facility authorization (FA) and storage with surveillance (SWS) documents were submitted to the CNSC as required by the site LCHs. CNSC staff deemed submitted FAs and SWSs acceptable before being implemented by CNL.

CNSC staff were notified of reportable events (Appendix E) as required and CNL submitted annual reports as required. No significant regulatory issues were identified during CNSC staff's review of these reports. CNL revised their overarching Management Control Procedure (MCP), *CNL Reporting to Regulatory Agencies*, 900-514300-MCP-006, to further clarify and improve reporting requirements. CNSC staff have access to CNL's Improvement Action System reports which are utilized for trending purposes by CNL.

4.3.1 Chalk River Laboratories

In 2022, there was an unplanned Class IV power outage at the CRL site related to a weather event that damaged electrical infrastructure off-site. Class III power initiated as required and operated as intended. As a cautionary measure CNL-CRL's Emergency Operations Centre (EOC) was activated. CNSC staff were notified by CNL. CNSC staff is satisfied with CNL's event response. In June 2022, CNL successfully executed an annual electrical site-wide outage at CRL to perform testing, inspections, cleaning, and maintenance and repairs.

In May 2022, CNSC staff conducted an inspection at the CRL Universal Hot Cells facility that resulted in a NNC pertaining to the FA document being out of

date. The FA referred to all facility work being conducted on work permits, but CNL staff had noted that facility work is no longer conducted on work permits, but rather using CNL's integrated work control system. This finding was of low safety significance as CNL's on-site work activities continue to be managed under a system and this NNC pertains to documentation to be updated. CNSC staff requested CNL to take corrective action to update the Universal Hot Cells FA document to refer to CNL's integrated work control system. CNL is working to address this NNC by Q3 of the 2023 calendar year via an FA document revision and it will remain open until it is addressed to CNSC staff's satisfaction.

In June 2022, CNSC staff conducted an inspection at the CRL Combined Electrolysis and Catalytic Exchange Upgrading and Detritiation (CECEUD) test facility that resulted in 2 NNCs pertaining to the documentation of operator surveillance on equipment monitoring, and regular performance monitoring and periodic testing of CECEUD systems, structures, and components. CNSC staff noted that the details of daily operator surveillance were not recorded in the facility daily logbook, in addition to a facility exhaust fan that was found not to be regularly maintained as required. CNSC staff requested CNL to take corrective action. CNL is working to address these NNCs by Q3 of the 2023 calendar year and they will remain open until they are addressed to CNSC staff's satisfaction.

In December 2022, CNSC staff conducted an inspection at the CRL Recycle Fuel Fabrication Laboratories (RFFL) facility that resulted in a NNC pertaining to an air flow testing station in the facility exhaust ventilation line being 2 days past due for calibration according to the calibration sticker. This finding was of low safety significance. CNSC staff requested CNL to take corrective action. CNL determined that their radiation protection program does not require air flow testing stations to undergo calibration and that the calibration sticker was mistakenly placed on the air flow testing station. CNL has since removed the calibration sticker and ensured that there were no other misplaced calibration stickers in the facility. CNSC staff determined that the corrective actions taken by CNL to address the NNC were acceptable, and the item is now closed.

4.3.2 Overall Conclusion

CNL continued to meet its reporting requirements including those associated with annual reports and reportable events, which demonstrates that facilities were operated and maintained according to the licensing basis. CNSC staff assessments conclude that CNL has conducted its activities in compliance with regulatory requirements.

4.4 Safety Analysis

The safety analysis SCA covers maintenance of the safety analysis that supports the overall safety case for the facilities. 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.

CNSC staff assess CNL's performance in the safety analysis SCA through desktop reviews of documents, reportable events (Appendix E) and through the course of inspections (Appendix D).

There were no safety analysis focused inspections conducted by CNSC staff at CNL sites in 2022. However, there were a total of 5 NNCs pertaining to safety analysis resulting from general inspections performed at CNL facilities.

4.4.1 Chalk River Laboratories

In May 2022, an inspection of the Universal Hot Cells facility at CRL resulted in a NNC pertaining to an expired training certification requirement of a Nuclear Criticality Control Officer (NCCO). CNL confirmed that the NCCO's required training was expired but clarified that the NCCO had not acted as the Universal Hot Cells' NCCO designate since the training had expired. CNSC staff requested CNL to take corrective action to ensure that NCCOs and designates have completed the required training. CNSC staff determined that the corrective actions taken by CNL to address the NNC were acceptable and the item is now closed.

In November 2022, an inspection of Building 429 at CRL resulted in a NNC pertaining to CNL not tracking an overall inventory of U-235 in the facility and being unable to determine whether the amount of U-235 in the facility exceeded the maximum 100 gram limit for non-nuclear criticality controlled areas (NCCA). CNSC staff requested CNL to take corrective action to determine the amount of U-235 in the facility and to maintain an accurate inventory of fissionable material at all times. CNL immediately determined the amount of U-235 in the facility to be less than the limit for non-NCCAs after the inspection and informed CNSC staff. CNL has since developed an accurate tracking inventory for fissionable material in the facility and the NNC has since been closed.

In June 2022, an inspection of the CECEUD facility at CRL resulted in 2 NNCs pertaining to safety analysis reports and facility operations documentation not being maintained and kept up to date to reflect the current operating status and configuration of the facility. CNSC staff requested CNL take corrective action to ensure facility operations documentation and safety analysis reports are updated. These NNCs are of low safety significance as the facility is in a safe shutdown state since April 2001 and there are no heavy water processing activities taking place in the facility. CNL is working to address these NNCs by Q4 of the 2023 calendar year and they will remain open until they are addressed to CNSC staff's satisfaction.

In September 2022, an inspection conducted on Waste Management Areas (WMA) D and H resulted in a NNC pertaining to the lack of required signage for non-NCCAs in the WMAs. CNL had recently re-organized a non-NCCA into smaller non-NCCAs but did not have signage at the point of entry to each individual non-NCCA. CNSC staff requested CNL take corrective action to ensure that there is signage posted at the point of entry of each of the non-NCCAs. CNL has since confirmed that posting the required signage is not feasible due to the movement of heavy equipment in the area and multiple outdoor storage areas. CNL has notified CNSC staff that they have revised the Nuclear Criticality Safety for Operations Standards with the constraints at WMA D and H while maintaining compliance with the requirements of CNSC's REGDOC-2.4.3, *Nuclear Criticality Safety* [14]. CNSC staff determined that the corrective actions taken by CNL to address the NNC were acceptable and the item is now closed.

4.4.2 Overall Conclusion

CNSC staff conclude that CNL continues to implement and maintain safety analysis programs in accordance with regulatory requirements.

4.5 Physical Design

The physical design SCA relates to activities that impact the ability of structures, systems, and components 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 CNL's performance in the physical design SCA through desktop reviews of documents, reportable events (Appendix E) and through the course of inspections (Appendix D). CNSC staff have reviewed CNL's conduct of design engineering documents, to ensure activities are planned, controlled and monitored in accordance with regulatory requirements and applicable codes and safety standards.

4.5.1 Port Hope Area Initiative

In 2022, CNSC staff conducted a desktop review of the construction activities at the Port Hope Harbour which is part of the PHAI. The review focused on the design details of the harbour wall rehabilitation. CNSC staff found that the design and construction of the harbour walls are satisfactory with respect to their integrity and stability.

4.5.2 Overall Conclusion

CNSC staff conclude that CNL's programs related to the physical design SCA continue to meet regulatory requirements.

4.6 Fitness for Service

The fitness for service SCA covers activities that impact the physical condition of structures, systems, and components 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. Regulatory oversight of the fitness for service SCA includes specific areas of equipment performance, maintenance, aging management, structural integrity and chemistry control.

CNSC staff assess CNL's performance in the fitness for service SCA through desktop reviews of documents, reportable events (Appendix E) and through the course of inspections (Appendix D).

4.6.1 Chalk River Laboratories

Throughout 2022, CNSC staff conducted inspections of CRL facilities including NRU, Molybdenum-99 Production Facility (MPF), Nuclear Fuel Fabrication Facility (NFFF), RFFL, CECEUD, and WMA D and H with one of the foci being on the fitness for service SCA. In total there were 10 NNCs raised for CNL to address that are related to fitness for service.

Of the 10 NNCs, 3 of them pertained to equipment or instrumentation that remained installed past their designated lifetime or calibration due date, or not meeting field installation requirements. In an inspection of NFFF in October 2022, CNSC staff found High Efficiency Particulate Air (HEPA) filters on active workstations installed beyond their 10-year allowable life. This finding was of low safety significance, as CNL continues to perform monitoring daily and testing of the HEPA filters on an annual frequency, where a failed test would prompt a filter replacement. In another inspection of the CECEUD facility conducted in June 2022, CNSC staff found installed instrumentation equipment with expired and/or faded calibration information labels. This finding was of low safety significance, as the instrumentation equipment was no longer in operation at the CECEUD facility. In an inspection at a CRL GC60 Class II irradiation facility in March 2022, CNSC staff found a room area radiation monitoring system without a backup power supply. CNSC staff requested CNL to take corrective action to address the non-compliances. CNSC staff determined that the corrective actions taken by CNL to address these 3 NNCs were acceptable and the items are now closed.

The remaining 7 NNCs pertain to the aging management program implementation in accordance with CNSC REGDOC-2.6.3, *Aging Management* [15] at CNL's Universal Hot Cells, NFFF and MPF. CNSC staff noted that several aging management requirements were not being met as required by the licence. These requirements included performing regular periodic reviews of conditions assessments of structures, systems and components (SSC), evaluating methods for monitoring and trending operating and maintenance data of SSCs, documenting corrective actions resulting from aging management field walkdowns in CNL's corrective action program and maintaining up to date facility SSC documentation. CNSC staff have requested CNL to take corrective action to address the non-

compliances. CNSC staff determined that the corrective actions taken by CNL to address the NNCs were acceptable and the items are now closed.

CNSC staff also observed that facility aging management plans were not implemented at the MPF and NFFF during inspections conducted in March 2022 and October 2022, respectively. CNSC staff have requested CNL to take corrective action to address these NNCs. In 2022, CNL conducted a self-assessment on CRL's aging management and provided a summary to CNSC staff for review. CNL had identified several programmatic and implementation non-compliances with CRL's licence requirements as per CNSC's REGDOC 2.6.3, *Aging Management* [15]. These non-compliances comprise of partial or no implementation of several integrated aging management requirements as per CNSC's REGDOC 2.6.3, *Aging Management* [15] at several CNL facilities including WL, NPDWF, DPWF and G1WF. CNL is working to revise their aging management program standard documentation and has created an aging management implementation gap plan. The NNCs pertaining to the aging management plans at MPF and NFFF have since been closed with the submission of CNL's aging management implementation plan. CNSC staff will be reviewing CNL's implementation plan and will plan future regulatory oversight activities to verify their implementation.

All these findings were of low safety significance. Despite the issues identified with respect to the fitness for service specific area of aging management and CNL's aging management program, CNL has been performing preventative maintenance tasks, condition-based maintenance on categorized SSCs and routine monitoring of facility data that mitigates the risk of component failure due to age related degradation mechanisms.

4.6.2 Overall Conclusion

Overall, CNSC staff conclude that CNL continues to operate and maintain the facilities in accordance with regulatory requirements with respect to the equipment performance, maintenance, structural integrity and chemistry control. However, CNSC staff will be performing regulatory oversight of CNL's aging management implementation plan at CRL.

4.7 Radiation Protection

The radiation protection SCA covers the implementation of a radiation protection program in accordance with the *Radiation Protection Regulations* [16]. CNL has successfully implemented and maintained a radiation protection program which ensures that contamination levels and radiation doses received by individuals are monitored, controlled and maintained as low as reasonably achievable (ALARA).

CNSC staff assessed CNL's performance in the radiation protection SCA through desktop reviews of documents, reportable events (Appendix E) and through the course of inspections (Appendix D). These compliance activities confirmed that the facilities and its processes were operated and maintained by CNL in accordance with their licensing basis.

In addition, data on dose to workers for each CNL site from 2018 to 2022 can be found in Appendix H.

CNL continues to demonstrate compliance and have been satisfactory in the radiation protection SCA. CNSC staff conclude that CNL's radiation protection performance meets regulatory requirements.

4.7.1 Application of ALARA

CNL's application of ALARA within the radiation protection program includes management commitment and oversight, personnel qualification and training, design analyses of facilities and systems, provision of protective equipment and ALARA assessments/reviews of radiological activities.

In 2022, CNSC staff confirmed that all CNL sites continued to implement radiation protection measures to keep radiation exposures and doses received by persons ALARA. CNL continued to effectively implement the corporate ALARA process at its sites. This process integrates ALARA into design, planning, management and control of radiological activities.

At CNL sites, dose control points (DCP) are used as a dose management tool for nuclear energy workers' (NEWs) radiological exposures. If a NEW's dose exceeds their assigned DCP by more than 1 mSv, an ALARA assessment is documented to assess whether the dose received was justified and optimized, as applicable. In 2022, no NEWs exceeded their assigned DCP by more than 1 mSv.

4.7.2 Worker Dose Control

Workers, including employees and contractors, conducting work activities which present a reasonable probability that the worker may receive an occupational dose greater than 1 mSv/year, are identified as NEWs.

In 2022, no worker received a radiation dose in excess of the CNSC's regulatory dose limits. The maximum individual effective dose received by a NEW across CNL sites was at the CRL site, with a dose of 5.48 mSv, which is approximately 11% of the CNSC's regulatory limit for effective dose of 50 mSv in a 1-year dosimetry period.

4.7.3 Radiation Protection Program Performance

CNSC staff conducted regulatory oversight activities at CNL sites to verify that CNL's radiation protection programs complied with regulatory requirements. These oversight activities included inspections, desktop reviews and compliance verification activities specific to radiation protection. Through these activities, CNSC staff confirmed that CNL has effectively implemented their radiation protection programs to control occupational exposures to workers and keep doses ALARA.

Action levels for radiological exposures are established as part of CNL's radiation protection program. If an action level is reached, it triggers CNL staff to establish the cause and, if applicable, restore the effectiveness of the radiation protection program. In 2022, there were no action levels reached at CNL sites.

4.7.4 Radiological Hazard Control

Radiation and contamination monitoring programs continued to be implemented at CNL sites in 2022, to control and minimize radiological hazards and the spread of radioactive contamination. Dose rate measurements, surface contamination monitoring and, where appropriate, in-plant air monitoring are routinely performed to confirm that radiation exposures are kept ALARA. The radiological hazard surveys conducted in 2022 by CNL did not identify any adverse trends and were consistent with expected radiological conditions.

4.8 Conventional Health and Safety

The conventional health and safety SCA covers a program to manage workplace safety hazards and protect workers. As CNL sites are federally regulated, they are subject to the requirements of the *Canada Labour Code* [17] and *Canada Occupational Health and Safety Regulations* [18]. CNL has developed and implemented a program to manage the workplace safety hazards and protect workers on the job while ensuring compliance with the *Canada Labour Code* [17] and *Canada Occupational Health and Safety Regulations* [18].

Many activities at CNL sites may be performed by contractors, most of which are provincially regulated, and as such contractors are subject to the provincial requirements. In most cases, contractors work under their own health and safety programs, which are reviewed and accepted by CNL. Contractor programs must meet or exceed the requirements of CNL's licences.

CNSC staff assessed CNL's performance in the conventional health and safety SCA through desktop reviews of documents, reportable events (Appendix E) and through the course of inspections (Appendix D). These compliance activities demonstrate that the facilities and activities were operated and maintained by CNL according to their licensing basis.

CNSC staff conclude that CNL continues to implement and maintain effective conventional health and safety programs in accordance with regulatory requirements.

4.8.1 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. A 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 workdays experienced per 100 employees, while frequency quantifies the number of lost-time injuries relative to the number of hours worked. Data on RLTI, and RLTI frequency and severity from 2018 to 2022 are included in Appendix I for all sites covered by this ROR. In 2022, there were 4 RLTIs at CNL sites, 2 were CRL employees, 1 was a CRL contractor and 1 was a PHP contractor. The total number of RLTIs decreased by 1 between 2021 to 2022. Collectively, these events led to 56 lost working days, 46 of which were related to the RLTI for the PHP

contractor. Of the 2 CRL employee RTLIs, 1 involved a worker performing a routine lift which resulted in back strain and the other involved a worker who experienced pain and swelling of their knee which occurred after sustained kneeling to install flooring. For CRL employees the RLTI frequency was 0.07 and the RLTI severity was 0.15. Contractor RLTI data is based on information voluntarily provided to the CNL Health Centre by contracting companies and only includes the number of lost time injuries and working days lost. There were no RLTIs at WL, PGP, DPWF, G1WF or NPDWF in 2022.

For comparison, CNL's reported RLTI frequency for CNL employees is lower than the 2022 lost-time injury rates for comparable industries in Ontario like specialty trades construction (1.03) and printing, petroleum and chemical manufacturing (0.55), as per Ontario Workplace Safety and Insurance Board data in the 2022 Workplace Safety and Insurance Board Statistical Report [19]. 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.

4.8.2 Practices

When evaluating safety practices at a site, CNSC staff do not distinguish between the licensee's own staff and those of contractors or visitors, considering all to be 'workers' and equally subject to CNSC requirements and licensee policies. This is notable for CNL, as many CNL sites employ contractors to perform a wide variety of tasks. CNL's Improvement Action System is used by CNL to record all events, including injuries, at CNL sites. CNSC staff review CNL's Improvement Action data to determine trends and monitor actions.

4.8.3 Awareness

CNL's COVID-19 pandemic response consisted of 5 phases. In 2022, CNL was in Phase 4, "New Normal Operations". Daily COVID-19 screening continued for all CNL staff and contractors. Masking requirements were paused in June 2022, in accordance with provincial government recommendations. During 2022, CNSC and CNL continued to have a protocol in place with respect to COVID-19 notification. The intent of the protocol was for CNL to provide notification to CNSC of confirmed COVID-19 cases that could potentially impact its ability to meet minimum shift. CNL provided proactive notification of all COVID-19 cases affecting positions defined within the protocol; however, there were no instances where CNL did not meet minimum shift complement. CNL reported COVID-19 cases to the CNSC until December 2022. Effective March 31, 2023, all CNL sites ceased all remaining COVID-19 controls due to low risk reported by public health agencies and a third-party epidemiologist, as well as the removal of public health restrictions. CNL moved from Phase 4 to Phase 5 of the CNL Pandemic Recovery Plan, with Phase 5 representing normal site operations.

4.9 Environmental Protection

Protection of the environment and the public are both assessed in the environmental protection SCA. This SCA covers programs that identify, control and monitor all releases of radioactive and hazardous substances, and the effects on people and the environment from facilities or as a result of licensed activities.

CNSC staff assess CNL's performance in the environmental protection SCA through desktop reviews of documents, reportable events (Appendix E) and through the course of inspections (Appendix D).

The CNSC publishes annual radionuclides loadings to the environment from nuclear facilities on the CNSC Open Government Portal. The data from CNL sites is available on the CNSC Open Government Portal.

Based on the review and assessment of CNL's submitted monitoring results, past performance history and the regulatory oversight to date, CNSC staff conclude that the environmental protection SCA performance for CNL facilities operated in Canada has been consistent with the previous years, with satisfactory ratings given for 2022.

4.9.1 Effluent and Emissions Control

CNL has implemented and maintains an effluent verification monitoring program that meets regulatory requirements at all sites covered by this report.

Regulatory Limit Exceedances in 2022

- Week ending June 1, 2022: There was an exceedance of the weekly release limit for copper in a composite effluent sample at PHP's waste water treatment plant (WWTP). CNL staff reported the exceedance to the CNSC, investigated the event, confirmed the source was corroded brass components on the cooling loop, and CNSC staff presented an Event Initial Report to the Commission in CMD 22-M38 [20] on June 28, 2022. This exceedance did not pose a risk to workers, the public or the environment.

Action Level Exceedances in 2022

- Week ending June 1, 2022: There was an exceedance for zinc in a composite effluent sample at PHP's WWTP. CNL staff reported the event to the CNSC, investigated the event, confirmed the source was corroded brass components on the cooling loop, and this information was included in CNSC staff's Event Initial Report presentation to the Commission in CMD 22-M38 [20] on June 28, 2022. This event did not pose a risk to workers, the public or the environment.
- Week ending June 7, 2022: There was an exceedance for arsenic in a composite effluent sample at PHP's WWTP. CNL staff reported the event to the CNSC and took immediate corrective action to successfully reduce the arsenic concentration in the effluent to return to levels below action levels. CNL found the elevated arsenic was due to a combination of old

reverse osmosis membrane filters, high water temperatures, low water levels and high proportions of arsenic in the primary collection ponds. This event was not expected to pose a risk to human health or the environment.

Airborne and waterborne releases of radioactive and hazardous substances at all other CNL sites remained below their respective regulatory limits in 2022. All these exceedances were reported to CNSC staff as per the reporting requirements of CNL's licences. Details on these events are also captured in Appendix E.

In 2022, CNL revised the CRL effluent verification program. CNSC staff reviewed the revision and determined that it met regulatory requirements.

Overall, CNSC staff determined that the effluent verification monitoring programs at CNL's sites continue to be protective of the environment and the public.

4.9.2 Assessment and Monitoring

In compliance with CSA standard N288.4, *Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills* [21], CNL has environmental monitoring programs at CRL and WL. CNL provided rationale for not triggering requirements under CSA N288.4 for DPWF, G1WF and NPDWF; thus determining that environmental monitoring programs at these facilities were not required. CNSC staff assessed CNL's information and concluded as such. Of note, environmental monitoring programs are required and have been implemented at the PHP and PGP.

In 2022, CNL revised the CRL environmental monitoring program. CNSC staff reviewed the revision and determined that it met regulatory requirements.

Additionally, CNL has comprehensive groundwater monitoring programs at applicable CNL sites consistent with CSA standard N288.7, *Groundwater protection programs at Class I nuclear facilities and uranium mines and mills* [22].

CNSC staff conclude that the environmental monitoring programs in place at CRL, WL, PHP and PGP are compliant with applicable regulatory requirements and are protective of the environment and the public.

4.9.3 Environmental Management System

The CNSC requires that licensees develop and maintain an Environmental Management System to provide a documented framework for integrated activities related to environmental protection. An Environmental Management System includes activities such as establishing annual environmental objectives, goals and targets. CNL has established a corporate level Environmental Management System that is part of the overall CNL management system which applies to all CNL sites. CNL's corporate Environmental Management System conforms to International Organization for Standardization (ISO) standard 14001:2015, *Environmental Management Systems* [23], and the Environmental Management Systems for CRL and WL are registered to ISO 14001:2015.

4.9.4 Environmental Risk Assessment

The environmental risk assessment (ERA) conducted by licensees is a systematic process used to identify, quantify and characterize the risk posed by contaminants and physical stressors to the environment and human health. An ERA includes an Ecological Risk Assessment and a Human Health Risk Assessment. Most CNL facilities have CNSC REGDOC 2.9.1, *Environmental Protection: Environmental Principles, Assessments and Protection Measures* [24] in their LCH as compliance verification criteria. An ERA is a requirement in the REGDOC for Class I facilities, such as CRL, WL, DPWF, G1WF and NPDWF.

CNSC staff reviewed the submitted ERAs for the CRL, DPWF and G1WF sites and have determined that they are compliant with the requirements in CNSC's REGDOC 2.9.1, *Environmental Protection: Environmental Principles, Assessments and Protection Measures* [24], and CSA standard N288.6-12, *Environmental risk assessments at class I nuclear facilities and uranium mines and mills* [25].

An ERA for the WL lagoon and landfill areas was submitted by CNL in 2021, taking into consideration current site conditions. CNSC staff provided comments on the ERA and are expecting CNL to submit a revised WL lagoon and landfill areas ERA, as well as the initial submission of the WL site-wide ERA in 2023.

CNSC staff conclude that CNL continues to maintain and implement an effective ERA at applicable sites in accordance with regulatory requirements.

4.9.5 Protection of the Public

The protection of the public within the environmental protection SCA is related to ensuring that members of the public are not exposed to unreasonable risk with respect to hazardous and nuclear substances released from the licensed facilities. CNL provides their results of monitoring of releases of hazardous and nuclear substances within their annual environmental and compliance monitoring reports.

Based on CNSC staff assessment of the results in CNL's 2022 environmental monitoring programs, CNSC staff conclude that the releases of hazardous and nuclear substances from CNL sites met the regulatory requirements.

Estimated Dose to the Public

As part of annual reporting to the CNSC, CNL provides data on dose to a hypothetical member of the public that is representative of someone who spends considerable time in proximity to the licensed site.

In all cases, CNL's data indicates that doses to the public resulting from CNL's operations remained well below the 1 mSv/year limit prescribed in the *Radiation Protection Regulations* [16]. At no point during 2022 did the emissions from the CRL site exceed the constraint for dose to the public of 0.30 mSv/year indicated in the CRL LCH. The maximum estimated dose to the public from a CNL site was estimated to be from PGP, at 0.033 mSv/year (3.3% of the 1 mSv/year dose limit).

Further details on the estimated dose to the public are available in Appendix J.

4.10 Emergency Management and Fire Protection

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

CNSC staff assess CNL's performance in the emergency management and fire protection SCA through desktop reviews of documents, reportable events (Appendix E) and through the course of inspections (Appendix D).

4.10.1 Chalk River Laboratories

CRL conducts drills and exercises to test their emergency procedures and evaluate their response capabilities. This includes an annual emergency preparedness exercise.

In June 2022, CNL performed a stay-in exercise to test their emergency preparedness and response program at CRL. The exercise was designed to test the response capabilities of the CRL site internal response organizations during a simulated high radiation incident in the Universal Cells Facility, resulting in a site stay-in condition. CNSC on-site inspectors observed the exercise and noted no areas of non-compliance.

4.10.2 Gentilly-1 Waste Facility

In December 2022, a fire drill was conducted at the G1WF site to simulate a fire drill at G1WF. CNSC staff reviewed the CNL G1WF After Action Report and were satisfied with G1WF staff's emergency preparedness capabilities, both from CNL G1WF building emergency staff, and the non-emergency staff.

4.10.3 Whiteshell Laboratories

Background

In April 2023, CNL performed a planned self-assessment of the WL fire protection program against the requirements of CSA N393-13, *Fire Protection For Facilities That Process, Handle, Or Store Nuclear Substances* [26]. The self-assessment involved CNL reviewing fire response training, equipment and response capability for compliance with CSA N393-13 [26] and included the review of fire protection records for calendar years 2020, 2021 and 2022.

This assessment determined that training records for members of the on-site fire brigade were incomplete, and therefore CNL could not demonstrate that fire response staff were adequately trained and competent to provide fire suppression activities consistent with the fire protection program for the WL site. Deficiencies were also identified with the procedures for equipment inspection, testing, and maintenance and the use of incomplete or expired personal protective equipment. The deficiencies identified in the training and equipment of fire response staff had a direct impact on CNL's ability to maintain minimum complement of fire response personnel at the WL site.

As a result of these findings, on April 27, 2023, CNL contacted the CNSC Duty Officer to report this event in accordance with section 29(1)(a) of the *General Nuclear Safety and Control Regulations* [27] and paragraph 27(b)(ii) of the *Nuclear Safety and Control Act* [1]. CNL immediately placed the WL site into a safe shutdown state, where only essential compliance and maintenance work could be conducted.

