CMD 25-M9 - CNSC Staff Submission

Regulatory Oversight Report for Canadian Nuclear Power Generating Sites for 2023

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Summary	Each year, the Canadian Nuclear Safety Commission (CNSC) publishes regulatory oversight reports, which offer information on the safety performance of Canadian licensees who are authorized to use nuclear substances. The reports evaluate licensees based on their safety procedures and adherence to regulatory policy. Key issues and emerging changes in regulation are also highlighted.
Actions required	See Section 1.7, Actions from the Commission

CMD 25-M9

Regulatory Oversight Report for Canadian Nuclear Power Generating Sites for 2023

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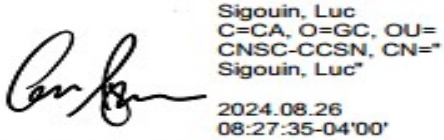

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Regulatory Oversight Report for Canadian Nuclear Power Generating Sites for 2023

Canadian Nuclear Safety Commission

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Changes since last review

Change	Rationale
Structure Change	Modernization and alignment of CNSC RORs
Data found in previous Section 2 now found in Appendix F	Modernization and alignment of CNSC RORs
Addition of staff hours and effort in 1.7	In response to Commission member feedback

Land acknowledgement

The Canadian Nuclear Safety Commission (CNSC) is committed to building and strengthening trust and advancing reconciliation with Indigenous Nations and communities.

CNSC staff would like to acknowledge that the facilities and activities regulated by the CNSC and subject to this regulatory oversight report are located on the many traditional and treaty territories of Indigenous peoples in Canada. It is important to give recognition and thanks to the land and the Indigenous peoples that the CNSC works with across Canada.

The CNSC aims to be an open, culturally sensitive, respectful organization that engages in open and transparent dialogue, partnership, and collaboration with Indigenous Nations and communities. The CNSC envisions its staff as being active listeners who understand the role they play in advancing reconciliation and acknowledges that they have a lot to learn from Indigenous peoples and their perspectives.

Plain language summary

The regulatory oversight report describes the oversight activities by the CNSC and safety performance of nuclear power generating sites, consisting of nuclear power plants (NPPs) and their associated Waste Management Facilities (WMFs), in Canada in 2023. For certain topics, updates on developments in 2024 are also described.

Each line in the list identifies facilities that are governed by a single CNSC licence; for this reason, they are assessed together in this report:

- Darlington Nuclear Generating Station, which includes the Tritium Removal Facility and Retube Waste Processing Building
- Darlington Waste Management Facility
- Pickering Nuclear Generating Station
- Pickering Waste Management Facility
- Bruce Nuclear Generating Station A and B
- Western Waste Management Facility
- Radioactive Waste Operations Site-1
- Point Lepreau Nuclear Generating Station, which includes the Solid Radioactive Waste Management Facility
- Gentilly-2 Facilities, which consist of the nuclear generating station in a safe shutdown state, and associated waste storage facilities

CNSC staff verified, and confirmed, the safe operation of the NPPs and WMFs in 2023. This conclusion was based on CNSC staff assessments of findings from compliance verification activities for each facility in the 14 CNSC safety and control areas (SCAs).

The conclusion was further supported by other observations, including the following:

- No serious process failures occurred at the NPPs. The number of unplanned power reductions, transients and trips in the reactors was low and acceptable to CNSC staff. All unplanned power reductions and transients in the reactors were controlled per design and safely managed.
- Radiation doses to the public and to workers at the NPPs and WMFs were below the regulatory limits.
- The frequency and severity of non-radiological injuries to workers were low.
- Radiological releases to the environment from the NPPs and WMFs were below regulatory limits.
- Licensees met the applicable requirements related to Canada’s international obligations; safeguards inspection results were acceptable to the IAEA.

The SCAs at all NPPs and WMFs were rated as “satisfactory”.

Referenced documents in this CMD are available to the public upon request, subject to confidentiality considerations.

1 Overview

1.1 Background

Each year, the Canadian Nuclear Safety Commission (CNSC) publishes regulatory oversight reports, which offer information on the safety performance of Canadian licensees. The reports evaluate licensees based on their safety procedures and adherence to regulatory requirements. Key issues and emerging changes in regulation are also highlighted.

Learn more about regulatory oversight reports

1.2 Scope of report

The *Regulatory Oversight Report for Canadian Nuclear Power Generating Sites: 2023* describes the regulatory oversight and safety performance of the NPPs in Canada, including Gentilly-2.