Pursuant to CNSC's REGDOC-3.1.2, *Reporting Requirements, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills* [11], CNL submitted the required event reports. The full event report identified additional non-compliances with the fire protection program linked to training of firefighters, the conduct of drills, the maintenance and availability of personal protective equipment for firefighters, annual inspection and maintenance for fire extinguishers, and the supply of firewater (i.e., pressure and flow). Several fire hydrants were also identified as unavailable, fixed suppression systems (sprinklers) had not been properly maintained and tested in Whiteshell Reactor-1 (WR-1), and emergency lighting in buildings had not been tested to National Fire Protection Association standards.

This event was presented to the Commission as an Event Initial Report in CMD 23-M25 [28] on June 28, 2023.

Regulatory Actions

On May 8, 2023, CNSC staff held a focused technical meeting with CNL to discuss the preliminary event report, CNL's immediate measures taken, impacts on CRL fire response capabilities as a result of providing support to WL, next steps and timelines for action completion. Given the number and significance of the non-compliances, CNSC staff determined additional timely information was required to assess whether any enforcement response was needed in alignment with the CNSC's graduated enforcement strategy. As a result, on May 15, 2023, a CNSC designated officer issued a 12(2) request, as outlined in CMD 23-M25 [28], requesting a number of actions be taken by CNL.

CNL responded to the 12(2) request as required by May 19, 2023. CNSC staff found CNL's response to be acceptable, and as a result, the CNSC designated officer closed the 12(2) request on May 26, 2023.

On May 30, 2023, CNSC staff conducted a site visit to WL. The purpose of this visit was to determine if CNL had in place a safe, effective and sustainable fire response and adequate implementation of compensatory measures to address the fire protection system non-compliances and ensure the protection of all workers, responders, facilities and the environment.

CNSC staff confirmed that fire extinguishers had been replaced, signage was in place regarding emergency lighting, fire hoses had been pre-deployed to areas lacking operational hydrants and new firefighting gear was present in the firehall. CNSC staff raised a concern regarding the presence of metal halide lighting as a potential ignition source and CNL took immediate actions to mitigate the risk of the presence of these lights and has initiated the process to have them replaced. CNSC staff and CNL had productive discussions regarding the minimum shift complement of firefighters at WL, and CNL has committed to maintaining a complement that CNSC staff confirm meets regulatory requirements. During the site visit, CNSC staff requested records regarding firefighter training, shift complement, the fire screening process and the status of fire hydrants. These records were provided on June 6, 2023 and are currently under review by CNSC staff.

Following the WL site visit and closure of the 12(2) request, CNSC staff are:

- reviewing all submissions from CNL related to this matter
- waiting for the submission of the Multi-Phase Re-Start Plan for CNSC staff review and acceptance
- developing a reactive compliance plan and follow-up activities for the WL site, whereby all compliance activities in the plan will be performed by end of March 2024.

CNSC staff will be providing an update to the Commission of the progress made and status of the WL safety stand-down during the ROR presentation for CNL sites scheduled for November 1, 2023. Additionally, CNSC staff will review the event and draft a lesson learned report which will focus on CNSC's regulatory oversight of WL from 2019 to 2022. This report and its findings will be shared with the Commission once finalized.

Conclusion

As a result of these findings, CNSC staff has rated the emergency management and fire protection SCA at WL as below expectations in 2022. CNSC staff will continue to conduct oversight in this area to ensure WL comes into compliance with regulatory requirements.

4.10.4 Overall Conclusion

Apart from WL, which received a below expectations rating, CNSC staff conclude that CNL continues to implement and maintain effective emergency management and fire protection programs at CNL sites in accordance with regulatory requirements.

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, location or site. This area also covers the planning for decommissioning.

CNSC staff assess CNL's performance in the waste management SCA through desktop reviews of documents, reportable events (Appendix E) and through the course of inspections (Appendix D).

CNL's activities involve the management of radioactive wastes, from generation to storage. Radioactive and other hazardous wastes have been previously generated from reactor operations and radioisotope production, and waste continues to be generated from on-going site operations, research and development, decommissioning and environmental remediation activities at CNL sites. CNSC staff maintain oversight of CNL's current and future management of radioactive wastes through compliance activities, including desktop reviews and inspections.

CNSC staff conclude that CNL met the applicable regulatory requirements for the waste management SCA at all CNL sites in 2022. CNSC staff were satisfied with the information provided by CNL in the annual compliance reports for all CNL sites in 2022.

Waste from institutions, including hospitals and universities from across Canada, are received at CRL on a commercial basis for safe long-term storage. This service ensures that wastes are managed in a safe, secure and environmentally-sound manner. CRL received a total of 111.6 m^3 of radioactive waste from external organizations in 2022. This includes 45.6 m^3 of commercial waste and 66 m^3 of waste returned from off-site treatment of CNL waste (for example, ash from incineration). In comparison, in 2021, CNL received a total of 61.3 m^3 of radioactive waste from external sources.

Radioactive wastes stored on the sites consist of high-, intermediate- and low-level radioactive wastes. The inventory of wastes stored at CNL sites as of December 31, 2019 is included in the seventh *Canadian National Report for the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (October 2020)* [29].

In 2022, CNSC staff conducted a technical review of a proposed revision of the Whiteshell Laboratories Detailed Decommissioning Plan: Volume 6 – Whiteshell Reactor #1: Building 100 for the in-situ decommissioning of WR-1, and concluded that the plan did not meet all of the necessary criteria of CNSC's REGDOC-2.11.2, *Decommissioning* [30] and CSA N294-19, *Decommissioning of facilities containing nuclear substances* [31]. CNSC staff sent the review comments to CNL for their disposition. The current approved decommissioning strategy for WR-1 is deferred decommissioning (complete removal), as set out in the approved version of the Detailed Decommissioning Plan for WR-1.

In 2022, CNSC staff conducted a technical review of the Preliminary Decommissioning Plan for the PGP and concluded that the plan did not meet all the regulatory requirements of CNSC's REGDOC-2.11.2, *Decommissioning* [20], CSA N294-19, *Decommissioning of facilities containing nuclear substances* [31] and CNSC's REGDOC-3.3.1, *Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities* [32]. CNSC staff sent review comments to CNL for their disposition. CNL was requested to provide clarity or additional information on a number of areas including: anticipated post-operational conditions; decommissioning strategy and work plan; waste management strategy; and cost estimate for the financial guarantee. CNL provided responses to CNSC staff's comments, which are currently undergoing review. Additionally, as part of the recent licence renewal for the PHAI, CNL has committed to submitting a Preliminary Decommissioning Plan for the PHP by June 30, 2024, at which point CNSC staff will conduct a technical review for its acceptance.

CNSC staff conducted 7 inspections at CNL sites in 2022 that had a focus on waste management; 2 at DPWF, 1 at WL and 4 at CRL. As a result of these inspections, there were 5 NNCs. There was 1 to DPWF for a waste container label non-compliance; 2 to WL, 1 for a waste container label non-compliance and 1 for an incomplete site wide inventory; and 2 to CRL, 1 for vegetation growth near waste containers in the WMA and 1 for waste package removal from rooms without monitoring for radiation from Fe-55 as required. All NNCs were of low safety significance, and all are closed except the NNC issued to WL for the incomplete site wide inventory, for which CNL is implementing corrective actions to be completed by Q4 of the 2023 calendar year.

4.11.1 Overall Conclusion

CNSC staff conclude, during 2022, CNL maintained effective programs to safely manage radioactive and hazardous wastes from CNL's licensed activities and the decommissioning of its facilities.

4.12 Security

The security SCA covers the programs required to implement and support the security requirements stipulated in the in the *General Nuclear Safety and Control Regulations* [27], *Nuclear Security Regulations* [33], the licence, orders and regulatory expectations for the facility or activity.

CNSC staff assess CNL's performance in the security SCA through desktop reviews of documents, reportable events (Appendix E) and through the course of inspections (Appendix D).

4.12.1 Whiteshell Laboratories

Background

On September 27-29, 2021, CNSC staff identified areas of improvement in the implementation of the security program in relation to Tactical Response Force (TRF) equipment and training following an on-site security inspection at WL.

These areas did not pose any immediate risk to the security of nuclear substances at WL. CNL implemented a corrective action plan (CAP) with milestones and timelines to address these areas by May 27, 2022, that were accepted by CNSC staff. All actions identified in the CAP have been completed.

CNL received a rating of below expectations from 2018 to 2021 in the security SCA. However, as a result of the significant progress made by CNL during the 2022 calendar year, CNSC staff have determined that the security SCA is now rated as satisfactory at WL, which will be discussed in the next section of this report.

Regulatory Actions

On June 15, 2022, CNSC staff conducted an inspection to verify the implementation of CNL's CAP. During the inspection, CNSC staff reviewed procurement documents related to the receipt of TRF equipment and training related actions completed by CNL. CNSC staff's review of CNL's documents demonstrated that training-related corrective actions have either been completed or have been recorded on the training calendar. In addition, CNSC staff noted that all required equipment has been procured and most were received. CNSC staff concluded that CNL was monitoring the timelines of the CAP closely (from the 2021 inspection) and taking appropriate actions including maintaining regular communications with the suppliers and providing regular updates to CNSC staff as procured equipment was being received.

On September 14-16, 2022, a planned inspection was conducted by CNSC staff to assess CNL's compliance with the regulatory requirements through verification of its physical protection program that included: the protected area, physical barriers and associated systems, security practices, as well as response arrangements, drills and exercises. CNSC staff also reviewed training records that included security drills that had occurred since CNSC staff inspected the site in June 2022 and records of official qualification of fitness, firearms and use of force. CNSC staff also followed up on the progress made by CNL with the open NNCs from the 2021 inspection related to procurement of security equipment. CNL provided documentation and demonstrated that most security equipment was received and commissioned, with the remaining few to be ready and commissioned by the end of December 2022. CNSC staff were satisfied with CNL's actions and closed all NNCs from the 2021 inspection.

Conclusion

As a result of CNSC staff verification activities conducted in 2022, and the review of CNL's submissions, CNSC staff have determined that CNL has demonstrated compliance with regulatory requirements at WL and there is no immediate risk to security of the nuclear substances at WL.

CNSC staff assessed that CNL met applicable regulatory requirements in 2022, and therefore assigned a satisfactory rating for the security SCA at WL.

4.12.2 Chalk River Laboratories

Background

CNSC staff assess CNL's performance in the security SCA through desktop reviews of documents, reportable events and through the course of inspections. Following a review of CNL's Tactical Response Arrangements, CNSC staff held technical meetings with CNL focusing on the security arrangements at Waste Management Areas (WMAs) at CRL.

At the request of CNSC, CNL provided a Tactical Response Plan (TRP) with timelines that reflected all training of the Nuclear Response Force (NRF). CNSC staff determined that CNL's submission did not meet regulatory requirements. CNSC staff also indicated that CNL must ensure that it always maintains an on-site NRF capable of providing an effective intervention at the WMAs and that CNL re-submit its updated TRP for CNSC staff review.

CNSC staff was not satisfied with the timelines and the measures being proposed by CNL, which resulted in the issuance of Order 6656254 in October 2021 (amended in November 2021 by the Designated Officer), that included the immediate implementation of compensatory measures. On October 18-19, 2021, CNSC staff conducted an on-site inspection and observed multiple deficiencies in the deployment of the compensatory measures, as required by the Order. From this inspection, CNSC staff also issued several NNCs related to physical protection measures at the WMAs.

In November 2021, CNL met the compensatory measures required by the Order, and continued to provide periodic updates including submissions and status reports on their progress.

Regulatory Actions

In February 2022, during a site visit to verify compensatory measures at the WMAs, and to follow up on CNL's progress with regards to the NNCs from the October 2021 inspection, CNSC staff determined that CNL's compensatory measures and CNL's corrective measures to address the enforcement actions were satisfactory. As a result, all open NNCs from the October 2021 inspection were confirmed closed.

Following a CNL submission in May 2022 of a revised TRP corresponding with the requirements of the Order, CNSC staff held multiple in-person technical meetings with CNL to provide comments on CNL's final TRP and performed walkdowns of the WMAs. CNSC staff requested additional information on various areas of the submissions, more specifically details on CNL-CRL's response ability and CNL's approach to assuring security objectives are being met. Furthermore, CNSC staff re-iterated their concerns of the lack of adequate security measures in WMAs.

In September 2022, CNSC staff performed an unannounced security field inspection of the Protected Areas at the WMAs in order to verify the physical protection measures in place. The inspection identified non-compliances and resulted in multiple follow-up actions involving the physical protection measures

at this particular WMA. CNL took immediate actions to correct these non-compliances.

In October 2022, CNSC staff communicated their concerns with regards to CNL's overall performance of security at CRL and its lack of implementation of corrective measures. CNL was directed by CNSC staff to undertake a programmatic review of the security program to better understand the circumstances behind the failures at CRL. CNL was required to identify actions to strengthen the program and prevent the recurrence of the failures. CNL's response included immediate programmatic measures that consisted of the creation of a special forum for a Nuclear Performance Assurance Review Board, implementation of project management and change control actions as well as a commitment to provide a more detailed Security Program Oversight Plan (SPOP) by December 16, 2022.

On December 15, 2022, CNL submitted a detailed SPOP that identified issues resulting from performing CNL quality assurance audits, extent of condition reviews and security management workshops. The SPOP contained a set of 17 actions broken into three themes (Management System Oversight, Audit and Assessment and Security Program Resource Review) for CNL to address, with a goal to strengthen the security program and prevent recurrence. CNL committed to monitor the performance of the SPOP actions and to provide quarterly updates to CNSC on the progress of the activities starting in 2023.

During a quarterly SPOP meeting held in April 2023, CNL provided updates on the progress of the actions as defined in the plan, the outcomes that are achieved as well as the status of focused actions taken by CNL to meet the intent of the open Security Order. At the time of writing this report, CNL confirmed closure of 12 actions, with the 5 remaining actions in progress consisting of revising program documents and completing performance reviews. CNL committed to a target date of completion of the remaining actions by November 2023. With regards to the status of the TRP, CNL submitted the revised TRP for CNSC staff review in mid-May 2023, with a formal request to close the Order. CNL committed to submitting the TRP implementation plan by end of July which will outline timelines and steps for full implementation. CNSC staff accepted CNL's revised TRP.

CNL has made significant progress since the issuance of the Order; however, continue to be rated as below expectations in 2022. During 2023, CNL has made significant improvements to the security program for addressing the Order and CNSC staff are satisfied with the progress being made.

Conclusion

The security program at CRL was assessed at below expectations in 2022. CNL has implemented adequate compensatory measures and there is no immediate risk to security of the nuclear substances at CRL. CNSC staff will continue to conduct oversight in this area to ensure CRL comes into compliance with the regulatory requirements and the effectiveness of the program is improved.

4.12.3 Overall Conclusion

Apart from CRL, which received a below expectations rating, CNSC staff conclude that CNL continues to implement and maintain effective security programs at CNL sites in accordance with regulatory requirements.

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/International Atomic Energy Agency (IAEA) safeguards agreements, as well as other measures arising from the *Treaty on the Non-Proliferation of Nuclear Weapons* [34].

CNSC staff assessed CNL's performance in the safeguards and non-proliferation SCA through desktop reviews of documents, reportable events (Appendix E) and through the course of inspections (Appendix D). These compliance activities demonstrated that facilities were operated and maintained according to the licensing basis.

Under the terms of the Canadian-IAEA safeguards agreements, the IAEA has the right to perform independent verification activities at various types of sites in Canada, including all the CNL sites covered by this report. IAEA activities are not CNSC compliance inspections, however CNSC staff accompanied IAEA staff on 11 of their activities at the sites covered by this report in 2022. CNSC staff also provided support remotely to an additional 17 IAEA activities carried out at CNL sites in 2022.

In 2022, the IAEA carried out activities at CRL, WL, PHP, PGP, DPWF and G1WF to verify nuclear material inventories and confirm the absence of undeclared nuclear materials and activities. As a result of the inspections conducted by the IAEA, no significant issues were identified. Appendix D contains a list of IAEA lead inspections carried out at each CNL site in 2022. The safeguards program at NPDWF is limited to providing access and assistance to IAEA inspectors in the event of a complementary access request. There was no IAEA complementary access at the NPDWF in 2022.

The CNSC, IAEA and CNL continue to work together to ensure that Canada's requirements under the *Treaty on the Non-Proliferation of Nuclear Weapons* [34] are fulfilled.

4.13.1 Overall Conclusion

CNSC staff conclude that CNL continues to implement and maintain effective safeguards programs in accordance with regulatory requirements.

4.14 Packaging and Transport

The packaging and transport SCA includes the programs that cover the safe packaging and transport of nuclear substances to and from licensed facilities.

CNSC staff assessed CNL's performance in the packaging and transport SCA through desktop reviews of documents, reportable events (Appendix E) and through the course of inspections (Appendix D). There were no transport focused inspections conducted in 2022.

CNL has developed and implemented a packaging and transport program that ensures compliance with the *Packaging and Transport of Nuclear Substances Regulations, 2015* [35] and *Transportation of Dangerous Goods Regulations* [36]. This program covers elements of package design, package maintenance and the registration for use of certified packages as required by the regulations.

In 2022, 342 m^3 of low-level waste and 2.5 m^3 of intermediate-level waste was transported from WL and safely delivered to CRL.

4.14.1 Overall Conclusion

CNSC staff conclude that CNL continues to implement and maintain effective packaging and transport programs in accordance with regulatory requirements.

5 INDIGENOUS CONSULTATION AND ENGAGEMENT

5.1 CNSC Consultation and Engagement Activities

The CNSC is committed to building long-term relationships and conducting ongoing engagement with Indigenous Nations and communities who have an interest in CNSC-regulated facilities within their traditional and/or treaty territories. The CNSC's Indigenous engagement practices include sharing information, discussing topics of interest, seeking feedback and input on CNSC processes, responding to addressing issues and concerns, ongoing collaboration and two-way dialogue, collaboratively drafting relevant sections of CNSC reports, including RORs, and providing opportunities to participate in environmental monitoring through the Independent Environmental Monitoring Program (IEMP). The CNSC also makes funding support available through the CNSC's Participant Funding Program (PFP) for Indigenous Peoples to meaningfully participate in Commission proceedings and ongoing regulatory activities.

CNL's sites fall within the traditional and treaty territories of many Indigenous Nations and communities, as listed in Appendix A. The majority of the engagement and consultation activities with Indigenous Nations and communities with an interest in CNL's sites, operations and activities in 2022 occurred via both in-person and remote means. CNSC staff welcomed the opportunity to discuss and address topics of interest and concern to the Indigenous Nations and communities through various engagement activities and conduct collaborative in-person activities to continue to build and strengthen the relationships between the CNSC and each Nation.

CNSC Engagement Efforts

In 2022, CNSC staff engagement efforts in relation to CNL sites were largely focused on consultation activities for the ongoing EAs and licensing processes for the NSDF Project and the NPDWF Decommissioning Project, as well as the renewal of the PHP licence. Indigenous Nations and communities were also provided updates on ongoing licensed activities at the DPWF, WL, G1WF, PHAI, NPDWF and CRL sites.

CNSC staff ensure that all Indigenous Nations and communities with a potential interest in CNL sites, facilities and activities, are aware of the CNL ROR process and how they can get involved. As was done in 2021, the CNSC continued to hold an annual CNL ROR virtual engagement session with Indigenous Nations and communities on September 8, 2022. There were over 20 participants representing approximately 11 Indigenous Nations, communities and organizations with an interest in CNL sites and the ROR. The goal of the engagement session was to provide an overview of the ROR, CNSC staff's findings with regards to CNL's performance in 2021 as well as discuss and address feedback, concerns, comments and recommendations submitted by interested Nations and communities in relation to the 2021 CNL ROR. CNSC staff appreciated the feedback and discussions and worked to include and reflect a number of the recommendations in the 2022 CNL ROR. Based on the continued success of these

virtual engagement sessions, CNSC staff plan to host another CNL ROR engagement session for the 2022 ROR in September 2023.

CNSC Communications with Indigenous Nations and Communities

In addition to the outreach and engagement sessions, CNSC staff ensure that all interested Indigenous Nations and communities are made aware of the opportunities to review the ROR and submit interventions to the Commission, including the opportunity to intervene orally, as well as opportunities to receive funding through the CNSC's PFP to support their participation in the process. As well, in 2022 CNSC staff continued to keep Indigenous Nations and communities up to date and informed with regards to CNSC staff's regulatory oversight activities at CNL sites including specific meetings on topics of interest, and ongoing discussions with regards to responding to and addressing issues, concerns and recommendations raised in their interventions to the Commission. In 2022, CNSC staff followed up with each Indigenous Nation and community who intervened with regards to the 2021 CNL ROR and offered to have specific meetings and discussions to address their concerns, comments and recommendations. In response to concerns raised by Indigenous Nations and communities, CNSC staff committed to taking the following actions to continue to improve the CNL ROR:

- Provide more detailed event descriptions for reportable events.
- Provide more information on NNCs arising from inspections.
- Include details on the CNSC's oversight strategy on climate change resiliency.
- Include an annex summarizing the issues, concerns and requests, and the status of the CNSC's responses/work to address them from intervenors from last year's ROR, including Indigenous Nations and communities.
- Continue working with Indigenous Nations and communities to address their recommendations in their interventions on the 2021 CNL ROR.
- Collaborate with Indigenous Nations and communities with whom the CNSC has a Terms of Reference (ToR) for long-term engagement on drafting summaries of engagement activities.
- Collaborate with Indigenous Nations and communities on summarizing their feedback and perspectives on engagement with CNL in 2022.

More information on the ToR engagement summaries and each Nation's perspective on CNSC staff's and CNL's engagement during 2022 can be found in Appendix L and section 5.2 of this report.

Issues and Concerns Tracking

In order to effectively track and respond to requests and recommendations from interventions submitted by Indigenous Nations and communities, CNSC staff have established an internal tracking process to capture issues, concerns and recommendations raised by each Indigenous Nation or community. This process includes populating internal tracking tables, in which CNSC staff document responses and proposed action items as needed. CNSC uses this tool to summarize the requests, concerns and recommendations included in the interventions in relation to each ROR, or other Commission proceedings as appropriate.

In response to the Commission's request for information on issues and concerns tracking, CNSC staff have included Appendix M in this report that provides key information about the number of issues, concerns and recommendations submitted by each Indigenous Nation and community in relation to the 2021 CNL ROR. Additionally, the appendix presents the number of issues and concerns that the CNSC has responded to, as well as the current status and CNSC staff's path forward to meaningfully address and close out specific requests, concerns and comments, where possible. Overall, the CNSC has been able to respond to all of the requests, concerns and comments raised by Indigenous Nations from the 2021 CNL ROR and is actively working with each intervenor to resolve or close out each request and recommendation, where possible.

CNSC staff also reached out to all Indigenous Nations and communities who intervened in the 2021 ROR, offering to meet and discuss the requests, concerns, and comments from their interventions, as well as how to address them. For Indigenous Nations and communities that have a ToR with CNSC, requests, concerns and comments raised in the ROR will be further discussed in agreed-upon regular meetings, and CNSC staff will work with the Nation or community to share and verify the data in their respective issues tracking table.

Overall, the interventions in relation to the 2021 ROR were categorized into 14 different themes including consultation and engagement, improvements to the ROR process and ROR content, and environmental monitoring.

Engagement on Monitoring Activities

In 2022, CNSC staff continued to engage and collaborate with Indigenous Nations and communities on the CNSC's IEMP. CNSC staff have made it a priority to ensure that IEMP sampling reflects Indigenous Knowledge, land use and values, where possible. In addition to IEMP sampling activities, CNSC staff sought input from Indigenous Nations and communities in the 2022 IEMP sampling plans and participation in the sampling process in-person alongside CNSC staff.

In advance of the 2022 IEMP sampling campaign around CRL, the Bruce Power site (DPWF) and WL, notification emails were sent to Indigenous Nations and communities near the sites to notify them of the sampling campaigns and to seek input on the applicable sampling plans. CNSC staff invited each interested Nation and community to provide and share Indigenous Knowledge, as well as

suggestions for species of interest, valued components and potential sampling locations where traditional practices and activities may take place.

Representatives from the Algonquins of Pikwakanagan First Nation (AOPFN), Algonquins of Ontario, the Métis Nation of Ontario (MNO), Curve Lake First Nation (CLFN) and Kitigan Zibi Anishinabeg (KZA) First Nation joined the sampling team around the CRL site for sampling activities in August 2022. Representatives from Sagkeeng Anicinabe First Nation, Manitoba Métis Federation (MMF), Black River First Nation and Hollow Water First Nation joined the sampling team around WL. Representatives from the MNO, the Historic Saugeen Métis (HSM) and the Saugeen Ojibway Nation (SON) joined the sampling team at the Bruce Power site in areas surrounding the DPWF site. CNSC awarded funding through the PFP to each participating Indigenous Nation and community to support these collaborative efforts on the 2022 IEMP.

As part of the sampling field work, CNSC staff and the participating Indigenous Nations and communities discussed the IEMP in more detail and related aspects of the CNSC's Environmental Protection Framework. The CNSC's sampling team demonstrated sampling techniques as well as packaging and chain of custody procedures. Participants helped to gather samples of water, soil, sand and vegetation. CNSC staff truly appreciated the engagement, input and participation by the Indigenous Nations and communities in the CRL, Bruce Power site/DPWF and WL sampling campaigns and look forward to future collaboration on the IEMP and other sampling initiatives. Once the results are available for each of the sampling campaigns, CNSC staff will work with each Indigenous Nation and community to communicate the results to their respective leadership and community members, including collaboration on easy-to-read results cards that can be shared with community members. The CNSC is committed to continuing to engage with interested Indigenous Nations and communities with regards to the IEMP, to ensure that sampling plans and activities are reflective of and incorporate Indigenous Knowledge, values and perspectives.

In 2022, CNSC and Environment and Climate Change Canada (ECCC) engaged with participating Indigenous Nations and communities and Environmental Non-Government Organizations in Phase 1 of the Regional Information and Monitoring Network for the Ottawa River Watershed (RIMNet) Initiative. This initiative is led by the CNSC and ECCC to improve information sharing and documentation regarding the environmental effects of past, existing and proposed nuclear facilities in the Ottawa River Watershed Basin. RIMNet aims to improve understanding of environmental effects, including cumulative effects of past, existing and proposed nuclear facilities.

The AOPFN, Kebaowek First Nation (KFN), KZA and Ottawa Riverkeepers have been engaging with CNSC and ECCC to share knowledge, perspectives and priorities in relation to the RIMNet initiative. Participants met with CNSC and ECCC quarterly to receive updates on data collection and analysis, review the draft table of contents for the State of the Environment report, which included identifying sections of the report where they may have interest in contributing to, as well as share resources and/or Indigenous Knowledge, as appropriate. CNSC

and ECCC are engaging with participants at all stages of Phase 1 of RIMNet to ensure a collaborative process and look forward to further collaboration in future phases of the initiative.

CNSC Terms of Reference for Long-Term Engagement with Indigenous Nations and communities

CNSC staff have formalized long-term engagement relationships with interested Indigenous Nations and communities through ToRs collaboratively developed with each Nation or community. The ToRs and associated work plans, include regular meetings, an accountability and governance structure, specific collaborative activities, as well as topics, facilities, sites and projects of interest. In 2022, the CNSC developed and finalized ToRs for long-term engagement with the following Indigenous Nations and communities with an interest in CNL sites and activities:

- AOPFN
- Mississaugas of Scugog Island First Nation
- KFN

This is in addition to existing ToRs with CLFN, the SON, the MNO and the HSM. In total, CNSC staff have signed 8 ToRs for long-term engagement to date and are working on developing a number of others in the coming years with interested Indigenous Nations and communities. CNSC staff remain open to developing ToRs for long-term engagement with other interested Nations and communities with nuclear facilities in their territories upon request. A summary of the engagement activities that occurred in 2022 in relation to each of the existing ToRs for long-term engagement with these Nations and communities which was collaboratively drafted between CNSC staff and each respective Indigenous Nation or community can be found in Appendix L.

5.2 CNL Engagement Activities

CNSC staff confirms that CNL has a dedicated Indigenous Engagement program that covers CNL's operations and activities. CNL met and shared information with interested Indigenous Nations and communities throughout 2022. CNL staff also participated in cultural awareness activities, provided capacity funding to support engagement activities, and invited Indigenous community members to CNL events.

CNL engagement with respect to CRL, NPDWF, DPWF, G1WF, PHAI and WL in 2022 generally focused on project-specific environmental assessments and licensing processes. However, discussions and activities have also addressed concerns and interest in the broader sites and ongoing licensing activities.

Chalk River Laboratories and Nuclear Power Demonstration Waste Facility Sites

For the CRL site, CNL continued to work on long-term relationship agreements in 2022. CNL has a Memorandum of Understanding (MOU) with the Algonquins of Ontario as well as an MOU with the MNO Regions 5 and 6. CNL is also in the process of working on an MOU and Contribution Agreement with KFN, as well as with KZA. CNL is working to amend a Contribution Agreement with CLFN to go until 2024 and is working to establish a Contribution Agreement with Hiawatha First Nation. CNL continued discussions with AOPFN on establishing a Guardian Program and a long-term relationship agreement. The MNO, AOPFN, KZA and KFN are also involved in CNL's public Environmental Stewardship Council. CNL continued engagement with KZA and KFN to continue to build their relationships and continued monthly meetings with the Williams Treaties First Nations (WTFN) (including CLFN). CNL has noted that Indigenous Nations and communities expressed interest in biodiversity and cultural heritage studies, as well as future site use at CRL. In response, CNL invited interested Indigenous community members to participate in archaeological assessment field studies at CRL.

Douglas Point Waste Facility

For the DPWF, CNL continued to focus on long-term engagement in 2022. CNL participated in the annual SON Tradeshow, as well the SON Environmental Office community event, provided regular project updates, provided a facility tour, and worked towards signing a ToR for long-term engagement. CNL conducted regular quarterly meetings with HSM to discuss project updates on the DPWF. CNL also met with the MNO staff and MNO Georgian Bay Traditional Territory Consultation Committee to provide project updates and discuss a relationship agreement.

Whiteshell Laboratories

In 2021, CNL shifted its approach to engaging with interested First Nations and the Red River Métis (represented by the MMF) in the vicinity of the WL site to be more relationship-based than solely project-focused. This work carried on into 2022. CNL continued to work to establish an Indigenous Advisory Committee for the WL site, as well as relationship agreements with key Indigenous Nations and communities. In 2022, CNL worked with Sagkeeng Anicinabe First Nation to establish a community liaison officer position, met with Chief and Council, provided site tours, renewed the Technical Working Group and supported the development of an independent Community Environmental Monitoring Program. In 2022, MMF participated in or observed many CNL environmental monitoring and other site activities, received updates on ongoing WL decommissioning activities, hosted CNL at a MMF Community Consultation Meeting, discussed potential collaborative initiatives, and continued negotiating a relationship agreement with CNL. In 2022, Black River First Nation and Hollow Water First Nation participated in a site tour, berry picking and mushroom collection,

medicinal plant walk, environmental monitoring and extended the existing relationship agreement with CNL.

Gentilly-1

No specific engagement activities with Indigenous Nations and communities were carried out for G1WF in 2022. However, CNL has indicated its intention to share information with and seek feedback from interested Indigenous communities with respect to G1WF and has noted that planning activities for Indigenous engagement and relationship building with Indigenous Nations and communities with an interest in the G1WF site were initiated by CNL in 2022 and 2023.

Port Hope Area Initiative

In 2022 for the PHAI, CNL continued engaging with the WTFN regarding the PHAI, which is located in their shared traditional and treaty territory, as well as approximate Indigenous communities with potential interests in the area around PHAI. CNL's Indigenous engagement staff met monthly with representatives from the Mississauga First Nations, as well as the Chippewa communities (Beausoleil, Georgina Island and Rama First Nations). In April 2022, CNL staff met with representatives of the Mississaugas of Scugog Island First Nation and their business partners to discuss potential procurement opportunities. In May 2022, CNL hosted senior representatives of Anishinabek Nation for an in-person meeting in Port Hope that included an update on PHAI activities and tour of the PHP sites.

The WTFN monthly meeting for June 2022 took place in-person in Port Hope and included a PHAI project update, information on the 10-year licence renewal application and revisions to the cleanup criteria amendment application proposal. The meeting was followed by a tour of the PHP and PGP sites. In July 2022, CNL staff met with representatives of the MNO Regions 6 and 8 to provide an update on the status of the PHAI project, an update on environmental monitoring and to discuss details of a proposed site tour with MNO representatives in the fall of 2022. Preparations for the PHP 10-year licence renewal hearing were also discussed. CNL continues to hold an active Contribution Agreement with CLFN and remains open to similar PHAI-related agreements with other Indigenous communities if desired.

Feedback received by Indigenous Nations and communities on engagement with CNL in 2022

In response to concerns raised by Indigenous Nations and communities in their interventions in relation to the 2021 CNL ROR that their input was not being incorporated into CNSC's assessment of licensees, CNSC staff sought formal feedback from Indigenous Nations and communities with regards to their perspectives and feedback on CNL's engagement with them in 2022 to be included in the 2022 CNL ROR. This input was sought outside of regular meetings from all interested Nations and communities who had raised issues, concerns and recommendations in the 2021 CNL ROR. Of the Nations CNSC

requested feedback from relevant to this ROR, the HSM, CLFN and the AOPFN have provided feedback. Their submissions are as follows:

1. Feedback on CNL's Engagement from the Historic Saugeen Metis:

HSM Council and staff informed CNSC staff that they appreciated the informative project updates and discussions with CNL in 2022, which also included a project site tour.

2. Feedback on CNL's Engagement from Curve Lake First Nation:

CLFN informed CNSC staff that in 2022, CNL and the WTFN continued the practice of conducting routine meetings for the WTFN communities that have shown an interest and are able to attend. Reoccurring meetings allow CLFN to stay up to date on the different CNL projects and maintain predictability of interactions based on a schedule. During meetings, CNL has asked the representatives from WTFN about what could be improved during meetings and to continue building the relationship. CLFN had the opportunity to talk about the need to improve communication tools, like having infographics instead of meeting minutes. Representatives from WTFN also suggested having more interactions and less updates, more leadership meetings, more in-person meetings, concrete actions and deliverables, as well as allowing space to learn and digest the information. At these meetings, CNL has made the effort to share public disclosures.

3. Feedback on CNL's Engagement from the Algonquins of Pikwakanagan:

In April 2023, AOPFN provided CNSC staff with a performance review of CNL's engagement activities with their community in 2022. AOPFN has developed their own Aboriginal Rights SCA Criteria to assess the quality of engagement of licensees and the CNSC, which was first discussed in AOPFN's 2021 CNL ROR submission to the Commission. AOPFN's assessment is based on AOPFN's experience with CNL in relation to their participation in engagement and outreach initiatives and activities. CNSC staff and AOPFN have collaborated on summarizing AOPFN's key findings with regards to CNL's engagement activities with them in 2022 and the summary is included below. AOPFN's full assessment will be included in their submission to the Commission in relation to the 2022 CNL ROR.

Summary of AOPFN's Assessment of CNL's Engagement Activities and Performance in 2022

AOPFN's key findings from their assessment of CNL's engagement activities and performance in 2022 include the need for CNL to provide more inclusive and accessible communications with AOPFN, the need for meaningful commitments to be made by CNL to address AOPFN's concerns and priorities, as well as the full implementation of existing commitments between AOPFN and CNL. Other findings include AOPFN's desire for CNL to recognize AOPFN as a partner with a joint decision-making role on CRL site planning activities, as well as monitoring and management activities that are not restricted due to security concerns. AOPFN notes no commitments have been made to date in relation to

measures at the NPDWF site to protect or promote AOPFN rights. Neither AECL, CNL or CNSC have indicated that they will respect and adhere to AOPFN United Nation Declaration on the Rights of Indigenous People (UNDRIP), Free, Prior and Informed Consent decisions, including in relation to projects that fit under the "positive consent requirements" for hazardous waste disposal facilities outlined in UNDRIP Article 29.2.

AOPFN has determined that from their perspective, CNL was overall operating below expectations in most of their Aboriginal Rights and engagement assessment categories for 2022. These categories include the integration of Indigenous Knowledge into site monitoring and management, engagement of Indigenous Peoples in site planning, monitoring and management, and contributions to reconciliation with Indigenous Peoples. However, AOPFN notes that they are seeing some improvement as CNL invests more in its relationship with AOPFN, including the ongoing efforts to develop a long-term relationship agreement (LTRA). This has contributed to a slight upward trend in the quality of CNL's engagement and the CNL-AOPFN relationship over the past year. AOPFN did not include the LTRA in their assessment of CNL's operations as no such agreement has been finalized to date.

AOPFN has developed and shared a list of proposed commitments that they would like CNL to implement to further improve the relationship between the two parties. AOPFN has shared these commitments with CNSC and CNL. Examples of the commitments include greater CRL site access provisions for AOPFN members and Guardians (including confirmed long-term funding and initial application of the Neya Wabun Guardian Program); recognition of past impacts on traditional use, culture and well-being; long-term funding for full implementation of AOPFN-led risk communication program agreement on a procurement and employment benefits program at CNL sites in their territory; greater communication and information sharing including but not limited to reportable incidents as well as plans for importing radioactive waste; among others.
AOPFN notes that CNL has made some progress towards improving the relationship and collaborating with AOPFN with respect to CNL sites in their traditional territory. For example, AOPFN appreciates that CNL is prioritizing having regular meetings with AOPFN at both the leadership and staff levels. However, AOPFN is of the view that CNL must make greater efforts to respect AOPFN rights and interests with regards to their operations and projects.

AOPFN reaffirms their responsibility to care for their unceded territory, and to preserve and protect the lands, waters, and wildlife. As such, AOPFN maintains that they must be recognized as a rightful, respected, and principled steward of the environment and have a greater role with regards to oversight, monitoring and management of the CRL site and other CNL operations and projects in their territory.

CNSC staff are encouraged that AOPFN and CNL are making progress towards enhancing their relationship and collaboration and encourage both parties to continue to make efforts to ensure the relationship and engagement continues to progress in a positive trend. CNSC staff will continue to monitor CNL's engagement and communication activities and support the relationship and work towards addressing AOPFN's concerns and comments as appropriate.

CNSC Indigenous Consultation and Engagement Findings

CNSC staff are overall satisfied with the level and quality of Indigenous engagement conducted by CNL with regards to its operations and proposed projects at its different sites in 2022. CNSC staff encourages CNL to continue to remain flexible and responsive to the requests and needs of the Indigenous Nations and communities that have an interest in its sites, facilities and proposed projects.

6 EVENTS AND OTHER MATTERS OF REGULATORY INTEREST

This section of the ROR provides information on other matters of regulatory interest, including reportable events, the separate efforts of CNSC staff and CNL regarding public engagement, environmental protection reviews, the Independent Environmental Monitoring Program (IEMP) and nuclear liability insurance at CNL sites.

6.1 Reportable Events

Detailed requirements for reporting unplanned situations or events at CNL licensed sites to the CNSC are referenced in the applicable LCHs. CNSC's REGDOC- 3.1.2, *Reporting Requirements, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills* [11] was implemented for applicable CNL sites with the exception of PHP and PGP. CNSC's REGDOC-3.1.3, *Reporting Requirements for Waste Nuclear Substance Licensees, Class II Nuclear Facilities and Users of Prescribed Equipment, Nuclear Substances and Radiation Devices* [37] was implemented for PHP and PGP. Over the period covered by this report, CNL has complied with the requirements for submission of these reports.

Appendix E provides a list and a brief description of the reportable events which occurred in 2022. These events are of low safety significance and CNSC staff are satisfied with CNL's corrective actions to prevent recurrence.

Events which CNSC staff assess as meeting specific risk criteria are the subject of "Event Initial Reports" from CNSC staff to the Commission. In 2022, there was one Event Initial Report, which was presented to the Commission on June 28, 2022:

- Exceedance of copper discharge criteria in plant effluent for the week ending on June 1, 2022 at the PHP waste water treatment plant (WWTP), presented to the Commission in CMD 22-M38 [20]. On June 6, 2022, CNL reported that during routine compliance sampling at the PHP WWTP the composite effluent sample for the week ending June 1, 2022, exceeded the weekly release limit for copper and the action level for zinc. CNL determined that the evaporator cooling loop was the source of the abnormal copper and zinc concentrations. CNL redirected the evaporator cooling loops to the plant process drain for water treatment until brass components could be modified and then tested to confirm the absence of copper and zinc concentrations in excess of the applicable licence limits and action levels. CNL also conducted an extent of condition evaluation on all systems potentially impacting the facility's final effluent to identify and address future sources of copper (both brass and bronze). CNSC staff took confirmatory influent and effluent water samples from the PHP WWTP and had them assessed by the CNSC lab and CNSC subject matter experts. The results were below applicable licence limits and action levels. CNSC staff are satisfied with the corrective actions taken by CNL and the

event is now closed. The event had no adverse environmental or health effects.

6.2 Public Engagement

6.2.1 CNSC

Public engagement consists of activities carried out directly by CNSC staff, and those activities carried out by CNL. The *Nuclear Safety and Control Act* [1] mandates the CNSC to disseminate objective scientific, technical and regulatory information to the public concerning its activities and the activities it regulates. CNSC staff fulfill this mandate in a variety of ways, including hosting in-person and virtual information sessions and through annual regulatory reports. CNSC staff also participate in local community events as well as CNL-led public meetings. CNSC staff also seek out other opportunities to engage with the public and Indigenous Nations and communities, often participating in meetings or events in communities with interest in nuclear sites. These allow CNSC staff to answer questions about the CNSC's mandate and role in regulating the nuclear industry, including CNL's sites. Additionally, CNSC staff have responded to or provided CNSC staff's path forward to meaningfully address and close out specific requests, concerns and comments raised by Indigenous Nations or communities and intervenors who raised issues or concerns in relation to the 2021 CNL ROR. More details can be found in Table A in Appendix M of this report.

CNSC staff carried out several targeted outreach activities in 2022. Some of these activities were linked to specific regulatory review and licensing processes underway, including the NSDF, the Global First Power Small Modular Reactor (SMR) EA and licensing proposals, and the PHAI licence renewal. Other activities were more generic in nature including the outreach related to the CNL ROR. Outreach related to the ROR focused on Indigenous Nations and communities that have traditional and/or treaty territories in proximity to CNL sites.

CNSC awarded $72,828.76 in participant funding to assist Indigenous Nations and communities, members of the public and stakeholders in reviewing this ROR and submitting comments to the Commission, as detailed in Appendix K.

6.2.2 CNL

The CNSC requires licensees to maintain and implement public information and disclosure programs, in accordance with CNSC's REGDOC-3.2.1, *Public Information and Disclosure* [38]. These programs are supported by disclosure protocols that outline the type of facility's information to be shared with the public as well as details on how that information is to be disseminated. This ensures that timely information about the health, safety and security of persons and the environment, and other issues associated with the lifecycle of nuclear facilities, is effectively communicated to the public.

CNSC staff monitor CNL's implementation of its public information and disclosure program to verify that it communicates regularly with its audiences in a

way that is open, transparent and meaningful to them. CNSC staff also review yearly program updates to verify CNL is taking communities feedback into consideration and taking steps to implement program adjustments to meet the evolving needs of the various communities.

With the lingering impact of the COVID-19 pandemic, all licensees continued to face challenges and make ongoing adjustments to their public information programs. CNL successfully maintained and adapted its public information and disclosure program to engage their many stakeholders while adapting to the evolving restrictions and respecting all necessary protocols. CNL was able to reintroduce a number of in-person activities in 2022 and continued to deliver a hybrid approach to meetings and events, offer webinars and increase digital communications whenever possible.

Communications activities conducted by CNL included:

- maintaining a current, easy to navigate, public facing website
- regularly updating its website with information on each facility/site/project and posting its public disclosure protocol and reportable events
- extensive posting on social media with information on each facility/site/project, as well as engaging with audiences on social media; this included a total of more than 290 posts across the main platforms (Twitter/ LinkedIn/Facebook/YouTube) resulting in a 56% increase in impressions and a notable increase of followers (13% increase of followers on Twitter, 35% increase of followers on LinkedIn, 9% increase of followers on Facebook) and over 1.6 million impressions in total
- advertising on social media, local and national media including Maclean and the Toronto Star
- sending out information externally to local communities and interested stakeholders via newsletters (mailout and online), as well as internally to CNL employees via staff meetings, intranet and internal newsletters (online). CNL produces general newsletters as well as facility-, site- and project-specific newsletters for specific communities [CRL (fall edition) ~55,000 households, WR-1 (winter 2021/2022 edition) ~8,000 households]. The Kids CONTACT newsletter (winter and summer edition) was expanded to include the CRL, WL and Port Hope catchment areas in 2022 (~72,000 households).
- developing and publishing the 2022 CNL Sustainability Report on the website
- hosting and participating in several in-person events including open houses, community events, national and international conferences and tradeshows, including events to acknowledge and celebrate Indigenous Peoples, and encourage and promote youth and women in STEM. A CNL Science Camp was launched in 2022. All initiatives increased participants' awareness and understanding of CNL.
- hosting and participating in virtual events such as webinars, online conferences, career fairs and school presentations

- conducting sitewide tours at various facilities/sites for local communities, school groups, interested stakeholders and media as requested
- supporting local communities through various initiatives including an employee crowdfunding initiative
- providing mechanisms for audience feedback and responding to public inquiries including:
  - 327 website visitors who used the "Contact Us" function (down approx. 500 visitors from 2021)
  - a toll-free information line
  - breakfast briefings, technical meetings and focus groups and other community events
- consistent engagement with local and national media, both proactively and in response to requests. In 2022, CNL produced 35 news releases. By taking a more proactive approach to media relations, coverage was more accurate overall.
- conducting a Nanos research public attitude survey of more than 500 residents within Renfrew and Pontiac counties
- maintaining the community advisory panel which began in 2021 and posting meeting summaries to the CNL website

In 2022, CNL demonstrated a strong commitment to disseminating appropriate and timely health and safety information to the public and community members through the use of their website, social media, in-person and virtual events, engagement activities, and newsletters. CNL has a diverse educational program for youth. CNSC staff found that all CNL sites and facilities were in compliance with applicable public information program requirements.

6.3 Environmental Protection Reviews

CNSC staff conduct environmental protection reviews (EPRs) for all licence applications with potential environmental interactions, in accordance with CNSC's mandate under the *Nuclear Safety and Control Act* [1] and associated regulations. An EPR is a science-based environmental technical assessment conducted by CNSC staff. The fulfillment of other aspects of the CNSC's mandate, such as regulating safety and security, are met through other oversight activities.

Starting in 2021, the CNSC began a new approach for publishing stand-alone EPR reports online based on the scale and complexity of the environmental risk of the facility. These reports are separate from a specific licensing decision to allow interested Indigenous Nations and communities and members of the public additional time to review information related to environmental protection and engage with CNSC staff on any information in the reports. All available EPR reports can be found on the CNSC website. EPR reports are typically timed to align with the facility's ERA cycle, which is at minimum every 5 years or sooner

if there is a major change to the facility. Currently, there is only one EPR report available for CNL sites and facilities, and it is for the Port Hope Area Initiative. CNSC staff will be publishing EPR reports for the other CNL sites and facilities in the future.

- Environmental Protection Review Report: Port Hope Area Initiative [39]

The information in EPR reports support staff's recommendations to the Commission in future licensing and regulatory decisions on whether the proposal provides adequate protection of the environment and the health of people.

6.4 Independent Environmental Monitoring Program

The CNSC requires that each nuclear facility licensee develops, implements and maintains an environmental monitoring program as appropriate to demonstrate that the public and the environment are protected from any releases to the environment related to the facility's nuclear activities. CNSC staff evaluate and assess the results of these monitoring programs to determine compliance with the applicable requirements and limits, as set out in the regulations that govern Canada's nuclear industry.

The Independent Environmental Monitoring Program (IEMP) is an independent from licensee, technical environmental sampling program that is carried out by CNSC staff in publicly accessible areas around nuclear facilities. The CNSC continues to strive to build Indigenous and public trust in the CNSC's regulation of the nuclear industry; and thus implements an IEMP to confirm the effectiveness of a licensee's monitoring program and to promote more awareness and information sharing of CNSC's work in the protection of people and the environment. The IEMP is a regulatory tool that complements and informs the CNSC's ongoing compliance verification program. The IEMP does not rely on licensees to provide samples. CNSC staff or independent contractors obtain samples from publicly accessible areas around nuclear facilities, then measure and report the amounts of radiological and hazardous substances present in these samples to the Commission, Indigenous Nations and communities, and the public.

In 2022, CNSC staff conducted independent environmental monitoring around the CRL, Bruce Power (DPWF) and WL sites. There were no results of concern. In addition, these results are consistent with the results submitted by CNL. The IEMP results add to the body of evidence and supports CNSC staff's assessment that the public and the environment in the vicinity of the CRL, DPWF and WL sites are protected and that CNL's environmental protection programs are effective.

Results from all IEMP sampling campaigns are available on the CNSC's Web page.

6.5 Nuclear Liability Insurance

Pursuant to section 7 of the *Nuclear Liability and Compensation Act* [40], which came into force on January 1, 2017, and previously under the *Nuclear Liability Act* [41], CNL is required to maintain nuclear liability insurance for designated nuclear installations. The 5 nuclear installations operated by CNL that require nuclear liability insurance, as designated in the Schedule (section 2) of the *Nuclear Liability and Compensation Regulations* [42], are: CRL, WL, DPWF, G1WF and NPDWF.

The insured facilities at CRL are a single-unit reactor of over 7 megawatts, nuclear fuel waste processing facilities, retired nuclear reactor structures, facilities for nuclear fuel production and nuclear substance processing, and radioactive waste processing and storage facilities. CNL's prescribed limit of liability for this installation is $180 million, in accordance with paragraph 5(a) of the *Nuclear Liability and Compensation Regulations* [42].

The insured facilities at WL, DPWF, and G1WF have each a prescribed limit of liability of $13 million.

CNL's prescribed limit of liability for the installation at NPDWF is $1 million.

Natural Resources Canada, which is the federal department responsible for the administration of the *Nuclear Liability and Compensation Act* [40], confirms that CNL is in compliance with its obligation under the *Nuclear Liability and Compensation Act* [40] for nuclear liability insurance for all 5 designated nuclear installations.

6.6 Overall Conclusions

CNSC staff conclude that the CRL, WL, PHP, PGP, DPWF, G1WF and NPDWF sites operated safely in 2022. This conclusion is based on CNSC staff's assessments of CNL's activities which included site inspections, reviews of reports submitted by CNL, and event and incident reviews, supported by follow-up and general communication with CNL.

For 2022, the performance in all SCAs was rated as satisfactory with the exception of the emergency management and fire protection SCA at WL and security SCA at CRL, which were rated as below expectations. Despite these below expectation SCAs, overall:

CNSC staff's compliance activities confirmed that:

- Radiation protection programs at all CNL sites adequately controlled radiation exposures, keeping doses ALARA
- Conventional health and safety programs at all CNL sites continue to protect workers; and
- Environmental protection programs at all CNL sites were effective in protecting people and the environment.

CNSC staff will continue to provide regulatory oversight at all CNL sites, to ensure that CNL makes adequate provision to protect the health, safety and security of workers, Canadians, and the environment, and continues to implement Canada's international obligations on the peaceful use of nuclear energy.

REFERENCES

[1] *Nuclear Safety and Control Act*, S.C. 1997, c. 9

[2] *Regulatory review status for the Near Surface Disposal Facility (NSDF) – Canadian Nuclear Safety Commission*

[3] *Canadian Environmental Assessment Act, 2012*, S.C. 2012, c. 19, s. 52

[4] Outcome of Federal-Provincial Review Team Review of Final Environmental Impact Statement for the Near Surface Disposal Facility Project CNSC to CNL, July 2, 2021

[5] Letter from Kebaowek First Nation

[6] Letter from Kitigan Zibi Anishinabeg

[7] *Regulatory review status for the decommissioning of the Whiteshell Reactor #1 – Canadian Nuclear Safety Commission*

[8] DEC 22-H13, Record of Decision, *Application to Renew the Waste Nuclear Substance Licence for the Port Hope Project as a Single Licence for the Port Hope Area Initiative*

[9] DEC 20-H4, Record of Decision, *Application to amend the Waste Facility Decommissioning Licence for the Douglas Point Waste Facility to include phase 3 decommissioning activities*

[10] Regulatory review status of Nuclear Power Demonstration Closure Project – Canadian Nuclear Safety Commission

[11] CNSC REGDOC-3.1.2, *Reporting Requirements, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills*

[12] CNSC REGDOC-2.2.4, *Fitness for Duty: Managing Worker Fatigue*

[13] CNSC REGDOC-2.2.2: *Personnel Training*

[14] CNSC REGDOC-2.4.3, *Nuclear Criticality Safety*

[15] CNSC REGDOC-2.6.3, *Aging Management*

[16] *Radiation Protection Regulations*, SOR/2000-203

[17] *Canada Labour Code*, R.S.C., 1985, c L-2

[18] *Occupational Health and Safety Regulations*, SOR/86-304

[19] 2022 Workplace Safety and Insurance Board Statistical Report

[20] CMD 22-M38 Event Initial Report, *Canadian Nuclear Laboratories Port Hope Waste Water Treatment Plant – Exceedance of Copper discharge in plant effluent*

[21] CSA Group, CSA N288.4, *Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills*

[22] CSA Group, CSA N288.7, *Groundwater protection programs at Class I nuclear facilities and uranium mines and mills*

[23] ISO Standard 14001:2015, *Environmental Management Systems*

[24] CNSC REGDOC 2.9.1, *Environmental Protection: Environmental Principles, Assessments and Protection Measures*

[25] CSA Group, CSA N288.6-12, *Environmental risk assessments at class I nuclear facilities and uranium mines and mills*

[26] CSA Group, CSA N393-13, *Fire protection for facilities that process, handle or store nuclear substances*

[27] *General Nuclear Safety and Control Regulations*, SOR/2000-202

[28] CMD 23-M25 Event Initial Report, *Safety stand-down at Canadian Nuclear Laboratories' Whiteshell Site following the discovery of non-compliances in the fire protection program*

[29] *Canadian National Report for the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (October 2020)*

[30] CNSC REGDOC-2.11.2, *Decommissioning*

[31] CSA Group, CSA N294-19, *Decommissioning of facilities containing nuclear substances*

[32] CNSC REGDOC-3.3.1, *Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities*

[33] *Nuclear Security Regulations*, SOR/2000-209

[34] United Nations, *Treaty on the Non-Proliferation of Nuclear Weapons*

[35] *Packaging and Transport of Nuclear Substances Regulations, 2015*, SOR/2015-145

[36] *Transportation of Dangerous Goods Regulations*, SOR/2001-286

[37] CNSC REGDOC-3.1.3, *Reporting Requirements for Waste Nuclear Substance Licensees, Class II Nuclear Facilities and Users of Prescribed Equipment, Nuclear Substances and Radiation Devices*

[38] CNSC REGDOC 3.2.1 *Public Information and Disclosure*

[39] Environmental Protection Review Report: Port Hope Area Initiative

[40] *Nuclear Liability and Compensation Act*, S.C. 2015, c. 4, s. 120

[41] *Nuclear Liability Act*, R.S.C. 1985, c. N-28

[42] *Nuclear Liability and Compensation Regulations*, SOR/2016-88

[43] CNSC REGDOC-3.6, *Glossary of CNSC Terminology*

[44] *CMD 23-M31, Regulatory Oversight Report on the Use of Nuclear Substances in Canada: 2022*, (e-Doc 6945639)

GLOSSARY AND ACRONYMS

For definitions of terms and acronyms used in this document, except for those listed below, see REGDOC-3.6, *Glossary of CNSC Terminology* [43].

ACMR	Annual Compliance Monitoring Report
AECL	Atomic Energy of Canada Limited
ALARA	As Low As Reasonably Achievable
AL	Action Level
ANMRC	Advanced Nuclear Materials Research Centre
AOPFN	Algonquins of Pikwakanagan First Nation
APM	Adaptive Phase Management
BE	Below Expectation
BNGS	Bruce Nuclear Generating Station
Bq	Becquerel
CAM	Continuous Air Monitor
CANDU	Canada Deuterium Uranium
CAP	Corrective Action Plan
CEAA	Canadian Environmental Assessment Act
CECEUD	Combined Electrolysis and Catalytic Exchange Upgrading and Detritiation
CED	Committed Effective Dose
CLFN	Curve Lake First Nation
CNL	Canadian Nuclear Laboratories
CNSC	Canadian Nuclear Safety Commission
CMD	Commission Member Document
CRL	Chalk River Laboratories
CVC	Compliance Verification Criteria
CWMP	Coastal Waters Monitoring Program
DCP	Dose Control Points
DIF	Dedicated Isotope Facility
DRL	Derived Release Limits
DPWF	Douglas Point Waste Facility
EA	Environmental Assessment

EAFS	Exhaust Air Filtration System
ECCC	Environment and Climate Change Canada
EOC	Emergency Operations Centre
EPR	Environmental Protection Review
ERA	Environmental Risk Assessment
FA	Facility Authorization
G1WF	Gentilly-1 Waste Facility
HEPA	High Efficiency Particulate Air
HSM	Historic Saugeen Métis
IAEA	International Atomic Energy Agency
IEMP	Independent Environmental Monitoring Program
ISO	International Organization for Standardization
KFN	Kebaowek First Nation
KZA	Kitigan Zibi Anihsinabeg
LCH	Licence Conditions Handbook
LLRW	Low Level Radioactive Waste
LTRA	Long-Term Relationship Agreement
LTWMF	Long-Term Waste Management Facility
MCP	Management Control Procedure
MMF	Manitoba Métis Federation
MNO	Métis Nation of Ontario
MOU	Memorandum of Understanding
MPF	Molybdenum-99 Production Facility
MSIFN	Mississaugas of Scugog Island First Nation
mSv	Millisievert
MWe	Megawatt Electric
MWth	Megawatt Thermal
NCCA	Nuclear Criticality Controlled Area
NCCO	Nuclear Criticality Control Officer
NEW	Nuclear Energy Worker
NFFF	Nuclear Fuel Fabrication Facility
NNC	Notice of Non-compliance

NPDWF	Nuclear Power Demonstration Waste Facility
NRF	Nuclear Response Force
NRU	National Research Universal
NRTEOL	Nuclear Research and Test Establishment Operating Licence
NRTEDL	Nuclear Research and Test Establishment Decommissioning Licence
NSDF	Near Surface Disposal Facility
NWMO	Nuclear Waste Management Organization
OPEX	Operating Experience
PFP	Participant Funding Program
PHAI	Port Hope Area Initiative
PGP	Port Granby Project
PHP	Port Hope Project
REGDOC	Regulatory Document
RFFL	Recycle Fuel Fabrication Laboratories
RIMNet	Regional Information and Monitoring Network
RLTI	Recordable Lost-Time Injury
ROR	Regulatory Oversight Report
RP	Radiation Protection
RSSSA	Recoverable Surface Storage and Staging Area
SA	Satisfactory
SAT	Systematic Approach to Training
SCA	Safety and Control Areas
SFM	Special Fissionable Material
SMR	Small Modular Reactor
SON	Saugeen Ojibway Nation
SPOP	Security Program Oversight Plan
SSC	Structures, Systems and Components
SWS	Storage with Surveillance
ToR	Terms of Reference
TRP	Tactical Response Plan
UA	Unacceptable
UNDRIP	United Nation Declaration on the Rights of Indigenous People

WFDL	Waste Facility Decommissioning Licence
WL	Whiteshell Laboratories
WMA	Waste Management Area
WNSL	Waste Nuclear Substance Licence
WR-1	Whiteshell Reactor No. 1
WTFN	Williams Treaties First Nations
WWTP	Waste Water Treatment Plant

A. INDIGENOUS NATIONS AND COMMUNITIES THAT HAVE TRADITIONAL AND/OR TREATY TERRITORIES WITHIN PROXIMITY TO CNL SITES

Chalk River Laboratories and Nuclear Power Demonstration

- Algonquin Anishinabeg Nation Tribal Council
- Algonquin Nation Secretariat
- Algonquins of Barriere Lake
- Algonquins of Ontario
- Algonquins of Pikwàkanagàn First Nation
- Conseil de la Nation Anishnabe de Lac Simon
- Conseil de la Première Nation Abitibiwinni
- Kebaowek First Nation
- Kitcisakik First Nation
- Kitigan Zibi Anishinabeg First Nation
- Long Point First Nation
- Métis Nation of Ontario
- Mitchikanibikok Inik (Algonquins of Barriere Lake)
- Timiskaming First Nation
- Wahgoshig First Nation
- Williams Treaties First Nations:
  - Alderville First Nation
  - Beausoleil First Nation
  - Chippewas of Georgina Island First Nation
  - Chippewas of Rama First Nation
  - Curve Lake First Nation
  - Hiawatha First Nation
  - Mississaugas of Scugog Island First Nation
- Wolf Lake First Nation

Douglas Point Waste Facility

- Saugeen Ojibway Nation, comprised of:
  - Chippewas of Nawash Unceded First Nation
  - Saugeen First Nation

- Historic Saugeen Métis
- Métis Nation of Ontario

Gentilly-1 Waste Facility

- Abénakis of Wôlinak and Odanak, represented by the Grand Conseil de la Nation Waban-Aki
- Nation huronne-wendat

Whiteshell Laboratories

- Sagkeeng Anicinabe First Nation
- Black River First Nation
- Brokenhead Ojibway Nation
- Grand Council of Treaty 3
- Hollow Water First Nation
- Iskatewizaagegan #39 Independent First Nation
- Red River Métis (represented by Manitoba Métis Federation)
- Northwest Angle #33 First Nation
- Shoal Lake #40 First Nation
- Wabaseemoong Independent Nations

Port Hope Area Initiative

- Mohawks of the Bay of Quinte
- Métis Nation of Ontario
- Williams Treaty First Nations:
  - Alderville First Nation
  - Beausoleil First Nation
  - the Chippewas of Georgina Island First Nation
  - Chippewas of Rama First Nation
  - Curve Lake First Nation
  - Mnjikaming (Chippewas of Rama First Nation)
  - Hiawatha First Nation
  - Mississaugas of Scugog Island First Nation

B. LICENCES AND LICENSING ACTIVITIES

Site/ Facility/ Project	Licence Number	Previous Commission Hearing	Licensing Changes in 2022
Chalk River Laboratories	NRTEOL-01.00/2028	CMD 18-H2, January 23-25, 2018	None
Whiteshell Laboratories	NRTEDL-W5-8.00/2024	CMD 19-H4, October 2-3, 2019	
Port Hope Long-Term Low-Level Radioactive Waste Management Project	WNSL-W1-2310.02/2022	CMD 17-H101 November 29, 2017	Licensing work to renew the Port Hope Project licence and consolidate with the other PHAI licences occurred in 2022, with the new licence being valid starting January 1, 2023 (CMD 22-H13, November 22, 2022).
Port Granby Long-Term Low-Level Radioactive Waste Management Project	WNSL-W1-2311.00/2022	CMD 21-H102, Hearing in Writing, December 13, 2021	
Pine Street Extension Temporary Storage Site	WNSL-W1-182.0/2022	DNCFR-CNLRPD-DOD-21-002, December 16, 2021	
Port Hope Radioactive Waste Management Facility	WNSL-W1-344-1.8/ind	DNCFR-NPFD-DOD-16-004, September 26, 2016	
Douglas Point Waste Facility	WFDL-W4-332.03/2030	CMD 20-H4, November 25-26, 2020	None
Gentilly-1 Waste Facility	WFDL-W4-331.00/2034	CMD 18-H107, Hearing in Writing, February 8, 2019	
Nuclear Power Demonstration Waste Facility	WFDL-W4-342.00/2034		
Waste Nuclear Substance Licence (WNSL) for Low-Level Radioactive Waste Management Office (Historic Waste)	WNSL-W2-2202.0/2026	WDD-DOD-16-004, November 28, 2016	

Site/ Facility/ Project	Licence Number	Previous Commission Hearing	Licensing Changes in 2022
Canadian Nuclear Laboratories Import Licence	IL-01.00/2031	DNCFR-CNLRPD-DOD-21-001, July 7, 2021	
Canadian Nuclear Laboratories Export Licence	EL-01.00/2031		
La Prade Nuclear Substances and Radiation Devices Licence*	15193-4-26.0	N/A	
Low-Level Waste Programs Nuclear Substances and Radiation Devices Licence*	15193-5-23.0		
Dosimetry Service Licence	15193-1-26.2		
**These Nuclear Substances and Radiation Devices Licences are discussed in CMD 23-M31, Regulatory Oversight Report on the Use of Nuclear Substances in Canada: 2022 [44] and are not included as part of the content of this ROR.*			

C. REGULATORY DOCUMENT IMPLEMENTATION

Regulatory documents are a key part of the CNSC's regulatory framework for nuclear activities in Canada. They explain to licensees and applicants what they must achieve in order to meet the requirements set out in the *Nuclear Safety and Control Act* [1] and the regulations made under the *Nuclear Safety and Control Act* [1].

In 2022, the CNSC published several updated regulatory documents that impacted CNL sites, including REGDOC-3.2.2, *Indigenous Engagement, Version 1.2*, REGDOC-2.4.4, *Safety Analysis for Class 1B Nuclear Facilities*, REGDOC-3.1.2, *Reporting Requirements, Volume I: Non-Power Reactor Class I Facilities and Uranium Mines and Mills*, Version 1.1.

When a new regulatory document or revision is published, CNSC staff will formally request CNL conduct a gap analysis and provide an implementation plan. The CNSC will review the plan. The dates provided in the implementation plan are considered the date that the regulatory document becomes effective at the site, at which point it becomes compliance verification criteria.

Table C-1: CNSC REGDOC Implementation dates

REGDOC number	Publication year	Effective date						
		CRL	WL	DPWF	G1WF	NPDWF	PGP	PHP
REGDOC-2.1.1 Management system	2019	Guidance						
REGDOC-2.1.2 Safety Culture	2018	2019	2020	2019	Guidance	Guidance	Guidance	Guidance
REGDOC-2.2.1 Human Factors	2019	Guidance						
REGDOC-2.2.2 Personnel Training	2016	2018	2020	2020	2020	2020	2021	2021
REGDOC-2.2.4 Fitness for Duty: Managing Worker Fatigue	2017	2019	2020	2019				
REGDOC-2.2.4 Fitness for Duty, Volume II: Managing Alcohol and Drug Use, Version 3	2021	2022*	2022*	2022*				
REGDOC-2.2.4 Fitness for Duty, Volume III: Nuclear Security Officer Medical, Physical, and Psychological Fitness	2018	2019	2020	2020				
REGDOC-2.2.5 Minimum Staff Complement	2019	Guidance	Guidance	Guidance				

REGDOC number	Publication year	Effective date						
		CRL	WL	DPWF	G1WF	NPDWF	PGP	PHP
REGDOC-2.3.1, Conduct of Licensed Activities: Construction and Commissioning Programs	2016	2018						
REGDOC-2.3.2, Accident Management, Version 2	2015							
REGDOC-2.3.3, Periodic Safety Reviews	2015							
REGDOC-2.4.1, Deterministic Safety Analysis	2014	2018						
REGDOC-2.4.3, Nuclear Criticality Safety, Version 1.1	2020	2020	2021					
REGDOC-2.4.4 Safety Analysis for Class 1B Nuclear Facilities	2022	Guidance	Guidance					
REGDOC-2.5.1, General Design Considerations: Human Factors	2019	Guidance	Guidance	Guidance				
REGDOC-2.5.2 Design of Reactor Facilities: Nuclear Power Plants	2014	Guidance						
REGDOC-2.5.7 Design, Testing and Performance of Exposure Devices	2017	2018						
REGDOC-2.6.1 Reliability Programs for Nuclear Power Plants	2017	Guidance						
REGDOC-2.6.3, Aging Management	2014	2018	Guidance	2018	2019	2019		
REGDOC-2.7.1, Radiation Protection	2021	Guidance	Guidance					
REGDOC-2.7.2, Dosimetry, Volume I: Ascertaining Occupational Dose	2021	Guidance	Guidance				Guidance	Guidance
REGDOC-2.7.2, Dosimetry, Volume II: Technical and Management System Requirements for Dosimetry Services	2020							

REGDOC number	Publication year	Effective date						
		CRL	WL	DPWF	G1WF	NPDWF	PGP	PHP
REGDOC-2.8.1, Conventional Health and Safety	2019	Guidance					Guidance	Guidance
REGDOC-2.9.1, Environmental Principles, Assessments and Protection Measures, Version 1.2	2020	2021	2020 (v. 1.1.)	2021	2021	2021	2020	2020
REGDOC-2.10.1, Nuclear Emergency Preparedness and Response, Version 2	2016	2018	2020	2020	2020	2020		
REGDOC-2.11 Framework for Radioactive Waste Management and Decommissioning in Canada, Version 2	2021	Guidance	Guidance	Guidance	Guidance	Guidance	Guidance	Guidance
REGDOC-2.11.1, Waste Management, Volume I: Management of Radioactive Waste	2021	2022	2022	2022	2022	2022	2023	2023
REGDOC-2.11.1 Waste Management, Volume III: Safety Case for the Disposal of Radioactive Waste, Version 2	2021	2021	2022	Guidance	Guidance	2022	Guidance	Guidance
REGDOC-2.11.2, Decommissioning	2021	2025**	2025	2024	2023	2025	2024	2024
REGDOC-2.12.1, High Security Facilities, Volume I: Nuclear Response Force, Version 2	2018	2019	2020	V 2012 effective 2015				
REGDOC-2.12.1, High-Security Facilities, Volume II: Criteria for Nuclear Security Systems and Devices	2018	2018	2020	Guidance				
REGDOC-2.12.2, Site Access Security Clearance	2013	2018	2020	Guidance	Guidance	2022		
REGDOC-2.12.3 Security of Nuclear Substances: Sealed Sources and Category I, II and III Nuclear Material, Version 2.1	2020	2020	2021	V 2013 TBD	Guidance	2022	Guidance	Guidance

REGDOC number	Publication year	Effective date						
		CRL	WL	DPWF	G1WF	NPDWF	PGP	PHP
REGDOC-2.13.1, Safeguards and Nuclear Material Accountancy	2018	2018	2020	2019	2019	2018 (section 6 only)		2018
REGDOC-2.13.2, Import and Export, Version 2	2018							
REGDOC-2.14.1 Information Incorporated by Reference in Canada's Packaging and Transport of Nuclear Substances Regulations, 2015, Volume I, Version 2	2021	Guidance	Guidance					
REGDOC-3.1.2, Reporting Requirements, Volume I: Non-Power Reactor Class I Facilities and Uranium Mines and Mills, Version 1.1	2022 2018	2019	2020	2019	2019	2019		
REGDOC-3.1.3, Reporting Requirements for Waste Nuclear Substance Licensees, Class II Nuclear Facilities and Users of Prescribed Equipment, Nuclear Substances and Radiation Devices	2020						2020	2020
REGDOC-3.2.1, Public Information and Disclosure	2018	2020	2020	2020		2020	Guidance	Guidance
REGDOC-3.2.2, Indigenous Engagement, Version 1.2	2022	Guidance						
REGDOC-3.3.1 Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities	2021	2022	2022			2022	2023	2023

Shaded cells indicate the REGDOC is not applicable for those facilities.

*Fully implemented with the exception of random alcohol and drug testing of workers in safety-critical positions

**All requirements in REGDOC-2.11.2, are effective March 1, 2023 with the exception of the requirements in section 6.1.1 (content of preliminary decommissioning plan) and section 7.1.1 (content of detailed decommissioning plan)

D. LIST OF INSPECTIONS AT CNL SITES

Table D-1: List of CNSC-led inspections at CRL

Inspection	Dates	SCAs Covered	Number of Notices of Non-Compliance (NNCs)
CNL-CRL-2022-01 General Inspection of Class II Nuclear Facilities at Chalk River Laboratories	March 1 – 2, 2022	• Fitness for Service • Operating Performance • Radiation Protection • Conventional Health and Safety	4 NNCs
CNL-CRL-2022-02 General Inspection of the Molybdenum 99 Production Facility, Target Residue Material Retrieval and Transfer and FISST – Building 225, 229 and 229A	March 14 – 15, 2022	• Fitness for Service • Operating Performance • Human Performance Management • Radiation Protection • Conventional Health and Safety • Emergency Management and Fire Protection • Waste Management	2 NNCs
CNL-CRL-2022-03 Focused Human Performance Management Inspection at Chalk River Laboratories	March 9 – 11, 2022	• Human Performance Management	6 NNCs
CNL-CRL-2022-04 General Inspection of Building 250, Facilities Decommissioning Project	March 22 – 23, 2022	• Operating Performance • Radiation Protection • Conventional Health and Safety • Waste Management	6 NNCs
CNL-CRL-2022-05 General Inspection of Universal Cells at Chalk River Laboratories	May 4 – 5, 2022	• Fitness for Service • Operating Performance • Safety Analysis • Radiation Protection • Conventional Health and Safety • Emergency Management and Fire Protection	7 NNCs

Inspection	Dates	SCAs Covered	Number of Notices of Non-Compliance (NNCs)
CNL-CRL-2022-06 General Inspection of the Waste Management Area B	June 1 – 2, 2022	• Operating Performance • Environmental Protection • Radiation Protection • Conventional Health and Safety • Emergency Management and Fire Protection • Waste Management	12 NNCs
CNL-CRL-2022-07 General Inspection of the Chalk River Laboratories Tritium Laboratory	June 7 – 8, 2022	• Operating Performance • Fitness for Service • Emergency Management and Fire Protection • Environmental Protection • Radiation Protection • Conventional Health and Safety	2 NNCs
CNL-CRL-2022-08 General Inspection of the Chalk River Laboratories Nuclear Fuel Fabrication Facility	October 3 – 4, 2022	• Fitness for Service • Operating Performance • Safety Analysis • Conventional Health and Safety • Radiation Protection • Human Performance Management • Emergency Management and Fire Protection	4 NNCs
CNL-CRL-2022-09 General Inspection of Building 429, Facilities and Decommissioning Project	November 7 – 8, 2022	• Operating Performance • Safety Analysis • Environmental Protection • Conventional Health and Safety • Radiation Protection • Emergency Management and Fire Protection • Waste Management	6 NNCs
CNL-CRL-2022-10 General Inspection of the Chalk River Laboratories Recycle Fuel Fabrication Laboratory	December 5 – 6, 2022	• Operating Performance • Safety Analysis • Conventional Health and Safety • Radiation Protection • Emergency Management and Fire Protection	2 NNCs
CNL-CRL-PTP-2022-01	N/A	• Security	N/A

Table D-2: List of CNSC-led inspections at WL

Inspection	Dates	SCAs Covered	Number of Notice of Non-Compliance (NNCs)
CNL-WL-2022-01 Baseline Radiation Protection Inspection at Whiteshell Laboratories	May 10 – 11, 2022	• Radiation Protection	0 NNCs
CNL-WL-2022-03 Inspection of Whiteshell Laboratories Waste Management Area	October 24 – 26, 2022	• Management System • Operating Performance • Radiation Protection • Conventional Health and Safety • Emergency Management and Fire Protection • Waste Management • Fitness for Service	5 NNCs
CNL-WL-NSD-T2-2022-001	N/A	• Security	N/A

Table D-3: List of CNSC-led inspections at PHP

Inspection	Dates	SCAs Covered	Number of Notice of Non-Compliance (NNCs)
CNL-PHAI-PHP-2022-01 General Inspection of the Port Hope Waste Water Treatment Plant and Long-Term Waste Management Facility	March 28 – April 8, 2022	• Environmental Protection • Radiation Protection • Conventional Health and Safety	3 NNCs
CNL-PHAI-PHP-2022-02 Baseline Inspection of Human Performance Management at the Port Hope Project	December 14 -16, 2022	• Human Performance Management	6 NNCs

Table D-4: List of CNSC-led inspections at PGP

Inspection	Dates	SCAs Covered	Number of Notice of Non-Compliance (NNCs)
CNL-PHAI-PGP-2022-01 General Inspection of the Port Granby Waste Water Treatment Plant and Long-Term Waste Management Facility	March 28 – April 8, 2022	• Environmental Protection • Radiation Protection • Conventional Health and Safety	0 NNCs
CNL-PHAI-PGP-2022-02 Remediation Verification of the Port Granby Former Waste Management Area	March 28 – April 8, 2022	• Environmental Protection • Physical Design	1 NNC

Table D-5: List of CNSC-led inspections at DPWF, G1WF and NPDWF*

Inspection	Dates	SCAs Covered	Number of Notice of Non-Compliance (NNCs)
CNL-DP-2022-01 General Inspection at Douglas Point Waste Facility	February 15 – 16, 2022	• Waste Management • Management System • Fitness for Service	3 NNCs
CNL-DP-2022-02 General Inspection at Douglas Point Waste Facility	July 25 – 27, 2022	• Environmental Protection • Radiation Protection • Conventional Health and Safety • Waste Management • Operating Performance	4 NNCs
G1WMF-NSD-T2-2022-001	N/A	• Security	N/A
**No inspections were performed at NPDWF in 2022.*			

Table D-6: List of IAEA-led inspections at CNL Sites

SITE/ Facility/ Project	IAEA inspections (CNSC Escort)
CRL	51 (9) (9 others supported remotely)
WL	3 (1) (2 others supported remotely)
PHP	2 (0) (2 supported remotely)
PGP	1 (1)
DPWF	2 (0) (2 supported remotely)
G1WF	2 (0) (2 supported remotely)
NPDWF	0
TOTAL	**61 (11)**

E. REPORTABLE EVENTS

This appendix contains information on the number of reportable events at the CNL sites covered by this ROR, in the 2022 calendar year. CNL is required to report events as per the *General Nuclear Safety and Control Regulations* [27], and, if applicable to the site, the criteria outlined in CNSC REGDOC-3.1.2, *Reporting Requirements, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills* [11] or CNSC REGDOC-3.1.3, *Reporting Requirements for Waste Nuclear Substance Licensees, Class II Nuclear Facilities and Users of Prescribed Equipment, Nuclear Substances and Radiation Devices* [37]. A total of 59 events were reported to and assessed by CNSC staff in 2022. CNSC staff, determined that there was no risk to the environment, nor the public associated with these events.

Table E-1: Number of reportable events at each CNL site in 2022

Site/Facility/Project	Number of events
Chalk River Laboratories	39
Whiteshell Laboratories	3
Port Hope Project	14
Port Granby Project	3
Douglas Point Waste Facility	0
Gentilly-1 Waste Facility	0
Nuclear Power Demonstration Waste Facility	0
TOTAL	59

Table E-2: Reportable events at CRL in 2022

Event Number	Title	CRL Event summary	SCA
1 HSSE-22-2889	Expanded 5 Gallon Secondary Container Found	A 5-gallon container was discovered to be bulging at the bottom of the pail presenting a pressure hazard and possible contamination. The building was evacuated. An Incident Action Plan was executed by moving the container to a ventilated and isolation room with effluent monitoring where the container was safely relieved of pressure. CNL staff took corrective action to prevent recurrence of the event and performed a full investigation. CNSC staff are satisfied with the actions completed.	Conventional Health and Safety
2 HSSE-22-1551	CNL Employee Trip and Fall Injury	A CNL employee was walking away from their workstation when their toe caught the floor and caused them to stumble, lose balance, and fall to the floor hitting their face and shoulder. The employee's colleagues provided initial care and activated emergency response where CNL's security, fire protection and health centre responded followed by Renfrew County Paramedics. An investigation of the accident area revealed no workplace factors which would contribute to the employee's fall. It was determined that the cause was an unprovoked stumble. CNSC staff are satisfied with CNL's response to the event and conclusion.	Conventional Health and Safety

Event Number	Title	CRL Event summary	SCA
3 HSSE-22-0089	Underground Fire Water Impairment South Loop	The CRL Fire Department was notified of a service water leak from fire water piping caused by repeated freezing and thawing of the ground. The CRL Fire Department implemented an impairment plan to compensate for the impaired hydrants due to the damaged fire water piping. Repairs to the firewater line were completed. CNSC staff are satisfied with the corrective measures taken by CNL.	Emergency Management and Fire Protection
4 HSSE-22-0108	Unplanned Sprinkler Impairment	A damaged building sprinkler head was discovered caused by ice buildup in the sprinkler pipe due to a defective heater in that area of the building. CNL implemented an impairment plan to compensate for the out of service sprinkler until repairs were completed for the sprinkler and heater. CNSC staff are satisfied with the corrective measures taken by CNL.	Emergency Management and Fire Protection
5 ERM-22-0386	Unplanned Level Increase in Liquid Storage Tank	A ruptured fire water line resulted in an unplanned level increase in a liquid storage tank. CNL staff transferred contents from tank 4 to other holding tanks within the Active Drainage system to restore the tank level to its previous volume. Abandoned piping to the liquid storage tank were cut and capped to prevent any recurrence. There were no effects on health, safety and security of persons,	Emergency Management and Fire Protection

Event Number	Title	CRL Event summary	SCA
		or the environment resulting from this event. CNSC staff are satisfied with the corrective measures taken by CNL.	
6 HSSE-22-0317	Chalk River Laboratories Emergency Operations Centre Activation Due to a Fire Water Line Break	A fire water line break was identified and isolated by the CRL Fire Department. No water or other anomalies were discovered in any of the surrounding buildings and areas, except for water entering a liquid storage tank. The breach of the Fire Water Service line has been attributed to repeated freezing and thawing cycles. There were no effects on health, safety and security of persons, or the environment resulting from this event. CNSC staff are satisfied with the actions taken by CNL.	Emergency Management and Fire Protection
7 HSSE-22-0772	External Fire Water Main Break	A fire water break was identified in the CRL Controlled Area and was isolated by the CRL Fire Systems Team Fire Department. An underground fire water line had a break due to ground movement from frost build-up and heavy equipment traffic. The CRL Fire Department was immediately dispatched and the fire service water was isolated by closing valves. Water samples were collected and all sample analysis test results indicated there was no contamination present above the exemption limits. CNSC staff are satisfied with CNL's	Emergency Management and Fire Protection

Event Number	Title	CRL Event summary	SCA
		actions.	
8 CTA-22-1074	Active Materials stored without a required Fire Hazard Analysis	Radium-226 material was found to be stored in a CRL building during a fire assessment walkdown. The material was moved to a concrete structure within the building with ventilation, heating, and radiation detection equipment, and contained within Special Form Capsules in a Type A Shipping Package. A Fire Hazard Assessment has been completed and submitted after the Radium-226 was moved under Fire Protection supervision. CNSC staff are satisfied with CNL's actions.	Emergency Management and Fire Protection
9 HSSE-22-1499	CRL Site-Wide Loss of Class IV Power	Power was lost at the CRL site due to a severe storm damaging electrical infrastructure off-site. Emergency backup power immediately came online and was confirmed to be operating as intended. Although the storm itself did not damage the CRL site, the off-site electrical infrastructure was significantly damaged resulting in loss of Class IV Power. CNSC staff were contacted by CNL and reported of the event. There were no effects on the health, safety and security of persons or the environment. CNSC staff are satisfied with CNL's response.	Emergency Management and Fire Protection

Event Number	Title	CRL Event summary	SCA
10 HSSE-22-1714	CRL Building Fire Alarm Panel Battery Failure	A CRL building fire alarm panel battery failed during the planned annual site-wide electrical outage. Due to the need for replacement of fire alarm panel batteries at set intervals, the Fire Protection Program had Fire Systems Staff on-site throughout the outage to rapidly perform battery replacements as required. Staff identified and replaced the battery which re-established fire panel monitoring. The fire panel, which reports fire alarms for several buildings, was impaired for 15.5 hours. CNSC staff are satisfied with the actions completed.	Emergency Management and Fire Protection
11 HSSE-22-2051	CRL Building Linear Heat Detector Impairment	CRL Fire Operations responded to a Linear Heat Detector activation alarm at a CRL building tunnel. There was no evidence of any hazards and the detector was determined to be in a fault due to nearby leaking steam in the tunnel. The detector was repaired during a steam shutdown. CNSC staff are satisfied with the corrective measures taken by CNL.	Emergency Management and Fire Protection
12 HSSE-22-2619	Lightning Strike on CRL Building Radio Tower Resulted in Loss of Fire Alarm Monitoring	During a thunderstorm, the radio tower at a CRL building was struck by lightning. This resulted in loss of fire detection, alarms and monitoring in several CRL buildings on the same fire-alarm loop. CNL implemented compensatory measures and fire alarm system components	Emergency Management and Fire Protection

Event Number	Title	CRL Event summary	SCA
		were inspected and replaced as required, followed by the restoration of fire detection, and monitoring to buildings. CNSC staff are satisfied with the corrective measures taken by CNL.	
13 S&T-22-2951	Digital Thermocouple Caught Fire in CRL Building	A fire occurred on top of an operating furnace at a CRL building shortly after initiating the heating up process for the unit and CNL staff activated the fire alarm. The fire was extinguished immediately by the staff using a portable ABC extinguisher. CNL conducted a follow up investigation and implemented corrective actions to prevent a similar recurrence. CNSC staff are satisfied with the actions completed.	Emergency Management and Fire Protection
14 HSSE-22-3198	Thermostat Failure Results in Portable Heater Fire in CRL Building	CNL staff were investigating a malfunctioning 600 V barrel heater and observed it igniting into flames. The fire did not spread beyond the heater and there were no combustibles in the area. CNL staff extinguished the fire and disconnected the electrical supply to the heater. A fire investigation was initiated, and the use of barrel heaters was paused across the site. CNL implemented corrective and compensatory actions as a result. CNSC staff are satisfied with the corrective measures taken by CNL.	Emergency Management and Fire Protection

Event Number	Title	CRL Event summary	SCA
15 HSSE-22-3810	Underground Fire Water Line Break Near CRL Building	CRL Fire Operations responded to a fire water break near the CRL Powerhouse. The water break was isolated by the fire department within one hour of the issue being identified and CNL proceeded to isolate the storm-water management pond. The EOC was activated to manage the impacts of the high volume of water at the site, to ensure the water had not entered any nuclear facilities, and to coordinate the collection of water samples at various locations for analysis. All water sample analysis results confirmed that the water was not contaminated. CNSC staff are satisfied with the actions completed.	Emergency Management and Fire Protection
16 ERM-22-1151	Non-Radiological Liquid Effluent Monthly Licence Condition Handbook Reference Limit Exceedance at the Waste Treatment Center for Mercury	The monthly average for mercury released for the final effluent of the Waste Treatment Center Liquid Waste Evaporator was measured at 0.00155 mg/L, exceeding the Action Level of 0.001 mg/L. There was no impact to human health or the environment from the release of the impacted batches due to dilution at the Process Outfall. Additional administrative controls were implemented to prevent recurrence while the investigation continued. CNL identified and resolved the root causes of the exceedances and has resumed normal operations. CNSC staff are	Environmental Protection

Event Number	Title	CRL Event summary	SCA
		satisfied with the corrective measures taken by CNL	
17 ERM-22-0575	Small Pipe Rupture Resulting in Release of Contaminated Groundwater	The re-circulation pump and heat tracing simultaneously failed, resulting in a line rupture. Between 10 L and 40 L of contaminated groundwater at 1500 Bq/L was released to the ground. CNL committed to cleaning the soil. CNSC staff concluded the event had a low safety significance and did not result in an increased risk to the environment due to the low volume, and that the water leaked in the same area where the groundwater originated. CNSC staff will follow up on the cleanup and repair activities during future compliance inspection activities.	Environmental Protection
18 ERM-22-1620	Severe heavy rainfall overfills secondary containment	Due to a severe rainfall event, secondary containment surrounding 2 shipping containers holding radiologically contaminated waste overfilled and discharged onto the surrounding soil. Samples of the water were collected and analyzed. Soil around the containers was monitored and no radioactive levels were detected. There was no impact on health, safety and security of persons. CNSC staff are satisfied with the CNL's actions.	Environmental Protection

Event Number	Title	CRL Event summary	SCA
19 HSSE-22-2658	Tritium Sample Inadvertently Released Down Sanitary Drain	A 125 mL urine sample that was intentionally spiked with tritium as part of a performance test required by CNL's Dosimetry Services was inadvertently disposed into a sanitary drain. The effect on the health, safety, and security of persons is low due to the small quantity of radioactivity released. The sample was not properly segregated due to lack of written instructions and insufficient communication during task hand-over. CNL ensured that all samples in the bioassay laboratory with high measurements were stored properly with instructions. Operating experience was communicated to CNL staff on the segregation of samples. In addition, a procedure describing the receipt of bioassay samples in the laboratory was updated to include written instructions relating to the segregation of samples. CNSC staff are satisfied with CNL's actions.	Environmental Protection
20 ERM-22-1798	Damaged Conduit Discovered in CRL Building Main Stairwell	CNL Workers attempted to push a loose conduit bracket back into place and caused an electrical short circuit which tripped the circuit breaker. CNL implemented corrective actions to prevent a similar recurrence. CNSC site inspectors conducted a walkdown of the area where the event occurred and	Human Performance Management

Event Number	Title	CRL Event summary	SCA
		discussed the event with CNL staff. CNSC staff are satisfied with CNL's actions.	
21 ERM-22-0645	Vehicle Driven Over Snow Covered Tile Holes at Waste Management Area	A Radiation Surveyor Trainee drove over the tile holes in the waste management area while performing routine surveys due to limited visibility caused by a significant snowfall. Following the event, contamination checks of the area were done as well as visual inspections of structures and no issues were noted. To prevent these types of events from occurring in the future, when there is significant snowfall, the Radiation Surveyor will accompany the snowplow operator, and at all other times there will be two individuals in the surveying vehicle. CNSC staff are satisfied with the corrective measures taken by CNL	Human Performance Management
22 S&T-22-1226	Ac-225 Product Shipments Delivered to Incorrect Customers	Two product shipments of Ac-225 were sent to separate customers. Upon review of the documentation for the shipments, it was determined that the 2 product vials were swapped in error. Radiobiology and Health began an investigation into the event and Actinium shipments were halted until the cause of the error could be identified. It was determined that there were no effects on the health, safety and security of persons or the environment as the packaging used was	Human Performance Management

Event Number	Title	CRL Event summary	SCA
		appropriate for both shipments. CNL took corrective action to prevent future recurrence and CNSC staff are satisfied with the corrective measures taken by CNL.	
23 CTA-22-1423	Non-compliance with reporting requirements for CNL Program Description Document	The Training and Development Program Description Document was submitted to the CNSC 6 days after it was implemented rather than at the time of implementation. CNL performed an extent of condition of management system document submissions and reported this to the CNSC and updated their regulatory reporting process steps within the Information Management implementation documents to prevent recurrences. CNSC staff are satisfied with the corrective measures taken by CNL.	Management System
24 S&T-22-1768	Unauthorized access and usage of gamma cell irradiation facility	A CNL employee, without proper authorization, was permitted to access the gamma cell irradiation facility and operate the gamma cell without proper oversight. The safety and security issues associated with this event were discussed with both employees and their facility access was revoked. To prevent recurrences, both employees received gamma cell training followed by a 6-month probationary period, and a site-wide OPEX was issued. CNSC staff are	Management System

Event Number	Title	CRL Event summary	SCA
		satisfied with the corrective measures taken by CNL.	
25 ERM-22-1457	Missing Record of Visual Inspection for Waste Management Area B	In preparation for a CNSC Inspection of WMA B (CNL-CRL-2022-06), CNSC staff requested records of routine safety inspections conducted by CNL. CNL stated that the inspection took place as required, but no record of this first-quarter inspection was available. CNL provided a new revision of the Routine Inspection, Radiological Monitoring and Surveillance procedure for the waste management areas, which was updated to include a summary table of all inspections conducted, the inspection frequency and the inspection form reference. CNSC staff verified that visual inspections are now recorded in the form as per CNL's revised procedure. CNSC staff are satisfied with the corrective measures taken by CNL.	Management System
26 ERM-22-0165	Temporary Loss of Power to NRU Emergency Air Filtration System Fans	Electrical power was lost to the Dedicated Isotope Facility (DIF) causing the operating NRU reactor Exhaust Air Filtration System (EAFS) Fans to shutdown unexpectedly. It is required that a minimum fan configuration of 1 EAFS fan shall be maintained in operation. Power was restored to the DIF and the NRU EAFS Fans restarted to the normal operating	Operating Performance

Event Number	Title	CRL Event summary	SCA
		configuration. CNSC site inspectors conducted a walkdown of the area where the event occurred and discussed the event with CNL staff. CNSC staff are satisfied with the corrective measures taken by CNL.	
27 ERM-22-0866	Incoming Dangerous Goods Package Labels Obscured by Other Packing Labels	A consignment of radioactive standards was received at CRL including an incoming package containing standards of low radioactivity. The package was received but the required label identifying the package as a dangerous good was not visible and had been obscured by other labels used while shipping. As the package was expected to be radioactive, all normal operating procedures were taken to receive the package safely with the proper surveying. There was no damage to the packaging and CNL took corrective actions to prevent recurrence of the event. There were no impacts on health, safety and security of persons or the environment. CNSC staff are satisfied with the corrective measures taken by CNL.	Packaging and Transport
28 S&T-22-0209	Area Radiation Monitor discovered past due calibration	A radiation monitor remained in service past its calibration due date. CNL replaced the monitor, verified the calibration dates of other radiation monitors, and evaluated calibration strategies used across CNL to ensure routine calibrations are	Radiation Protection

Event Number	Title	CRL Event summary	SCA
		performed on time. CNSC staff are satisfied with the corrective measures taken by CNL.	
29 S&T-22-1120	Skin contamination following an undesired chemical reaction in fume hood	A bottle containing consolidated waste solutions ruptured in a laboratory fume hood. A technologist received contamination in their hair and on their hand. The technologist notified their supervisor and contacted Radiation Protection and the Health Physicist. The technologist was instructed to shower, and Radiation Protection confirmed that the contamination was removed, and the worker was cleared to return to work. The committed effective dose was determined to be less than 1 mSv for the technologist. CNL issued a stop work order and performed an extent of condition to ensure work scope and work control practices are in place for all S&T laboratories. CNSC staff are satisfied with the corrective measures taken by CNL.	Radiation Protection
30 S&T-22-1271	Accessible Dose Rates Above 2.5 mrem/h Discovered Outside CRL Building	A radiation surveyor detected unposted radiation fields in an accessible area outside of a miscellaneous storage building at CRL. The field was due to the storage inside the building of drums containing radium needles. CNL put appropriate barriers and signage in place. CNSC staff are satisfied with the	Radiation Protection

Event Number	Title	CRL Event summary	SCA
		corrective measures taken by CNL.	
31 HSSE-22-3741	Instrument found in use beyond its calibration date	The calibration date for swipe castle E4133 expired on November 11, 2022. The instrument remained in service and utilized in the facility until December 2, 2022 during which the equipment functioned as intended and passed its weekly source checks. CNL Radiation Protection (RP) performed an extent of condition on all RP instrumentation to confirm that they are all within their calibration due dates. Coaching from RP Management to RP staff was done on the importance of calibration due date checks. CNL provided an update on the corrective actions during a RP focused meeting held on March 9, 2023 and CNSC staff are satisfied with the corrective actions taken by CNL.	Radiation Protection
32 ERM-22-1763	IAEA Measuring Equipment Damaged	Four spent driver fuel were being loaded into a sealed Rod Storage Can for transport to CRL WMAs. An IAEA inspector and CNL staff were performing fuel composition measurements using a detector tool when the detector accidentally contacted a component of the Rod Bay purification system. The measurement tool was damaged rendering it inoperable. A spare detector	Safeguards and Non-proliferation

Event Number	Title	CRL Event summary	SCA
		was used to complete measurements. CNL took corrective actions to prevent recurrence of the event. There were no impacts on health, safety and security of persons or the environment. CNSC staff are satisfied with the corrective actions taken by CNL.	
33 BUS-MGMT-22-2253	Unclear Wording in Import Licence Leads to an Exceedance in Maximum Uranium Content in Samples	The CNL-CRL site received an import of samples from the IAEA for a forensic exercise. The samples contained 5.5 g of uranium enriched with 0.19 g of uranium-235. The import licence indicated that 1 g of enriched uranium could be imported. CNSC staff requested clarification on the amount of enriched uranium imported. CNL mistook the wording to mean 1 g of uranium-235 and not 1 gram of total uranium. CNL reviewed all current import and export licences with enriched uranium to ensure there were no other issues. There were no impacts on health, safety and security of persons or the environment. CNSC staff are satisfied with the corrective actions taken by CNL.	Safeguards and Non-proliferation

Event Number	Title	CRL Event summary	SCA
34 ERM-22-2680	IAEA Seal Cable Found Damaged	Work was in progress in the NRU Rod Bays involving receipt of a pressure tube and end fitting components from Building 234 Universal Cells using a fuel flask subject to IAEA safeguards controls. During transit activities, a CNL operator discovered that the seal on the top of the flask was damaged from accidental contact between the hoist cable. CNL performed an investigation and took corrective actions to prevent future recurrence of the event. There were no impacts on health, safety and security of persons or the environment. CNSC staff are satisfied with the corrective actions taken by CNL.	Safeguards and Non-proliferation
35 ERM-22-2366	Waste Management Area D and H Recoverable Surface Storage Area Non-Nuclear Criticality Controlled Area Exceedance	During a review of the inventory for CRL WMA D and H above ground waste storage areas, CNL identified that the non-nuclear criticality-controlled area limit (100 g) of fissile nuclides in special fissionable materials (SFM) had been exceeded. CNL halted acceptance of waste containing FM/SFM within WMA D and H until a criticality safety analysis is completed along with 8 remedial and corrective actions (with a final completion due date by August 31, 2023) to prevent recurrence of similar events. CNSC staff's review of the event's full report raised	Safety Analysis

Event Number	Title	CRL Event summary	SCA
		several questions and comments for CNL's disposition. CNL proposed to arrange a meeting to answer and clarify CNSC staff questions, which was held in March 2023. CNSC staff will continue to perform compliance oversight until satisfied with CNL's corrective action plan.	
36 HSSE-22-2660	Unauthorized Site Access	The details of this event are Classified-Confidential.	Security
37 HSSE-22-2779	Unauthorized Site Access	The details of this event are Classified-Confidential.	Security
38 HSSE-22-3486	Unauthorized Site Access	The details of this event are Classified-Confidential.	Security
39 HSSE-22-3023	Security Equipment Failure	The details of this event are Classified-Confidential.	Security

Table E-3: Reportable events at WL in 2022

Event Number	Title	WL Event summary	SCA
1 ERM-22-1559	Worker Received Electrical Shock from Non-isolated Electrical Source	CNL workers were performing planned maintenance on a pump when a worker experienced an electrical shock to both hands. The worker was assessed by First Aid Responders, and they deemed the worker fit to return to normal duties with no further medical attention needed. It was determined that an electrical circuit related to the pump motor was not isolated via lock out tag out procedures to remove the hazard to workers. CNL has proposed a corrective action plan and implemented compensatory measures to ensure planning and work control documents are reviewed in detail and approved in signature by a member of WL management before work can proceed. CNSC staff will be performing compliance and implementation oversight of CNL's action plan.	Conventional Health and Safety
2 ERM-22-3469	Annual 3rd Party Inspection of Fire Devices Overdue	An annual fire devices inspection was delayed due to contractor workers' security clearances being outstanding. Discussions between CNL and the contractor took place to rectify the situation; however, the deadline for inspection completion was not met. The inspection was completed at the next opportunity. There has been no safety consequence because of the non-conformance. Due to the other fire device tests that are performed there, this is a low-level risk. CNSC staff are satisfied with the actions taken by CNL.	Emergency Management and Fire Protection

Event Number	Title	WL Event summary	SCA
3 HSSE-22-3025	Continuous Air Monitor in Whiteshell Laboratories Shielded Facility Waste Compactor Area Operated Past Calibration Due Date	A beta and gamma continuous air monitor (CAM) in the WL Shielded Facility waste compactor area was identified to be operating 12 days past its annual calibration due date, CNL staff had identified the CAM to be due for removal and replacement within the WL instrument calibration database, however the CAM was missed because of a temporary change in personnel assignments. There was no safety consequence because of the non-conformance. There was no waste processing during this period. The monitor was removed out of service and replaced with a calibrated instrument. An extent of condition was performed and confirmed there were no other in-service radiation protection instruments past their calibration due date on the WL site. CNSC staff are satisfied with the corrective measures taken by CNL.	Operating Performance

Table E-4: Reportable events PHP in 2022

Event Number	Title	PHP Event summary	SCA
1 ERM-22-3304	Fire Alarm Call to 228 Cavan Street, Port Hope (Pine Street Extension Site)	A building fire alarm sounded due to low voltage battery alarm. The building was provided the all clear by Fire Services and the alarm was cleared by CNL's monitoring service. The low voltage battery alarm was serviced. CNSC staff are satisfied with the corrective actions taken by CNL.	Emergency Management and Fire Protection

Event Number	Title	PHP Event summary	SCA
2 ERM-22-2149	39 Hayward Street – False Fire Alarm Event	A fire alarm indication was activated on the upper floor of the 39 Hayward Street field office. Fire and Emergency Services personnel determined that there was no fire in the field office and the site was secured. CNSC staff are satisfied with the corrective measures taken by CNL to prevent a similar event in the future.	Emergency Management and Fire Protection
3 ERM-22-2126	Port Hope Waste Water Treatment Plant Toxicity test failure of effluent	Final effluent sampling done in the low storage pond resulted in 100% mortality to Daphnia magna zooplankton, where a result of < 50% mortality is considered non-toxic. This resulted in a halt to releases to the environment. CNL has reviewed the factors that may have contributed to this toxicity failure and has concluded that the 100%-mortality test result was due to a lab error. Following 7 consecutive days of toxicity sampling where all toxicity tests were passed with zero mortality, CNL resumed normal plant operations. CNSC staff are satisfied with the actions taken by CNL.	Environmental Protection
4 ERM-22-3601	Gasoline Spill into Port Hope Harbour	A spill of less than 1 L of gasoline occurred from a boat at the Port Hope Harbour. There was no effect on the health, safety or security of persons or the environment. The visible gasoline was remediated from the water body. The affected boat and motor have been removed from service until an assessment and repair or replacement is completed. Site staff were	Environmental Protection

Event Number	Title	PHP Event summary	SCA
		reminded to continue to conduct equipment inspections prior to each operation. CNSC staff are satisfied with the corrective actions taken by CNL.	
5 ERM-22-1705	Arsenic Action Concentration Exceedance	During routine compliance sampling at the Port Hope waste water treatment plant (WWTP), it was determined that arsenic concentration in the final effluent from the plant for the week ending on June 7, 2022 was 41.5 ppb and thus exceeded the regulated weekly composite action concentration limit of 41 ppb. CNL took immediate corrective action and split the flow of effluent to the old Port Hope WWTP which lowered arsenic concentrations to below the action level. CNL posted a public disclosure to the PHAI website. CNSC staff are satisfied with the corrective actions taken by CNL.	Environmental Protection
6 ERM-22-1841	Environmentally Safe Vegetable Oil-Based Rock Drill Lubricant Spill	An environmentally safe vegetable oil-based rock drill lubricant spill from a drill head occurred on a drill barge. An estimated 0.6 L of oil was released to the inner harbour. Work stopped immediately when the spill was identified, and spill containment was installed. CNL took corrective action through spill contingency and equipment maintenance. There was no risk	Environmental Protection

Event Number	Title	PHP Event summary	SCA
		to human health or the environment because of this spill. CNSC staff are satisfied with the corrective measures taken by CNL.	
7 ERM-22-1698	Waste Water Treatment Plant Exceedance Of Discharge Criteria In Plant Effluent (Copper And Zinc)	CNL determined that the final effluent produced by the WWTP for the week ending on June 1, 2022 exceeded the weekly composite release limit for copper and the action level for zinc. The source of the elevated copper and zinc concentrations was due to corroding brass components on the treated effluent side of the WWTP, therefore was not related to water influent requiring treatment. CNL isolated the brass components in the cooling loop and the copper and zinc levels returned to normal operating levels. Corrective measures were put in place until the brass components could be replaced. CNSC staff are satisfied with the information provided and corrective measures taken by CNL to prevent a similar event in the future.	Environmental Protection
8 ERM-22-2612	Boiler Condensate Tank Overflow	During a routine walkdown, CNL operations staff observed water leaking from a treated water boiler steam vent piping at the Port Hope WWTP. An automatic valve failed to open and caused the tank to overflow. The spilled water entered a storm sewer drain and was contained within the system. CNL immediately shut down the boiler and drained the tank. The faulty valve was replaced. No water was observed to be released off site with the	Fitness for Service

Event Number	Title	PHP Event summary	SCA
		single discharge location noted to be free of standing water. CNSC staff are satisfied with the corrective actions taken by CNL.	
9 ERM-22-1960	Port Hope Pine Street Extension Temporary Storage Site - Delayed Submission of Annual Compliance Monitoring Report (ACMR)	CNL staff did not meet the deadline to submit the 2021 ACMR for the Pine Street Extension Temporary Storage Site Waste Nuclear Substance Licence, WNSL-W1-182.0/2022, by March 15 as required by the licence conditions handbook and was instead submitted March 31. CNL staff have taken corrective action to review, communicate, and track ACMR deadlines on an annual basis. CNSC staff are satisfied with the corrective measures taken by CNL to prevent a similar event in the future.	Operating Performance
10 ERM-22-3086	Misclassification of LSA-I Material	A shipment consisting of 50 bags of personal protective equipment was misclassified by a CNL sub-contractor. The shipment was travelling from the PHAI Harbour Center Pier Site to the Long-Term Waste Management Facility (LTWMF) in Port Hope in a covered and secured dump-truck box. The misclassification did not change the way the material was required to be	Packaging and Transport

Event Number	Title	PHP Event summary	SCA
		handled and there was no risk to workers, the public and the environment. CNSC staff are satisfied with CNL's corrective actions to ensure its contractors' packaging and transport procedures and CNL's supplier operating procedure are revised to ensure it is compliant with the *Packaging and Transport of Nuclear Substances Regulations, 2015*.	
11 ERM-22-1033	Failure to Provide CNSC Written Notification Of Licence Document Revision (Wooden Pallet Placement)	During a CNSC inspection, a CNSC inspector observed wooden pallets supporting supersacks of Cameco waste being placed into the Port Hope LTWMF, which is a deviation from one of CNL's detailed design description report documents that was previously accepted by CNSC staff. CNL failed to provide written notification to CNSC of this change to this licensing basis document as required by the PHP licence WNSL-W1-2310.02/2022. As a result of this finding, CNL submitted an event report on its failure to provide written notification. CNL is compiling a fulsome extent-of-condition report to identify if other licensing basis documents require revision and if any licensing documents have been revised and not provided to CNSC staff as required.	Physical Design
12 ERM-22-2507	Sub-Contractor Hand Scrape in Radiological (RP) Zone 3	A sub-contractor at a small scale site was holding a vacuum for dust control, while another worker was using a drill with a wire wheel to remove	Radiation Protection

Event Number	Title	PHP Event summary	SCA
		contamination from the foundation of a concrete block. During the decontamination process, the wire wheel slipped causing a fracture to the hand of the worker holding the vacuum. This resulted in a lost-time injury. CNL took corrective action and requested the contractor to determine appropriate tools and personal protective equipment to prevent a similar event from occurring again. CNL confirmed that the contractor took significant corrective actions to prevent the recurrence, which included adding an extension to the vacuum hose to keep the worker's hand further away from the drill's wire wheel and adding a second grip to the drill to give the operator better control of the drill. CNL also released an operating experience bulletin to all CNL sites and contractors with a summary of the event, causes and lessons learned. CNSC staff are satisfied with the corrective actions taken by CNL.	
13 ERM-22-3994	PHAI perimeter fences down at various project sites due to winter storm	Due to a severe winter storm, PHAI perimeter fences were temporarily down across several worksites. The severity of the storm prevented immediate safe restoration of the fencing. Contractor security providers were stationed near where the fences were down at the Harbour and the Viaduct sites excavations and radiation zones to mitigate unauthorized access. CNL has repaired the perimeter fencing and is working to improve the	Security

Event Number	Title	PHP Event summary	SCA
		robustness of the fencing. There were no adverse effects on the health, safety and security of persons or the environment. There was no evidence of public access to any of the sites. CNSC staff are satisfied with the corrective actions taken by CNL.	
14 ERM-22-2209	Attempted Trespassing	An individual known to PHAI staff and Port Hope police attempted to gain access to the Port Hope Harbour and Centre Pier site. The individual was stopped from gaining entry by the front gate attendant and turned away by a site security guard. Port Hope Police were notified of the incident and were able to track down and speak with the individual. There was no loss or breach of security at the Harbour Centre Pier. CNSC staff are satisfied with the actions taken by CNL.	Security

Table E-5: Reportable events PGP in 2022

Event Number	Title	PGP Event summary	SCA
1 ERM-20-3094	Water Collection Line Struck and Severed During Excavation	During excavation near the PGP mound a leachate pipe was damaged. Pumps were used to pump water away and divert it into the EQ pond. There were no injuries or contamination events to personnel because of this event. Following the repair of the line, the area was checked for contamination and all impacted material was removed. Following this removal, soil samples were taken and analyzed by a third-party laboratory to confirm the area was clean. CNSC staff are satisfied with the corrective actions taken by CNL.	Operating Performance
2 HSSE-22-0145	Shipment of Unclassified Material	A shipment containing process residual waste from the PGP LTWMF was shipped to the PHP LTWMF, as part of the ongoing effort to demobilize the equipment from the PGP LTWMF site. It was revealed during the paperwork consolidation that 7 of the 14 totes on the shipment had not been classified in accordance with the Off-site Transportation of Dangerous Goods Standard (900-508520-STD-001). The 7 waste packages were correctly packaged in Industrial Packaging 2; however, the associated shipping documentation did not identify them as contents of the consignment. CNL took corrective action to investigate the event to verify package contents and the adequacy of packaging and documentation. CNL also introduced a handler verification system to ensure correct packages	Packaging and Transport

Event Number	Title	PGP Event summary	SCA
		are loaded. CNSC staff are satisfied with the corrective actions taken by CNL to prevent a similar event in the future.	
3 ERM-22-2811	Port Granby Long-Term Waste Management Facility Security Breach	Overnight, a security event occurred at the PGP LTWMF that involved an unidentified male gaining access to the site. Contracting staff arriving at the site the morning after discovered that the contractor's lunchroom trailer doors were locked, which was not typical. It was noticed that the far door to the trailer was open and upon inspection, it was noted that bottled water had been consumed. Nothing else appeared disturbed, missing or stolen. There were no adverse effects on the health, safety and security of persons or the environment because of this event. CNSC staff are satisfied with the corrective actions taken by CNL to prevent a similar event in the future.	Security

Table E-6: Reportable events at DPWF in 2022

There were no reportable events for DPWF in 2022.

Table E-7: Reportable events at G1WF in 2022

There were no reportable events for G1WF in 2022.

Table E-8: Reportable events at NPDWF in 2022

There were no reportable events for NPDWF in 2022.

F. RATING DEFINITIONS

The CNSC applies rating levels as follows:

Satisfactory (SA): The 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.
- The 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:

- The 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.

G. SAFETY AND CONTROL AREA RATINGS

Note that the following acronyms are used in this appendix:

SA = satisfactory

BE = below expectations

UA = unacceptable

Table G-1: Safety and control area summary, CRL, 2018-2022

Safety and control areas	2018	2019	2020	2021	2022
Management system	SA	SA	SA	SA	SA
Human performance management	SA	SA	SA	SA	SA
Operating performance	SA	SA	SA	SA	SA
Safety analysis	SA	SA	SA	SA	SA
Physical design	SA	SA	SA	SA	SA
Fitness for service	SA	SA	SA	SA	SA
Radiation protection	SA	SA	SA	SA	SA
Conventional health and safety	SA	SA	SA	SA	SA
Environmental protection	SA	SA	SA	SA	SA
Emergency management and fire protection	SA	SA	SA	SA	SA
Waste management	SA	SA	SA	SA	SA
Security	SA	SA	SA	BE	**BE**
Safeguards and non-proliferation	SA	SA	SA	SA	SA
Packaging and transport	SA	SA	SA	SA	SA

Table G-2: Safety and control area summary, WL, 2018-2022

Safety and control areas	2018	2019	2020	2021	2022
Management system	SA	SA	SA	SA	SA
Human performance management	SA	SA	SA	SA	SA
Operating performance	SA	SA	SA	SA	SA
Safety analysis	SA	SA	SA	SA	SA
Physical design	SA	SA	SA	SA	SA
Fitness for service	SA	SA	SA	SA	SA
Radiation protection	SA	SA	SA	SA	SA
Conventional health and safety	SA	SA	SA	SA	SA
Environmental protection	SA	SA	SA	SA	SA
Emergency management and fire protection	SA	SA	SA	SA	**BE**
Waste management	SA	SA	SA	SA	SA
Security	BE	BE	SA	BE	SA
Safeguards and non-proliferation	SA	SA	SA	SA	SA
Packaging and transport	SA	SA	SA	SA	SA

Table G-3: Safety and control area summary, PHP, 2018-2022

Safety and control areas	2018	2019	2020	2021	2022
Management system	SA	SA	SA	SA	SA
Human performance management	SA	SA	SA	SA	SA
Operating performance	SA	SA	SA	SA	SA
Safety analysis*	N/A	N/A	N/A	N/A	N/A
Physical design	SA	SA	SA	SA	SA
Fitness for service*	N/A	N/A	N/A	N/A	N/A
Radiation protection	SA	SA	SA	SA	SA
Conventional health and safety	SA	SA	SA	SA	SA
Environmental protection	SA	SA	SA	SA	SA
Emergency management and fire protection	SA	SA	SA	SA	SA
Waste management	SA	SA	SA	SA	SA
Security	SA	SA	SA	SA	SA
Safeguards and non-proliferation	SA	SA	SA	SA	SA
Packaging and transport	SA	SA	SA	SA	SA

*As per the LCH for the PHP, due to the scope of work under the licence, the safety analysis and fitness for service SCAs do not apply to the PHP.

Table G-4: Safety and control area summary, PGP, 2018-2022

Safety and control areas	2018	2019	2020	2021	2022
Management system	SA	SA	SA	SA	SA
Human performance management	SA	SA	SA	SA	SA
Operating performance	SA	SA	SA	SA	SA
Safety analysis*	N/A	N/A	N/A	N/A	N/A
Physical design	SA	SA	SA	SA	SA
Fitness for service*	N/A	N/A	N/A	N/A	N/A
Radiation protection	SA	SA	SA	SA	SA
Conventional health and safety	SA	SA	SA	SA	SA
Environmental protection	SA	SA	SA	SA	SA
Emergency management and fire protection	SA	SA	SA	SA	SA
Waste management	SA	SA	SA	SA	SA
Security	SA	SA	SA	SA	SA
Safeguards and non-proliferation*	N/A	N/A	N/A	N/A	N/A
Packaging and transport	SA	SA	SA	SA	SA

*As per the LCH for the PGP, due to the scope of work under the licence, the safety analysis, fitness for service, and safeguards and non-proliferation SCAs do not apply to the PGP.

Table G-5: Safety and control area summary, DPWF, 2018-2022

Safety and control areas	2018	2019	2020	2021	2022
Management system	SA	SA	SA	SA	SA
Human performance management	SA	SA	SA	SA	SA
Operating performance	SA	SA	SA	SA	SA
Safety analysis	SA	SA	SA	SA	SA
Physical design	SA	SA	SA	SA	SA
Fitness for service	SA	SA	SA	SA	SA
Radiation protection	SA	SA	SA	SA	SA
Conventional health and safety	SA	SA	SA	SA	SA
Environmental protection	SA	SA	SA	SA	SA
Emergency management and fire protection	SA	SA	SA	SA	SA
Waste management	SA	SA	SA	SA	SA
Security	SA	SA	SA	SA	SA
Safeguards and non-proliferation	SA	SA	SA	SA	SA
Packaging and transport	SA	SA	SA	SA	SA

Table G-6: Safety and control area summary, G1WF, 2018-2022

Safety and control areas	2018	2019	2020	2021	2022
Management system	SA	SA	SA	SA	SA
Human performance management	SA	SA	SA	SA	SA
Operating performance	SA	SA	SA	SA	SA
Safety analysis	SA	SA	SA	SA	SA
Physical design	SA	SA	SA	SA	SA
Fitness for service	SA	SA	SA	SA	SA
Radiation protection	SA	SA	SA	SA	SA
Conventional health and safety	SA	SA	SA	SA	SA
Environmental protection	SA	SA	SA	SA	SA
Emergency management and fire protection	SA	SA	SA	SA	SA
Waste management	SA	SA	SA	SA	SA
Security	SA	SA	SA	SA	SA
Safeguards and non-proliferation	SA	SA	SA	SA	SA
Packaging and transport	SA	SA	SA	SA	SA

Table G-7: Safety and control area summary, NPDWF, 2018-2022

Safety and control areas	2018	2019	2020	2021	2022
Management system	SA	SA	SA	SA	SA
Human performance management	SA	SA	SA	SA	SA
Operating performance	SA	SA	SA	SA	SA
Safety analysis	SA	SA	SA	SA	SA
Physical design	SA	SA	SA	SA	SA
Fitness for service	SA	SA	SA	SA	SA
Radiation protection	SA	SA	SA	SA	SA
Conventional health and safety	SA	SA	SA	SA	SA
Environmental protection	SA	SA	SA	SA	SA
Emergency management and fire protection	SA	SA	SA	SA	SA
Waste management	SA	SA	SA	SA	SA
Security	SA	SA	SA	SA	SA
Safeguards and non-proliferation	SA	SA	SA	SA	SA
Packaging and transport	SA	SA	SA	SA	SA

H. DOSES TO NUCLEAR ENERGY WORKERS AND NON-NUCLEAR ENERGY WORKERS AT CNL SITES

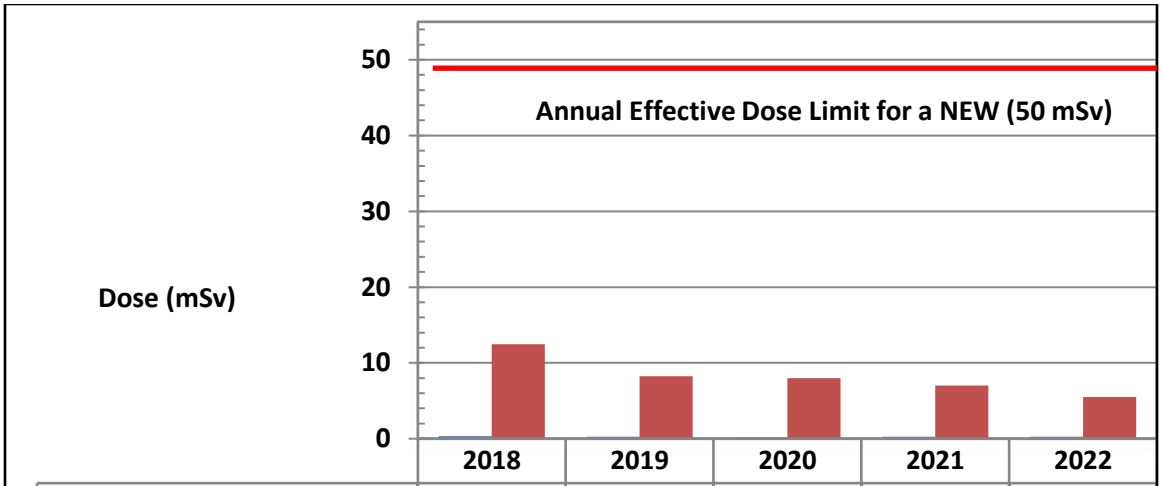
This appendix presents information on doses to Nuclear Energy Workers (NEWs) and non-NEWs at CNL sites.

Chalk River Laboratories

Radiation exposures of workers at the CRL site are ascertained, recorded and monitored to ensure compliance with CNSC's regulatory dose limits and to maintain radiation doses ALARA. External and internal dosimetry are provided by CNL's licensed dosimetry service.

At CRL, workers, including employees and contractors, conducting work activities which present a reasonable probability of receiving an occupational dose greater than 1 mSv/year are identified as NEWs. In 2022, the maximum effective dose received by a NEW was 5.48 mSv, well below the CNSC's regulatory effective dose limit for NEWs of 50 mSv in a 1-year dosimetry period. Figure H-1 provides the average and maximum effective doses received by NEWs at CRL from 2018 to 2022.

Figure H-1: Effective doses to NEWs at CRL from 2018 – 2022



	2018	2019	2020	2021	2022
Average Effective Dose (mSv)	0.34	0.27	0.16	0.27	0.26
Maximum Effective Dose (mSv)	12.48	8.23	7.97	7.01	5.48
Number of NEWs Monitored	4227	4071	3679	3957	4134

The dose fluctuations from year to year are attributed to the scope and duration of the radiological work conducted, along with the dose rates associated with the work. No adverse trends were identified in 2022.

Annual average and maximum equivalent doses to the skin and extremities (hands) for NEWs at CRL from 2018 to 2022 are provided in tables H-1a and H-1b. In 2022, the maximum skin dose received by a NEW at CRL was 32 mSv, and the maximum extremity dose received by a NEW at CRL was 11.50 mSv. Doses to the skin and

extremities at CRL were well below the CNSC's regulatory equivalent dose limit for NEWs of 500 mSv in a 1-year dosimetry period.

Table H-1a: Equivalent (skin) doses to NEWs at CRL from 2018 – 2022

Dose Data	2018	2019	2020	2021	2022	Regulatory Limit
Average skin dose (mSv)	0.40	0.29	0.19	0.31	0.28	N/A
Maximum skin dose (mSv)	15.84	9.65	9.37	7.43	32	500 mSv/year

Table H-1b: Equivalent (extremity) doses to NEWs at CRL from 2018 – 2022

Dose Data	2018	2019	2020	2021	2022	Regulatory Limit
Average extremity dose (mSv)	4.85	2.21	1.70	2.02	0.98	N/A
Maximum extremity dose (mSv)	44.83	21.38	11.86	28.30	11.50	500 mSv/year

Non-NEWs at CRL

In 2022, the maximum effective and equivalent (skin) doses received by a person not considered as a NEW was 0.44 mSv and 0.52 mSv, respectively, which is well below the CNSC's regulatory effective and equivalent dose limits for persons who are not NEWs of 1 mSv and 50 mSv, respectively, in one calendar year.

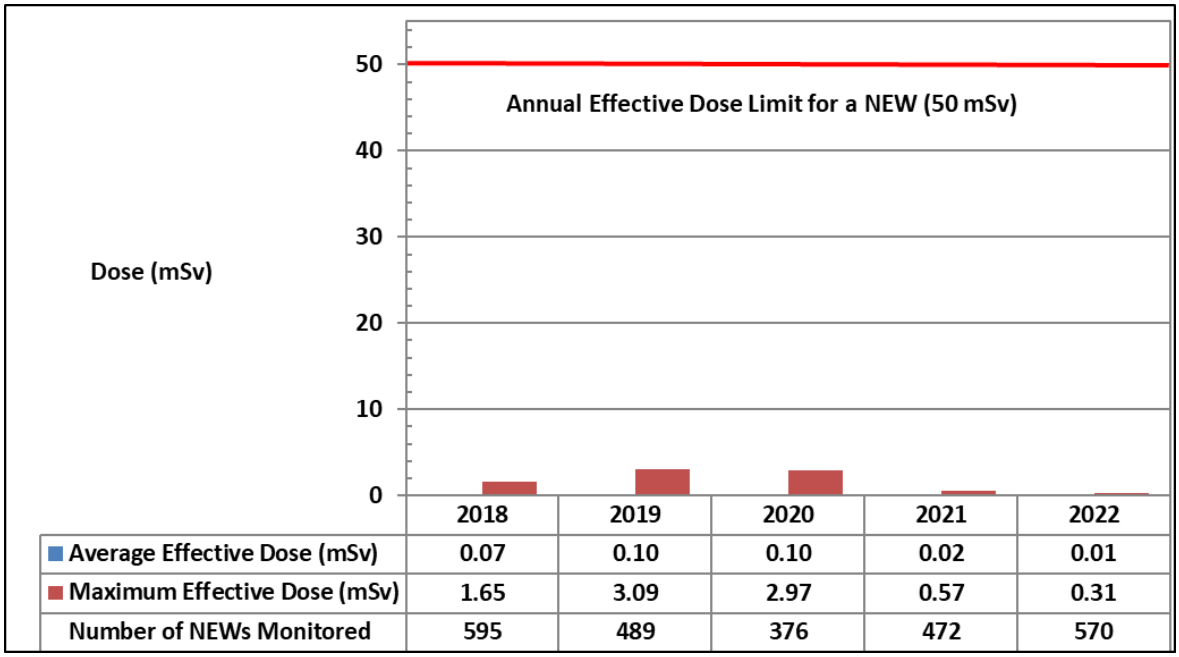
Whiteshell Laboratories

Radiation exposures of workers at WL are ascertained, recorded and monitored to ensure compliance with CNSC's regulatory dose limits to maintain radiation doses ALARA. WL uses CNL's licensed dosimetry services for external and internal dosimetry for site/facility staff and contractors.

At WL, workers, including employees and contractors, conducting work activities which present a reasonable probability of receiving an occupational dose greater than 1 mSv/year are identified as NEWs. In 2022, the maximum effective dose received by a NEW was 0.31 mSv, well below the CNSC's regulatory effective dose limit for NEWs of 50 mSv in a 1-year dosimetry period.

Figure H-2 provides the average and maximum effective doses received by NEWs at WL from 2018 to 2022.

Figure H-2: Effective doses to NEWs at WL from 2018 – 2022



	2018	2019	2020	2021	2022
Average Effective Dose (mSv)	0.07	0.10	0.10	0.02	0.01
Maximum Effective Dose (mSv)	1.65	3.09	2.97	0.57	0.31
Number of NEWs Monitored	595	489	376	472	570

The dose fluctuations from year to year are attributed to the scope and duration of the radiological work conducted. Worker doses decreased in 2022 with the site safety pause instituted in June. The main contribution to radiation doses to NEWs in 2022 was the replacement of hot cell roughing filters. There was continued waste handling with low level waste package removal and characterization activities; however, these activities had only a small contribution to NEW's doses.

Annual average and maximum equivalent doses to the skin and extremities (hands) for NEWs at WL from 2018 to 2022 are provided in Table H-2a and H-2b. In 2022, the maximum skin dose received by a NEW at WL was 0.66 mSv, and the maximum extremity dose received by a NEW at WL was 1.38 mSv. Doses to the skin and extremities at WL were well below the CNSC's regulatory equivalent dose limits for NEWs of 500 mSv in a 1-year dosimetry period.

Table H-2a: Equivalent (skin) doses to NEWs at WL from 2018 – 2022

Dose Data	2018	2019	2020	2021	2022	Regulatory Limit
Average skin dose (mSv)	0.12	0.20	0.16	0.02	0.02	N/A
Maximum skin dose (mSv)	3.72	7.47	6.80	0.94	0.66	500 mSv/year

Table H-2b: Equivalent (extremity) doses to NEWs at WL from 2018 - 2022

Dose Data	2018	2019	2020	2021	2022	Regulatory Limit
Average extremity dose (mSv)	5.02	4.80	1.43	0.45	0.27	N/A
Maximum extremity dose (mSv)	36.71	37.77	6.46	1.86	1.38	500 mSv/year

Non-NEWs at WL

In 2022, the maximum individual effective to a non-NEW at WL was 0.01 mSv, which was well below the CNSC's regulatory effective dose limit for persons who are not NEWs of 1 mSv, in one calendar year.

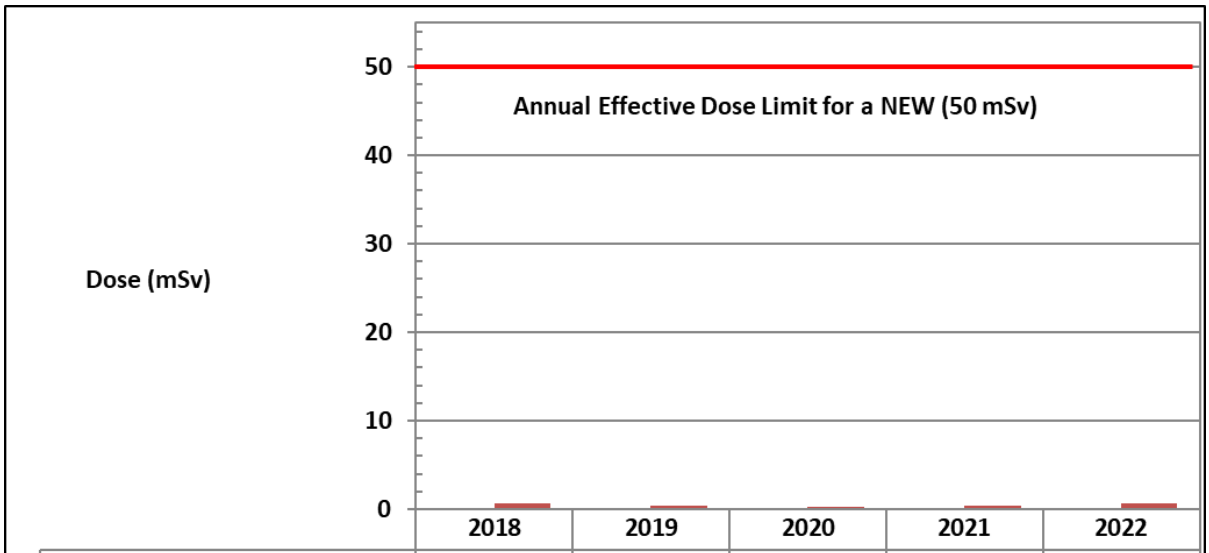
Port Hope Area Initiative

Port Hope

Radiation exposures of NEWs at the PHP are ascertained, recorded and monitored to ensure compliance with the CNSC's regulatory dose limits and to maintain radiation doses ALARA. Dosimeters are used for measuring external doses (whole body and skin) of PHP workers. Internal doses for PHP workers, resulting from exposure to radon progeny and long-lived alpha, are determined by indirect methods using concentration levels in air and time spent in work areas, or through the use of Personal Alpha Dosimeters. In 2022, no NEW received a radiation dose in excess of the CNSC's regulatory dose limits.

Figure H-3 provides the average effective doses and the maximum effective doses for NEWs from 2018 to 2022. In 2022, the maximum effective dose received by a NEW at the PHP was 0.59 mSv, which is well below the CNSC's regulatory effective dose limit for NEWs of 50 mSv in a 1-year dosimetry period.

Figure H-3: Effective doses to NEWs at PHP from 2018 – 2022



	2018	2019	2020	2021	2022
Average Effective Dose (mSv)	0.04	0.03	0.03	0.02	0.01
Maximum Effective Dose (mSv)	0.59	0.38	0.27	0.43	0.59
Number of NEWs Monitored	656	935	595	919	1474

As the project continues, effective doses are expected to remain low and comparable to previous years.

Annual average and maximum equivalent doses to the skin for NEWs at the PHP from 2018 to 2022 are provided in Table H-3. In 2022, the maximum skin dose received by a NEW at the PHP was 0.49 mSv, which is well below the CNSC's regulatory equivalent dose limit for NEWs of 500 mSv in a 1-year dosimetry period.

Table H-3: Equivalent (skin) doses to NEWs at PHP from 2018 – 2022

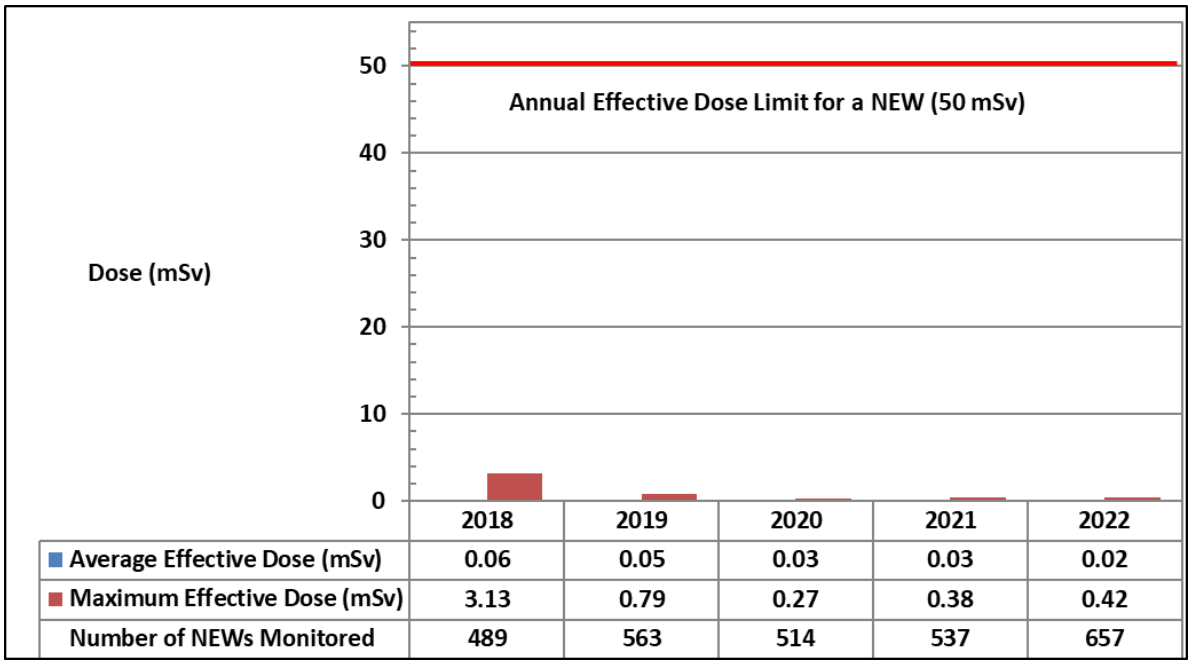
Dose Data	2018	2019	2020	2021	2022	Regulatory Limit
Average skin dose (mSv)	0.04	0.04	0.03	0.01	0.02	N/A
Maximum skin dose (mSv)	0.33	0.60	0.27	0.45	0.49	500 mSv/year

Port Granby Project

Radiation exposures of NEWs at the PGP are ascertained, recorded, and monitored to ensure compliance with the CNSC's regulatory dose limits and to maintain radiation doses ALARA. Dosimeters are used for measuring external doses (whole body and skin) of PGP workers. Internal doses for PGP workers, resulting from exposure to radon progeny and long-lived alpha, are determined by indirect methods using concentration levels in air and time spent in work areas. In 2022, no NEW received a radiation dose in excess of the CNSC's regulatory dose limits.

Figure H-4 provides the average effective doses and the maximum effective doses for NEWs from 2018 to 2022. In 2022, the maximum effective dose received by a NEW at the PGP was 0.42 mSv, which is well below the CNSC's regulatory effective dose limit for NEWs of 50 mSv in a 1-year dosimetry period.

Figure H-4: Effective doses to NEWs at PGP from 2018 - 2022



Effective doses of NEWs continue to be very low as expected, as capping and site closure activities are completed at the PGP.

Annual average and maximum equivalent doses to the skin for NEWs at the PGP from 2018 to 2022 are provided in Table H-4. In 2022, the maximum skin dose received by a NEW at the PGP was 0.49 mSv, which is well below the CNSC's regulatory equivalent dose limit for NEWs of 500 mSv in a 1-year dosimetry period.

Table H-4: Equivalent (skin) doses to NEWs at PGP from 2018 – 2022

Dose Data	2018	2019	2020	2021	2022	Regulatory Limit
Average skin dose (mSv)	0.05	0.05	0.03	0.01	0.03	N/A
Maximum skin dose (mSv)	2.44	0.79	0.27	0.45	0.49	500 mSv/year

Non-NEWs at Port Hope Area Initiative

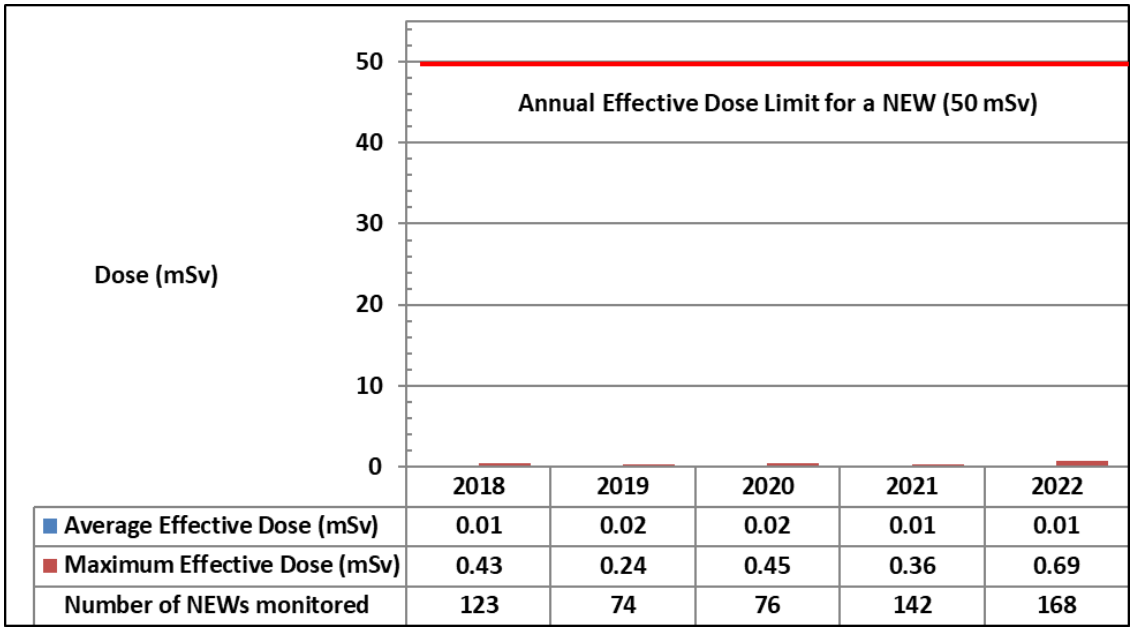
In 2022, there were no measurable doses recorded for visitors and contractors that were not considered as NEWs at the PHP and PGP.

Douglas Point Waste Facility

Radiation exposures of NEWs at the DPWF are ascertained, recorded, and monitored to ensure compliance with the CNSC's regulatory dose limits and to maintain radiation doses ALARA. In 2022, no NEW received a radiation dose in excess of the CNSC's regulatory dose limits.

Figure H-5 provides the average effective doses and the maximum effective doses for NEWs from 2018 to 2022. In 2022, the maximum effective dose received by a NEW at the DPWF was 0.69 mSv, which is well below the CNSC's regulatory effective dose limit for NEWs of 50 mSv in a 1-year dosimetry period.

Figure H-5: Effective doses to NEWs at DPWF from 2018 – 2022



	2018	2019	2020	2021	2022
Average Effective Dose (mSv)	0.01	0.02	0.02	0.01	0.01
Maximum Effective Dose (mSv)	0.43	0.24	0.45	0.36	0.69
Number of NEWs monitored	123	74	76	142	168

Over 2018 to 2022, hazard reduction work activities occurred at the DPWF site. In 2018, most of the maximum individual effective dose was attributed to the Spent Resin Removal Project. In 2019 and 2020, the hazard reduction work continued in the Reactor Building, including the dry active waste removal campaigns. In 2021, work focused outside of the reactor building, in low dose rate areas. In 2022, work focused on the installation and energization of the new Class IV power system, Service Building characterization and hazard abatement, Reactor Segmentation characterization work, walk downs for the Detailed Decommissioning Plans development, and preparation work for non-nuclear building demolition activities.

Annual average and maximum equivalent doses to the skin for NEWs at the DPWF from 2018 to 2022 are provided in Table H-5. In 2022, the maximum skin dose received by a NEW at the DPWF was 0.74 mSv, which is well below the CNSC's regulatory equivalent dose limit for NEWs of 500 mSv in a 1-year dosimetry period.

Table H-5: Equivalent (skin) doses to NEWs at DPWF from 2018 - 2022

Dose Data	2018	2019	2020	2021	2022	Regulatory Limit
Average skin dose (mSv)	0.01	0.02	0.03	0.01	0.01	N/A
Maximum skin dose (mSv)	0.43	0.24	0.51	0.45	0.74	500 mSv/year

Non-NEWs at DPWF

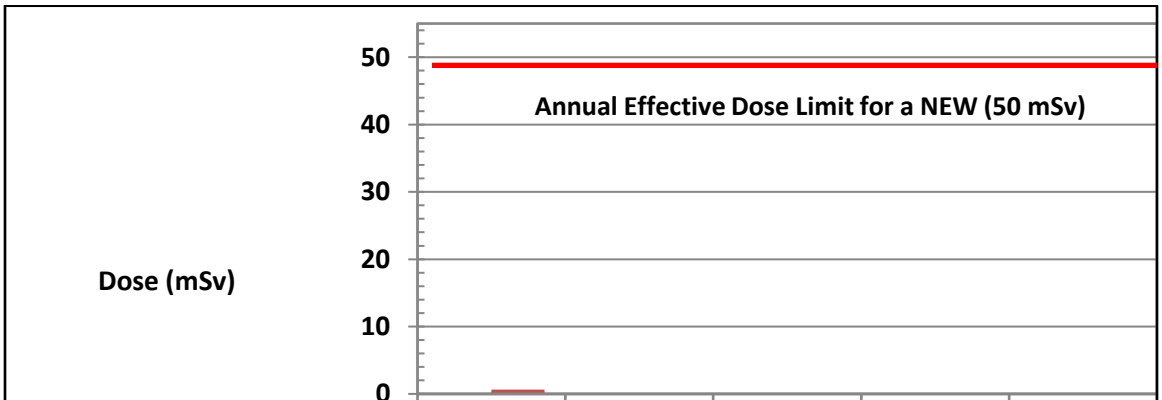
In 2022, there were no visitors or contractors not considered as NEWs at the DPWF, and therefore no corresponding dose information.

Gentilly-1 Waste Facility

Radiation exposures of NEWs at the G1WF are ascertained, recorded, and monitored to ensure compliance with the CNSC's regulatory dose limits and to maintain radiation doses ALARA. External and internal dosimetry are provided by CNL's licensed dosimetry service. In 2022, no NEW received a radiation dose in excess of the CNSC's regulatory dose limits.

Figure H-6 provides the average effective doses and the maximum effective doses for NEWs from 2018 to 2022. In 2022, the maximum effective dose received by a NEW at the G1WF was 0.07 mSv, which is well below the CNSC's regulatory effective dose limit for NEWs of 50 mSv in a 1-year dosimetry period.

Figure H-6: Effective doses to NEWs at G1WF from 2018 - 2022



	2018	2019	2020	2021	2022
Average Effective Dose (mSv)	0.03	0.01	0.00	0.01	0.00
Maximum Effective Dose (mSv)	0.62	0.10	0.01	0.12	0.07
Number of NEWs Monitored	101	57	43	132	202

In 2018, most of the maximum individual effective dose was attributed to the Spent Resin Removal Project. From 2019 to 2021, the hazard reduction work continued, including asbestos abatement and dry active waste removal. This work had a low potential for worker exposures and resulted in low effective doses observed as compared to 2018. In 2022, hazard reduction work at the site continued; however, this work resulted in low effective doses to workers.

Annual average and maximum equivalent doses to the skin for NEWs at the G1WF from 2018 to 2022 are provided in Table H-6. In 2022, the maximum skin dose received by a NEW at the G1WF was 0.07 mSv, which is well below the CNSC's regulatory equivalent dose limit for NEWs of 500 mSv in a 1-year dosimetry period.

Table H-6: Equivalent (skin) doses to NEWs at G1WF from 2018 – 2022

Dose Data	2018	2019	2020	2021	2022	Regulatory Limit
Average skin dose (mSv)	0.03	0.01	0.00	0.01	0.00	N/A
Maximum skin dose (mSv)	0.62	0.16	0.01	0.12	0.07	500 mSv/year

Several extremity doses were recorded at G1WF during 2022 for the inspections of the spent fuel canisters. The maximum extremity dose received by a NEW at the G1WF was 0.15 mSv, which is well below the CNSC's regulatory equivalent dose limit for NEWs of 500 mSv in a 1-year dosimetry period.

Non-NEWs at Gentilly-1

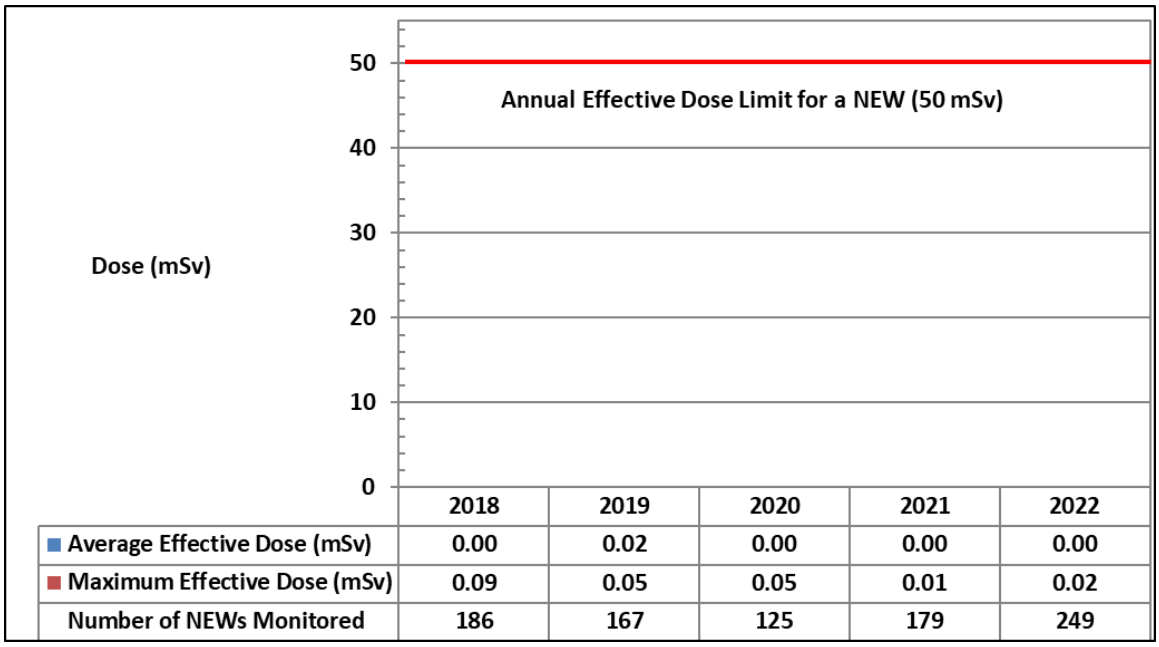
In 2022, there were no visitors or contractors not considered as NEWs at the G1WF, and therefore no corresponding dose information.

Nuclear Power Demonstration Waste Facility

Radiation exposures of NEWs at the NPDWF are ascertained, recorded, and monitored to ensure compliance with the CNSC's regulatory dose limits and to maintain radiation doses ALARA. External and internal dosimetry are provided by CNL's licensed dosimetry service. In 2022, no NEW received a radiation dose in excess of the CNSC's regulatory dose limits.

Figure H-7 provides the average effective doses and the maximum effective doses for NEWs from 2018 to 2022. In 2022, the maximum effective dose received by a NEW at the NPDWF was 0.02 mSv, which is well below the CNSC's regulatory effective dose limit for NEWs of 50 mSv in a 1-year dosimetry period.

Figure H-7: Effective doses to NEWs at NPDWF from 2018 – 2022



	2018	2019	2020	2021	2022
Average Effective Dose (mSv)	0.00	0.02	0.00	0.00	0.00
Maximum Effective Dose (mSv)	0.09	0.05	0.05	0.01	0.02
Number of NEWs Monitored	186	167	125	179	249

Effective doses over these years are consistently low and reflect storage with surveillance activities such as routine inspection and maintenance, as well as some hazard reduction activities.

Annual average and maximum equivalent doses to the skin for NEWs at the NPDWF from 2018 to 2022 are provided in Table H-7. In 2022, the maximum skin dose received by a NEW at the NPDWF was 0.02 mSv, which is well below the CNSC's regulatory equivalent dose limit for NEWs of 500 mSv in a 1-year dosimetry period.

Table H-7: Equivalent (skin) doses to NEWs at NPDWF from 2018 – 2022

Dose Data	2018	2019	2020	2021	2022	Regulatory Limit
Average skin dose (mSv)	0.00	0.02	0.00	0.00	0.00	N/A
Maximum skin dose (mSv)	0.09	0.05	0.05	0.01	0.02	500 mSv/year

Non-NEWs at NPDWF

In 2022, there were no visitors or contractors not considered as NEWs at the NPDWF and therefore no corresponding dose information.

I. LOST-TIME INJURY INFORMATION

This appendix contains information on the number, frequency and severity of recordable lost time injuries (RLTIs) at the CNL sites covered by this ROR, with information presented separately for CNL employees and contractors.

CNL Employees

Frequency and severity are calculated per 100 full-time workers (equivalent to 200,000 worker-hours per year) using the following formulas:

Frequency rate =

(# of Lost-Time Injuries) x (200 000 hrs of exposure) / (person hours worked)

Severity rate =

(# of Working Days Lost) x (200 000 hrs of exposure) / (person hours worked)

Table I-1: Summary of CRL's Employee RLTIs, frequency and severity *(Source: CNL)*

Year	2018	2019	2020	2021	2022
Person Hours Worked	5,396,450	5,729,010	5,346,690	5,358,630	5,709,410
Lost-Time Injuries	5	1	4	3	2
Working Days Lost	69	75	78	4	3
Frequency	0.19	0.03	0.15	0.11	0.07
Severity	2.56	2.62	2.92	0.15	0.15

Table I-2: Summary of WL's Employee RLTIs, frequency and severity *(Source: CNL)*

Year	2018	2019	2020	2021	2022
Person Hours Worked	688,000	642,000	584,030	684,000	812,000
Lost-Time Injuries	1	0	1	0	0
Working Days Lost	5	0	2	0	0
Frequency	0.28	0	0.34	0	0
Severity	1.45	0	0.68	0	0

Table I-3: Summary of PHP's RLTIs, frequency and severity *(Source: CNL)*

Year	2018	2019	2020	2021	2022
Person Hours Worked	-	298,377	391,875	389,016	397,443
Lost-Time Injuries	0	1	0	2	0
Working Days Lost	0	33	0	12	0
Frequency	0	0.68	0	1.03	0
Severity	0	22.57	0	6.17	0
Note that prior to 2019, CNL did not provide data on person-hours worked on the PHP site.					

Table I-4: Summary of PGP's RLTIs, frequency and severity *(Source: CNL)*

Year	2018	2019	2020	2021	2022
Person Hours Worked	-	41,622	30,000	19,614	10,513
Lost-Time Injuries	0	1	0	0	0
Working Days Lost	0	1	0	0	0
Frequency	0	4.81	0	0	0
Severity	0	4.81	0	0	0
Note that prior to 2019, CNL did not provide data on person-hours worked on the PGP site.					

Table I-5: Summary of DPWF, G1WF, and NPDWF Employee RLTIs, frequency and severity *(Source: CNL)*

Year	2018	2019	2020	2021	2022
CNL staff at the DPWF, G1WF, and NPDWF sites have not recorded a lost-time injury since 2016.					

Contractors at CNL sites

The number of contractor recordable lost-time incidents reported to CNL in 2022 is shown in Table I-6.

CNL records the number of lost-time injuries reported to CNL by their contractors. However, contractor employee hours worked is considered sensitive information and the contractors do not divulge the specific number of hours worked to CNL as their client. Therefore, CNL does not provide frequency and severity rates for contractors since these calculations require hours worked.

Table I-6: Contractor lost-time injuries in 2022 *(Source: CNL)*

Site	CRL	WL	PHP	PGP	DP	G-1	NPD
Lost-Time Injuries (Change from 2021)	1(-1)	0	1(+1)	0	0	0	0

J. ESTIMATED DOSE TO THE PUBLIC

This appendix contains information on the estimated dose to the public around CNL sites. Regulatory release limits known as Derived Release Limits (DRLs) are site-specific calculated release levels that could, if exceeded, expose a member of the public of the most highly exposed group to a committed dose equal to the regulatory annual dose limit of 1 mSv/year. DRLs are calculated using CSA standard N288.1-14, *Guidelines for calculating derived release limits for radioactive materials in airborne and liquid effluents for normal operation of nuclear facilities* [32].

As per the *Radiation Protection Regulations* [16] subsection 1(3), and considering the fact that the radiological releases from all the sites covered by this ROR have remained small fractions of the DRLs applicable to those sites, the contribution to the dose to the public from these releases remains a very small fraction of the prescribed limit for the general public.

Chalk River Laboratories

The maximum dose in each year since 2018 has been well below the dose limit of 1 mSv/year.

Table J-1: CRL maximum effective dose to a member of the public from 2018 - 2022

Dose Data	2018	2019	2020	2021	2022	Regulatory Limit
Maximum Effective Dose (mSv)	0.0360	0.0036	0.0072	0.0037	0.0026	1 mSv/year

Whiteshell Laboratories

The dose to critical groups from releases from CNL-WL in 2022 was well below the regulatory dose limit of 1 mSv/year.

Table J-2: WL maximum effective dose to a member of the public from 2018 - 2022

Dose Data	2018	2019	2020	2021	2022	Regulatory Limit
Maximum effective dose (mSv)	0.00004	0.00009	0.000005	0.00001	0.00002	1 mSv/year

Port Hope Area Initiative

A modified approach for calculating estimated dose to the public was performed by CNL for PHAI sites beginning in 2019 and includes both radon monitoring and fence line dosimeter measurements at both PHP and PGP sites.

The annual estimated doses to the public in 2022 at PHP and PGP were well below the annual regulatory dose limit of 1 mSv.

Table J-3: PHP maximum effective dose to a member of the public from 2018 - 2022

Dose Data	2018	2019	2020	2021	2022	Regulatory Limit
Maximum effective dose (mSv)	0.0275	0.0350	0.033	0.023	0.028	1 mSv/year

Table J-4: PGP maximum effective dose to a member of the public from 2018 - 2022

Dose Data	2018	2019	2020	2021	2022	Regulatory Limit
Maximum effective dose (mSv)	0.0200	0.0396	0.020	0.041	0.033	1 mSv/year

DPWF

The gap analysis against CSA standard N288.1-14 conducted in 2021 by CNL determined that given the very low levels of contaminants in airborne and waterborne effluents, there is no need for an environmental monitoring program at DPWF. CNSC staff reviewed and accepted this gap analysis. All releases of radioactive material in DPWF effluents are a small fraction of their respective regulatory limits which indicate the potential of minimal impact on the public or the environment. In addition, as DPWF is located within the Bruce Nuclear Site, the Bruce Power environmental monitoring program potentially captures any environmental impacts emanating from the small contribution of DPWF. The dose to the public from the Bruce Nuclear Site, (potentially including contributions from the DPWF), remain below 2.4µSv/year (0.0024 mSv/year).

G1WF

The effluent monitoring plan assessment conducted in 2021 by CNL determined that there is minimal or no source of airborne radioactivity from routine operations at G1WF. In addition, all liquid releases were discharged through the Gentilly-2 effluent system, operated by Hydro-Québec, and represent a small fraction of the total releases from the larger Gentilly site. Hydro-Québec's Gentilly-2 environmental monitoring program captures any environmental impacts from the small contribution from G1WF. The dose to the public from the Gentilly-2 nuclear site, including contributions from G1WF, remain below 0.01 mSv/year.

NPDWF

NPDWF is no longer discharging liquid effluents from the facility sumps to the Ottawa River, and there were no such releases during the 2022 reporting period. All other releases of radioactive material in NPDWF effluents are a small fraction of their respective DRLs and thus, continue to indicate minimal impact on the public or the environment. CNL's environmental monitoring at CRL will regionally overlap with the NPDWF, so information from CRL's off-site environmental monitoring program could also be considered. CNSC staff have determined that the public dose from NPDWF remains at a very small fraction of the public dose limit.

K. PARTICIPANT FUNDING AWARDED FOR THE 2022 REGULATORY OVERSIGHT REPORT

CNSC staff provided interested communities with notice of the opportunity for funding through the CNSC's Participant Funding Program to review and comment on this report and the opportunity to submit a written intervention and/or appear before the Commission as part of the Commission meeting.

CNSC awarded approximately $72,828.76 in participant funding to assist the following Indigenous Nations and communities, members of the public and stakeholders in reviewing this ROR and submitting comments to the Commission.

Recipient
Algonquins of Pikwanagan First Nation
Manitoba Métis Federation
Hiawatha First Nation
Nuclear Transparency Project
Chippewas of Kettle and Stony Point First Nation
Total: $72,828.76

Further information on the CNSC's Participant Funding Program can be found on the CNSC's website at: http://www.nuclearsafety.gc.ca/eng/the-commission/participant-funding-program/index.cfm

L. SUMMARY OF ENGAGEMENT IN RELATION TO CNSC'S TERMS OF REFERENCE FOR LONG-TERM ENGAGEMENT AND ASSOCIATED WORKPLANS IN 2022

These sections were drafted collaboratively between representatives of the represented Indigenous Nations and Communities below and CNSC staff.

L.1 CNSC- Historic Saugeen Métis Long-term Engagement Terms of Reference

As committed to with the Historic Saugeen Métis (HSM) as part of the Terms of Reference (ToR) for long-term engagement with the CNSC, the update below was prepared in collaboration with HSM representatives.

Following the licence renewal hearing for the Bruce Nuclear Generating Station (BNGS) in 2018, a ToR was agreed upon and signed April 12, 2019, between CNSC staff and the HSM, which ensures that HSM is provided with adequate and meaningful funding, support and capacity to participate in consultation and engagement activities required throughout the year.

Topics of discussion related to the facilities in this ROR included updates and discussions about Douglas Point such as CNSC inspections and HSM's interest in the project.

CNSC staff and HSM representatives collaborated on the IEMP sampling campaign that took place around BNGS in 2022. CNSC staff appreciated the HSM's involvement in the IEMP, through selection of samples and participating in sample collection. Their contributions have helped to strengthen the IEMP. HSM and CNSC staff also discussed how to best share results with HSM community members and committed to working collaboratively once results are available.

While the HSM did not have any outstanding concerns related to the nuclear activities on the Bruce site, they continued to actively participate and make informed contributions to address any potential impacts on HSM rights and interests. CNSC staff plan to continue to engage and update HSM on regulatory activities on a semi-annual basis as agreed upon in the ToR including updates on CNL's Douglas Point decommissioning project and communicating results from the IEMP sampling campaign in 2022.

L.2 Curve Lake First Nation and CNSC Long-term Engagement Terms of Reference

As committed to with Curve Lake First Nation (CLFN) as part of the ToR for long-term engagement with the CNSC, the update below was prepared in collaboration with CLFN representatives.

In 2020, CNSC staff started discussions with CLFN to establish a formal long-term relationship with the community, and a ToR for long-term engagement was signed between the CLFN and CNSC in February 2021. This ToR ensures that CLFN is provided with adequate and meaningful funding, support, and capacity to participate in consultation and engagement activities required throughout the year. As part of the ToR a yearly work plan is developed between the CNSC and CLFN, which provides

information on the scope of work, detailed activities, and timelines associated with work items for collaboration and engagement.

In 2022 the work plan included:

- ToR maintenance and updates
- Participation in the CNSC's IEMP
- Updates and discussions on specific Projects and Ongoing Operations of Existing Nuclear Facilities of Interest
- Co-Jurisdictional Matters of Significance (i.e., Fisheries Act Authorization, Emergency preparedness and thermal emissions from Nuclear Generation Stations)
- Information, communication, and other topics (i.e., REGDOC updates, feedback on CNSC reporting and processes, PFP opportunities)
- Developing a plan for a CLFN Indigenous Knowledge Study

In 2022, due to capacity constraints and other priorities CLFN and CNSC were not able to initiate discussions on developing a plan for an Indigenous Knowledge study. However, it is CLFN and CNSC's commitment to develop a plan for a Curve Lake Indigenous Knowledge Study in 2023.

In 2022, CLFN and CNSC staff continued to meet monthly and work collaboratively to make progress on a number of the agreed upon initiatives in the work plan. Through routine monthly meetings and interactions, CLFN and CNSC have developed a good working level relationship; one that has been more conducive to open and direct communications.

Topics of discussion included updates and information sharing with regards to ongoing CNL projects and sites including NSDF, NPDWF and CRL. Discussions were also had regarding the PHAI licence renewal. CNSC staff and CLFN also met to discuss CLFN's involvement in the 2022 IEMP sampling campaign planned near the CRL site. In August 2022, CLFN observers participated in the IEMP sampling activities around the CRL site. Having CLFN representatives participate in the sampling promotes a better understanding of sampling methods and improves input into future sampling in terms of CLFN species of interest, valued components and potential sampling locations.

In 2022, CLFN and CNSC staff worked collaboratively on communication products (such as a KI Pill information sheet and pamphlet for the Cameco Fuel Manufacturing Environmental Protection Review Report) to improve how information is shared with CLFN community members.

In October 2022, CLFN hosted CNSC staff in their community for a lunch and meeting with their leadership. CLFN also shared their knowledge during a tour of the Petroglyphs Provincial Park. These activities were invaluable for building and strengthening the relationship, advancing project-specific discussions and enhancing CNSC staff cultural awareness and understanding. CNSC staff and CLFN are planning on organizing another in-person event in the CLFN community and territory in 2023.

In 2022, CLFN provided feedback through their intervention on the 2021 RORs and continue to do so through ongoing discussions. CNSC staff have made a number of improvements to reports and documentation based on the feedback, such as including land acknowledgements for each facility and creating a separate Indigenous consultation and engagement section. CNSC staff and CLFN are working together to discuss and address the common themes raised in CLFN's interventions.

CNSC staff and CLFN continue to be committed to strengthening the relationship through on-going respectful dialogue to share knowledge, information on culture, history and perspectives that help CNSC staff and CLFN learn from each other. CNSC staff will also continue to have discussions regarding areas of interest and issues or concerns related to existing CNSC-regulated nuclear activities of interest to CLFN.

In 2023, CLFN and CNSC staff are planning to initiate discussions on the scope and approach to a Territory wide study of Indigenous Knowledge and Land Use Study as it relates to CNSC-regulated facilities and activities. Discussions will include the specific funding and capacity needs in order for CLFN to be able to meaningfully participate and complete these important studies and research. CLFN and CNSC staff will also continue to foster and create a safe ethical space for Indigenous Knowledge to be collected and shared.

L.3 CNSC-Mississaugas of Scugog Island First Nation Long-term Engagement Terms of Reference

As committed to with the Mississaugas of Scugog Island First Nation (MSIFN) as part of the ToR for long-term engagement with the CNSC, the update below was prepared in collaboration with MSIFN representatives.

In September 2021, CNSC staff started discussions with MSIFN to establish a formal long-term relationship with the community, and ToR were signed between MSIFN and the CNSC in March 2022. The ToR ensures that MSIFN is provided with adequate and meaningful funding, support and capacity to participate in consultation and engagement activities required throughout the year. As part of the ToR, a yearly work plan is developed between the CNSC and MSIFN, which provides information on the scope of work, detailed activities, and timelines associated with work items for collaboration and engagement.

In 2022, the work plan included:

- Learning about and engaging in the CNSC's IEMP
- Collaborative annual reporting to the Commission and to MSIFN Chief and Council
- Updates and discussions on specific projects and ongoing operations of licensed nuclear facilities of interest
- Enhancing information sharing and communication between the CNSC and MSIFN members
- Emergency management and preparedness

In 2022, MSIFN and CNSC staff continued to meet monthly and work collaboratively to make progress on a number of the agreed upon initiatives in the work plan. In addition, in October 2022, MSIFN hosted CNSC staff in their community for a lunch and meeting with their leadership. The in-person meeting was an important step for building and strengthening the relationship, advancing project-specific discussions and enhancing CNSC staff's understanding of MSIFN priorities and areas of concern. CNSC staff and MSIFN are planning on organizing another in-person meeting and event in the MSIFN community and territory in 2023.

L.4 Algonquins of Pikwakanagan First Nation -CNSC terms of reference for long-term relationship

As committed to with Algonquins of Pikwakanagan First Nation (AOPFN) as part of the ToR for long-term engagement with the CNSC, the update below was prepared in collaboration with AOPFN representatives.

In 2022, CNSC staff and AOPFN representatives started discussions to establish a ToR for a long-term relationship. The ToR were signed on November 30, 2022, providing a formalized structure for ongoing dialogue on CNSC-regulated facilities and activities of interest in the AOPFN traditional territory. As part of the ToR, a yearly work plan was developed between the CNSC and AOPFN that provides information on the scope of work, detailed activities, and timelines associated with work items for collaboration and engagement. The work plan includes activities that CNSC staff and AOPFN will be working to implement throughout 2023 and beyond, including:

- participation in the CNSC's IEMP
- collaborative annual reporting to the Commission and to the AOPFN Chief and Council
- updates and discussions on specific projects and ongoing operations of licensed nuclear facilities of interest
- enhanced information sharing and communication between the CNSC and AOPFN members
- emergency management and preparedness

The following facilities covered in this ROR are of interest in the work plan:

- Chalk River Laboratories
- Nuclear Power Demonstration Closure Project

CNSC staff and AOPFN are committed to continuing to strengthen the relationship through ongoing, respectful dialogue to share knowledge, information on culture and history, and perspectives that help CNSC staff and AOPFN learn from each other. CNSC staff will also continue to have discussions on areas of interest and concern related to CNSC-regulated nuclear activities of interest to AOPFN.

L.5 Saugeen Ojibway Nation- CNSC Long-term Engagement Terms of Reference

As committed to with the Saugeen Ojibway Nation (SON) as part of the ToR for long-term engagement with the CNSC, the update below was prepared in collaboration with SON representatives.

The ToR were signed between the SON and the CNSC in 2019. The ToR ensures that the SON is provided with adequate and meaningful funding, support and capacity to participate in consultation and engagement activities required throughout the year. As part of the ToR, a yearly work plan is developed between the CNSC and SON, which provides information on the scope of work, detailed activities, and timelines associated with work items for collaboration and engagement.

In 2022, the work plan included:

- Joint review and analysis of licensee submissions, particularly around environmental protection
- Participation in the CNSC's IEMP
- Inclusion on the design and review of Bruce Power's study of available mitigation measures for environmental impacts
- SON community outreach
- Sharing the results of CNSC's environmental oversight, such as inspection reports
- Identifying federal, provincial, and municipal decision-making agencies, as needed
- Coordinating meetings with federal and provincial Crown agencies, as needed
- Sharing information on the Western Waste Management Facility, Douglas Point and Nuclear Waste Management Organization's (NWMO) Adaptive Phase Management (APM) initiative

The work plan sets out detailed tasks and timelines for each of these items.

Topics of discussion related to the facilities in this ROR included updates and discussions about Douglas Point.

In 2022, CNSC staff and the SON continued to meet and work collaboratively to complete a number of the agreed upon initiatives in the work plan. These activities included CNSC's funding support for a traditional land use and occupancy study to obtain a baseline inventory of mapped cultural sites in relation to the SON's Territory, including the Territory around the Bruce Power site. However, due to the pandemic and inability to meet with community members in person, this work has been delayed, however is expected to be completed in early 2023.

Work was completed on Bruce Power's mitigation measures study. The outcomes of this process have led to further collaboration between SON and CNSC staff on environmental monitoring as well as future updates to the CNSC's regulatory framework.

CNSC staff and members from the SON community participated in the IEMP sampling campaign for 2022. SON helped to select and provide samples (including fish) that would be meaningful to their community members. As part of IEMP sampling, CNSC staff also conducted outreach activities as well to explain the program as well as health impacts due to radiation.

CNSC staff participated in a number of outreach activities with the SON. Spring and Fall community information sessions were organized by the SON Environment Office staff and were well attended. This provided the opportunity for SON members to ask questions and learn more about how nuclear energy and radiation is regulated in Canada.

Additionally, SON Environment Office staff and CNSC staff provided a joint presentation at the 2022 CNS Conference on the participation by SON in regulatory inspections to share this experience with the nuclear industry.

In addition, the SON completed another year of the Coastal Waters Monitoring Program (CWMP), which is an initiative funded in cooperation with Bruce Power, but was designed, led and implemented by the SON to monitor environmental conditions in the nearshore areas of the Saugeen Peninsula. SON has recently shared with CNSC the 2022 Annual CWMP Report, as has been done in previous years. CNSC staff are interested in the results of the CWMP, as this will provide data that can be used in future environmental risk assessments in relation to the BNGS.

SON has on-going concerns regarding the storage of nuclear waste in their traditional territory. In 2022, CNSC staff provided information on the update to Natural Resources Canada's plans to update Canada's nuclear waste policy. In addition, work is on-going to provide information on how the SON can contribute to and participate in the processes around new nuclear projects in Ontario in which waste may be stored at the Western Waste Management Facility, or a potential deep geological repository sited in SON Territory.

CNSC staff and SON will continue to work collaboratively to address areas of concern, rights, and interests for the SON in relation to the Bruce site, including CNL's Douglas Point decommissioning project.

L.7 Métis Nation of Ontario-CNSC Long-term Engagement Terms of Reference

As committed to with the Métis Nation of Ontario (MNO) as part of the ToR for long-term engagement with the CNSC, the update below was prepared in collaboration with MNO representatives.

Following the licence renewal hearing for the BNGS in 2018, a ToR was agreed upon and signed on December 18, 2019, between CNSC staff and the MNO, which formally documents the engagement with their Nation. As the MNO is a province-wide organization, a specific engagement plan under the Terms of Reference was also signed in December 2019 with MNO Region 7, which is the consultation committee region that includes the Bruce site to address their areas of interest.

In 2022, the engagement plan included:

- Participation in the CNSC's IEMP
- Sharing information on NWMO's APM initiative

- Sharing information on SMRs
- CNSC to support MNO capacity building through professional development workshops
- Communication with MNO citizens

The following facilities covered in this ROR are of interest: Douglas Point.

As per the engagement plan, in 2022, CNSC staff continued to meet with MNO representatives semi-annually to discuss topics such as the Douglas Point decommissioning project, the Bruce Power Major Component Replacement project and the pressure tube findings, OPG's WWMF and NWMO's APM project. CNSC staff worked with MNO to update the work plan to identify areas of collaboration, including environmental monitoring through the IEMP and providing information related to Impact Assessments and Small Modular Reactors. In 2022, MNO representatives participated in the IEMP sample campaign that took place around BNGS. Representatives observed the air sampling station set up by Baie-du-Doré and helped with identifying vegetation in the area that is important to their citizens (e.g., plantains, cattails).

As discussed at Bruce Power's licence renewal hearing in 2018, MNO Region 7 would like to be more involved in environmental monitoring activities and addressing the concerns their citizens have regarding perceived environmental impacts related to the Bruce site. CNSC staff will continue to collaborate and engage with the MNO Region 7 on areas of interest with regards to the Bruce site including CNL's Douglas Point decommissioning project, including the upcoming midterm licence review, on a semi-annual basis as agreed upon in the Terms of Reference.

L.8 Kebaowek First Nation (KFN)-CNSC Long-term Engagement Terms of Reference

As committed to with Kebaowek First Nation (KFN) as part of the long-term relationship arrangement "the Arrangement" with the CNSC, the update below was prepared in collaboration with KFN representatives.

In 2022, CNSC staff and KFN representatives started discussions to establish an Arrangement for a long-term relationship. The Arrangement was signed on September 29, 2022, providing a formalized structure for ongoing dialogue on CNSC-regulated facilities and activities where KFN has identified concerns in relation to a project's construction or existing operations on their rights, interests, culture, current and traditional uses of their territory.

As part of the Arrangement, a yearly work plan is being developed between the CNSC and KFN that provides information on the scope of work, detailed activities, and timelines associated with work items for collaboration and engagement. The work plan includes activities that CNSC staff and KFN will be working to implement throughout 2023 and beyond, including:

- collaborative annual reporting to the Commission and to the KFN Chief and Council

- updates and discussions on specific projects and ongoing operations of licensed nuclear facilities of interest
- enhanced information sharing and communication between the CNSC and KFN members
- opportunities to comment and review policies and regulations including those related to nuclear safety, non-proliferation and Indigenous engagement.

The following facilities covered in this ROR are of interest in the to be developed work plan:

- Chalk River Laboratories
- Nuclear Power Demonstration Closure Project

CNSC staff and KFN are committed to continuing to strengthen the relationship through ongoing, respectful dialogue and the sharing of knowledge, information on culture and history, and perspectives that help CNSC staff learn from KFN. CNSC staff will also continue to have discussions on areas of interest and concern related to CNSC-regulated nuclear activities of interest to KFN.

M. SUMMARY TABLE OF THE STATUS OF ISSUES CONCERNS AND REQUESTS FROM INTERVENORS IN THE 2021 CNL ROR

In direct response to the Commission's action from the 2021 RORs, CNSC staff has established an internal CNSC issues, concerns, and comments tracking table for each intervening Indigenous Nation or Community in the 2021 CNL ROR. These tables also summarize and track CNSC's efforts to respond to and address intervenor requests concerns and comments, where feasible. In the 2021 CNL ROR meeting, the Commission noted the concerns raised by several intervenors that comments and recommendations made regarding past RORs had not been addressed directly by CNSC staff. As a result, the Commission expects to be updated on the status of CNSC staff's efforts to address and track intervenor recommendations across all RORs moving forward. The Commission has directed CNSC staff to provide an update on whether and how comments and recommendations made by Indigenous Nations and communities in particular have been, or will be, addressed, including where there are disagreements.

The purpose of this appendix is to provide a summary of information and data from the CNSC's issues tracking tables to the Commission. The tables below provide an overview of the issues raised in interventions in relation to the previous year's ROR, and the proposed path forward to address them. Table A outlines the number of specific issues and concerns raised by each intervenor and their related themes, as well as CNSC responses and proposed path forward. Table B provides an overview of the key thematic categories raised by each intervenor and the total number of times each theme or topic was raised by all intervenors in their interventions. Tracking this thematic information will provide a baseline to help direct CNSC staff to focus their efforts in future engagements and consultations to areas that generate the most concerns. This is a new ROR initiative and will continue taking shape moving forward as CNSC staff begin tracking trends in intervention topics and track progress with Indigenous Nations and Communities, as well as repeat public intervenors.

Table A: Issues and Concerns Raised in Interventions from Indigenous Nations and Communities from the 2021 CNL ROR Tracking and Response Table

The following table provides details regarding the number of specific issues and concerns raised in the interventions by Indigenous Nations and communities in relation to the 2021 CNL ROR, the number of thematic categories the issues and concerns are grouped by, and the status of the CNSC's approach to responding to and addressing each issue, concern or request raised in the interventions to date.

CNSC staff are committed to responding to and following up with the intervenors below with regards to their interventions and working collaboratively to identify options for a path forward to address the comments, where possible. For Indigenous Nations and communities that have a ToR for long-term engagement with the CNSC, requests, concerns and comments raised in relation to the ROR have been integrated into the engagement work plan and regular meetings with each Indigenous Nation or community, including sharing the specific issues and concerns tracking table with each Indigenous Nation and community in order to verify the data and discuss a path forward for meaningfully addressing their comments.

In addition, CNSC staff have also followed up with Indigenous Nations and communities who the CNSC does not currently have a ToR for long-term engagement with, in order to follow up on or set a path forward on their comments and issues.

2021 CNL ROR Interventions from Indigenous Nation and Communities	The number of Requests/ Concerns/ Comments Raised in 2021 ROR intervention	Requests/ Concerns/ Comments Responded to by CNSC staff*	Notes
Algonquins of Pikwàkanagàn First Nation (AOPFN)	9 (falling within 5 main subjects/categories)	9	The issues, concerns and recommendations raised by AOPFN in their intervention for the 2021 CNL ROR are being addressed and discussed with AOPFN through an issues tracking table and regular meetings and the associated workplan in relation to the CNSC-AOPFN ToR for long-term engagement. In addition, CNSC staff reached out to AOPFN to offer to have a specific meeting and discussions to address their concerns, comments, and recommendations from the 2021 CNL ROR. This meeting was held virtually on April 26, 2023. Examples of the themes and issues raised include CNSC's consultation and engagement activities (Indigenous and Stakeholder) and impacts on rights.
Manitoba Métis Federation (MMF)	8 (falling within 3 main subjects/ categories)	8	The issues, concerns and recommendations raised by MMF in their intervention for the 2021 CNL ROR are being addressed and discussed with MMF based on an issues tracking table developed by CNSC staff in 2021 designed to track the issues, concerns, and comments that MMF have raised in various interventions over the past few years. CNSC staff has shared the

2021 CNL ROR Interventions from Indigenous Nation and Communities	The number of Requests/ Concerns/ Comments Raised in 2021 ROR intervention	Requests/ Concerns/ Comments Responded to by CNSC staff*	Notes
			tracking table with MMF for review and offered to meet to discuss CNSC staff's responses and a path forward on addressing their comments, requests and concerns. CNSC is committed to working with MMF to address each topic to the greatest extent possible. CNSC staff reached out to offer to have a specific meeting and discussions to address MMF's concerns, comments and recommendations in relation to their interventions for the 2021 CNL ROR. This meeting was held virtually on May 1, 2023. In addition, CNSC has offered MMF a ToR for long-term engagement (offered in 2021) as well as funding and capacity support. CNSC staff look forward to hearing back from MMF with regards to working towards finalizing a ToR for long-term engagement, developing a workplan and prioritizing discussions on addressing their comments, concerns and recommendations. Examples of the themes and issues raised include CNSC's consultation and engagement activities (Indigenous and Stakeholder) and Environmental Monitoring.
Grand Council Treaty 3	29 (falling within 4	29	The issues, concerns and recommendations raised by Grand

2021 CNL ROR Interventions from Indigenous Nation and Communities	The number of Requests/ Concerns/ Comments Raised in 2021 ROR intervention	Requests/ Concerns/ Comments Responded to by CNSC staff*	Notes
	main subjects/categories)		Council Treaty 3 in their intervention for the 2021 CNL ROR are being addressed and discussed with Grand Council Treaty 3 based on an issues tracking table developed by CNSC staff. CNSC staff have reached out to offer to have a specific meeting and discussions to address their concerns, comments and recommendations in relation to the 2021 CNL ROR. CNSC has offered to provide Grand Council Treaty 3 funding and to establish regular meetings to support this work with the CNSC. CNSC staff look forward to hearing back from Grand Council Treaty 3 and making progress on developing the relationship and addressing their comments, concerns and recommendations. Examples of the themes and issues raised include CNSC's consultation and engagement activities (Indigenous and Stakeholder) and CNSC Oversight Activities.
Sagkeeng Anicinabe First Nation	9 (falling within 5 main subjects/categories)	9	The issues, concerns and recommendations raised by Sagkeeng Anicinabe First Nation in their intervention for the 2021 CNL ROR are being addressed and discussed with Sagkeeng Anicinabe First Nation based on an issues tracking table developed

2021 CNL ROR Interventions from Indigenous Nation and Communities	The number of Requests/ Concerns/ Comments Raised in 2021 ROR intervention	Requests/ Concerns/ Comments Responded to by CNSC staff*	Notes
			by CNSC staff designed to track the issues, concerns, and comments that Sagkeeng Anicinabe First Nation has raised. CNSC staff have reached out to Sagkeeng Anicinabe First Nation to offer to have a specific meeting and discussions to address their concerns, comments and recommendations. CNSC has offered to develop a ToR for long-term engagement and related work plan with Sagkeeng Anicinabe First Nation. CNSC has also offered funding support, should this be of interest to Sagkeeng Anicinabe First Nation in relation to the 2021 CNL ROR. CNSC staff look forward to hearing back from Sagkeeng Anicinabe First Nation and making progress on developing the relationship and addressing their comments, concerns and recommendations. Examples of the themes and issues raised include CNSC's consultation and engagement activities (Indigenous and Stakeholder) and impacts to rights.
Curve Lake First Nation (CLFN)	9 (falling within 2 main subjects/categories)	9	The issues, concerns and recommendations raised by Curve Lake First Nation in their intervention for the 2021 CNL ROR are being addressed and discussed with Curve Lake First Nation based on an issues

2021 CNL ROR Interventions from Indigenous Nation and Communities	The number of Requests/ Concerns/ Comments Raised in 2021 ROR intervention	Requests/ Concerns/ Comments Responded to by CNSC staff*	Notes
			tracking table designed by CNSC staff and regular meetings and the associated workplan in relation to the CNSC-Curve Lake First Nation ToR for long-term engagement. In addition, CNSC staff reached out to Curve Lake First Nation to offer to have a specific meeting and discussions to address their concerns, comments, and recommendations in relation to the 2021 CNL ROR. CNSC looks forward to working with CLFN to address their comments and recommendations. Examples of the themes and issues raised include CNSC's consultation and engagement activities (Indigenous and Stakeholder) and Other (some examples: Nation-specific concerns, comments relating to specific technologies).
Chippewas of Kettle and Stony Point First Nation	18 (falling within 7 main subjects/categories)	18	The issues, concerns and recommendations raised by the Chippewas of Kettle and Stony Point First Nation in their intervention for the 2021 CNL ROR are being addressed and discussed with the Chippewas of Kettle and Stony Point First Nation based on an issues tracking table designed by CNSC staff to track the issues, concerns, and comments that Chippewas of Kettle and Stony Point First Nation have raised.

2021 CNL ROR Interventions from Indigenous Nation and Communities	The number of Requests/ Concerns/ Comments Raised in 2021 ROR intervention	Requests/ Concerns/ Comments Responded to by CNSC staff*	Notes
			In addition, CNSC staff reached out to the Chippewas of Kettle and Stony Point to offer to have a specific meeting and discussions to address their concerns, comments and recommendations in relation to the 2021 CNL ROR. This meeting was held virtually on April 27, 2023. Examples of the themes and issues raised include CNSC's consultation and engagement activities (Indigenous and Stakeholder) and environmental monitoring.

** "Responded to" refers to the number of requests/concerns/comments that CNSC staff have provided dispositions to, responded to directly, or have made requests with intervenors to have a specific meeting and discussions to address their concerns, comments and recommendations. See notes column for more details.*

Engagement with Other Public Intervenors

CNSC staff are committed to engaging with the public and learning more about their values, issues and concerns. Repeat public intervenors, including individuals and civil society organizations, have been reached out to, to follow up on their issues, concerns, and recommendations. This is being facilitated through existing opportunities for engagement and individualized bilateral meetings.

Table B. Interventions by Thematic Category

The following table provides an overview of the key thematic categories raised in the interventions in relation to the 2021 CNL ROR and the number of times each theme or topic was raised in total across all interventions. In total for this ROR last year there were 10 intervenors. Some were positive and did not raise concerns, however, there were a number that raised concerns in the categories outlined below. The categories included in Table B have been ordered from most frequently raised to least. The thematic categories are derived from the review of the 2021 interventions and CNSC staff's analysis of the issues and topics raised.

CNSC staff are committed to continuing to follow up and work with each intervenor in Table A, as well as other repeat individuals and civil society organizations who

intervened to continue discussions on how best to address these themes and areas of interest identified in their interventions.

Requests/Concerns/ Comments Category in the intervention for the 2021 CNL ROR	Number of times the topic category was raised across 2021 CNL ROR interventions	Number of Intervenors who raised the topic in intervention
CNSC's Consultation and Engagement activities (Indigenous and Stakeholder) (e.g., suggestions for improvements to the approach to consultation and engagement and request for meaningful responses to issues raised)	41	7
Improvements to ROR process and ROR content (e.g., requests related to: improving accessibility, providing additional information or clarification in specific sections of the report, providing information about the performance rating system and improving the format of the report)	30	2
CNSC Oversight Activities (e.g., suggestions for improvements to the approach to consultation and engagement and request for meaningful responses to issues raised)	25	4
Environmental Monitoring (e.g., requests to be included in the development of monitoring plans and for additional monitoring to occur)	18	6
Waste Management (e.g., concerns about impacts from increased amounts of waste)	5	4
Impacts to Indigenous or Treaty Rights (e.g., concerns about lack of consent from Indigenous Nations and communities in the initial establishment of nuclear operations on traditional territories)	4	2
Indigenous Knowledge (e.g., requests to clarify how Indigenous Knowledge has been considered and	4	3

Requests/Concerns/ Comments Category in the intervention for the 2021 CNL ROR	Number of times the topic category was raised across 2021 CNL ROR interventions	Number of Intervenors who raised the topic in intervention
incorporated)		
Other (some examples: Nation-specific concerns, comments relating to specific technologies)	3	1
Nuclear Emergency Management (e.g., concerns around potential nuclear emergencies and safety processes)	2	2
CNL activities and Engagement (e.g., suggestions for improving CNL's engagement with Indigenous Nations and communities)	2	2
Participant Funding Program (e.g., requests for more funding to support participation in regulatory activities)	1	1
Small Modular Reactors (e.g., concerns relating to the possibility of SMR development)	1	1
Economic Development (e.g., request for more economic opportunities resulting from the nuclear industry)	1	1
Long Term Relationship Development (e.g., requests for additional relationship development activities between the CNSC and Indigenous Nations and Communities)	1	1

Conclusion

CNSC staff take the issues and concerns raised by intervenors seriously and CNSC ROR Project officers with assistance from the Indigenous and Stakeholder Relations Division will continue to work with each intervenor identified in Table A who has raised issues and concerns on identifying approaches to addressing the different topic areas, requests and comments raised as appropriate. Furthermore, the CNSC is committed to continuously improving the quality of data included in RORs, and the ROR reporting process. CNSC acknowledges that the two main themes of issues raised in the 2021 CNL

ROR were “CNSC’s Consultation and Engagement activities” and “improvements to the ROR process and ROR content” and has made it a priority to further discuss and address these issues, where feasible. As part of this commitment, CNSC staff have included appendices in all 2022 RORs with information on the issues and concerns raised by intervenors and the status of the CNSC’s work to follow-up, respond to and address each intervention as appropriate, and are working towards the continued expansion and enhancement of reporting to the Commission on issues tracking and engagement efforts.

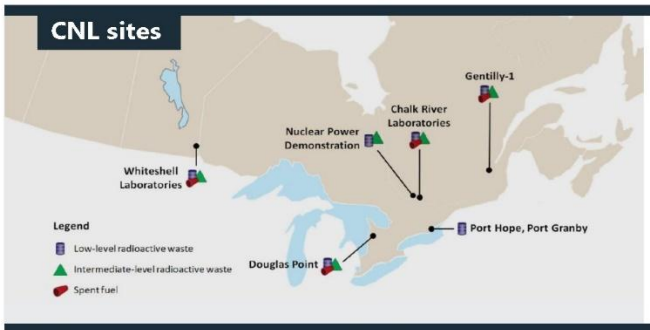
The CNSC is dedicated to continuous improvement, and actively works to identify meaningful ways and approaches for addressing the concerns, comments and recommendations made by intervenors identified in the RORs, where appropriate. In instances where issues and concerns are raised that the CNSC and the intervenor may disagree the CNSC is open to having dialogue and working towards finding solutions and building consensus around key issues within the CNSC’s mandate and authority.

N. ROR DASHBOARD

Regulatory Oversight Report (ROR) Dashboard of Canadian Nuclear Laboratories Sites: 2022

This dashboard gives an overview of the safety performance of Canadian Nuclear Laboratories (CNL) sites and the efforts of the Canadian Nuclear Safety Commission (CNSC) to ensure the safety and protection of the people and the environment around the sites in 2022.

CNL sites



8 CNSC inspectors dedicated to CNL sites

30–40 CNSC staff with regulatory effort at CNL sites

3 CNSC employees working at Chalk River Laboratories site

Safety and control areas (SCAs)

14 SCAs

Chalk River Laboratories and Whiteshell Laboratories were rated as below expectations for the SCAs of Security and Emergency Management and Fire Protection, respectively. Other SCAs for these sites were rated as satisfactory. All other sites were rated as satisfactory for all 14 SCAs.

3 SCAs of focus in the ROR

1. Environmental protection
2. Radiation protection
3. Conventional health and safety

CNSC staff concluded that all CNL sites operated safely in 2022

Activities

61 International Atomic Energy Agency-led safeguards inspections

21 CNSC inspections

73 CNSC notices of non-compliance (NNCs)

Events

59 reportable events

1 event reported to the Commission

All NNCs were of low safety significance and did not impact safety at CNL sites

Maximum doses

Regulatory limit

Estimated dose

Effective dose

The public

0.033 mSv/y — 1 mSv/y

The maximum estimated dose to the public from any CNL site in 2022 was at the Port Granby Project.

Nuclear energy workers (NEWs)

5.48 mSv/y — 50 mSv/y

The maximum effective dose received by a NEW in 2022 across CNL sites was at Chalk River Laboratories.

Public outreach

CNSC staff conducted and participated in more than 10 outreach activities with respect to CNL sites in 2022.

Independent Environmental Monitoring Program

In 2022, CNSC staff conducted independent environmental monitoring around Chalk River Laboratories, Douglas Point and Whiteshell Laboratories. There were no results of concern.

Licensing actions

In 2022, the Commission made the decision to renew the Port Hope Project licence and consolidate with the other Port Hope Area Initiative licences. This new licence was valid starting January 1, 2023.

O. SELECTED WEBSITES

Canadian Nuclear Laboratories - www.cnl.ca

Canadian Nuclear Safety Commission - www.nuclearsafety.gc.ca

CNL Annual Compliance Monitoring Reports via the CNL website - https://www.cnl.ca/environmental-stewardship/performance-reporting/

CNL Regulatory Oversight Reports via the CNSC website - http://www.nuclearsafety.gc.ca/eng/resources/publications/reports/regulatory-oversight-reports/CNL-sites.cfm

Information on CRL via the CNSC website- http://nuclearsafety.gc.ca/eng/reactors/research-reactors/nuclear-facilities/chalk-river/index.cfm

CSA Group - www.csagroup.org/

CSA Group via the CNSC website - https://nuclearsafety.gc.ca/eng/acts-and-regulations/regulatory-documents/csa-standards.cfm

Information on WL via the CNSC website- http://nuclearsafety.gc.ca/eng/reactors/research-reactors/other-reactor-facilities/whiteshell-laboratories.cfm

Information on DPWF via the CNSC website- http://nuclearsafety.gc.ca/eng/reactors/research-reactors/other-reactor-facilities/douglas-point-waste-facility.cfm

Information on G1WF via the CNSC website- http://nuclearsafety.gc.ca/eng/reactors/research-reactors/other-reactor-facilities/gentilly-1-facility.cfm

Information on NPDWF via the CNSC website- http://nuclearsafety.gc.ca/eng/reactors/research-reactors/other-reactor-facilities/nuclear-power-demonstration.cfm

CNSC's SCA framework via the CNSC website-

1.http://www.nuclearsafety.gc.ca/eng/resources/publications/reports/powerindustry/safety-and-control-areas.cfm

2. http://www.nuclearsafety.gc.ca/eng/resources/news-room/feature-articles/safety-and-control-areas.cfm

Action Levels (AL) via the CNSC website- http://www.nuclearsafety.gc.ca/eng/resources/news-room/feature-articles/radiation-dose-limits-release-limits-and-action-levels.cfm

2022 Annual radionuclides via CNSC Open Government Portal- https://open.canada.ca/data/en/dataset/6ed50cd9-0d8c-471b-a5f6-26088298870e

Independent Environmental Monitoring Program (IEMP) via CNSC website- http://www.nuclearsafety.gc.ca/eng/resources/maps-of-nuclear-facilities/iemp/index-iemp.cfm