- Reference to “NPPs” are intended to apply to Gentilly-2, while the phrase “operating NPPs” is used for statements that do not apply to Gentilly-2.
- The report also covers the WMFs located at the same sites, whether they are regulated under the same licence as the NPP or licensed separately.
- The information provided in this regulatory oversight report is pertinent to 2023, and the status that is described is valid as of December 2023.
- The word “UPDATE” is used to identify topics where more up-to-date information (up to June 1, 2024) is included (for example, progress on corrective actions, descriptions of significant events, and updates that the Commission specifically requested).

1.3 Nuclear facilities covered by this report

Figure 1 shows the geographic location in Canada for the NPPs and WMFs covered by this report. It also indicates the type of waste stored at each WMF and the status of each reactor on a site. 16 reactors continued to operate in Canada throughout 2023.

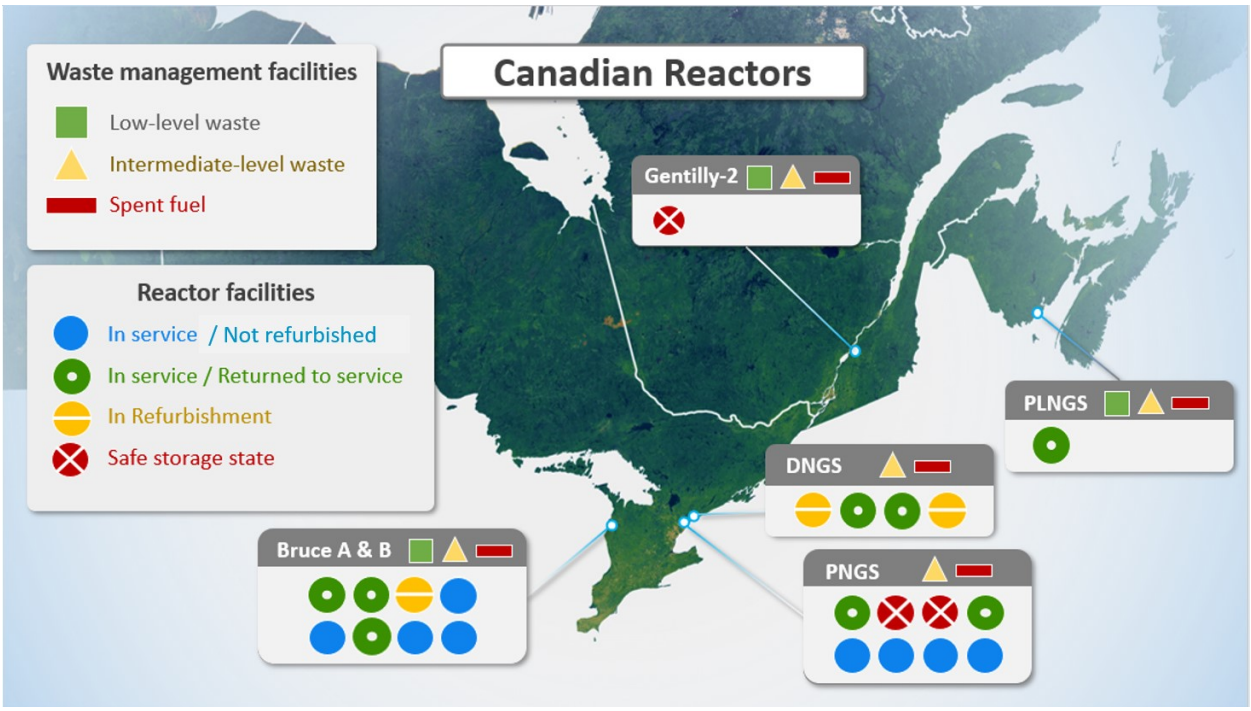


Figure 1: Locations of nuclear power generating sites in Canada

Table 1 provides the list of the location and licensee for each nuclear power generating site in Canada. For additional information on each facility, please refer to the link provided in the table.

Table 1: Nuclear Power Generating Sites in Canada 2023

Nuclear facility	Location	Licensee
Bruce Nuclear Generating Stations A and B (cnsc-ccsn.gc.ca)	Kincardine, Ontario	Bruce Power
Western Waste Management Facility	Kincardine, Ontario	Ontario Power Generation
RWOS-1*	Kincardine, Ontario	Ontario Power Generation
Darlington Nuclear Generating Station (cnsc-ccsn.gc.ca)	Clarington, Ontario	Ontario Power Generation
Darlington Waste Management Facility	Clarington, Ontario	Ontario Power Generation
Pickering Nuclear Generating Station (cnsc-ccsn.gc.ca)	Pickering, Ontario	Ontario Power Generation
Pickering Waste Management Facility	Pickering, Ontario	Ontario Power Generation

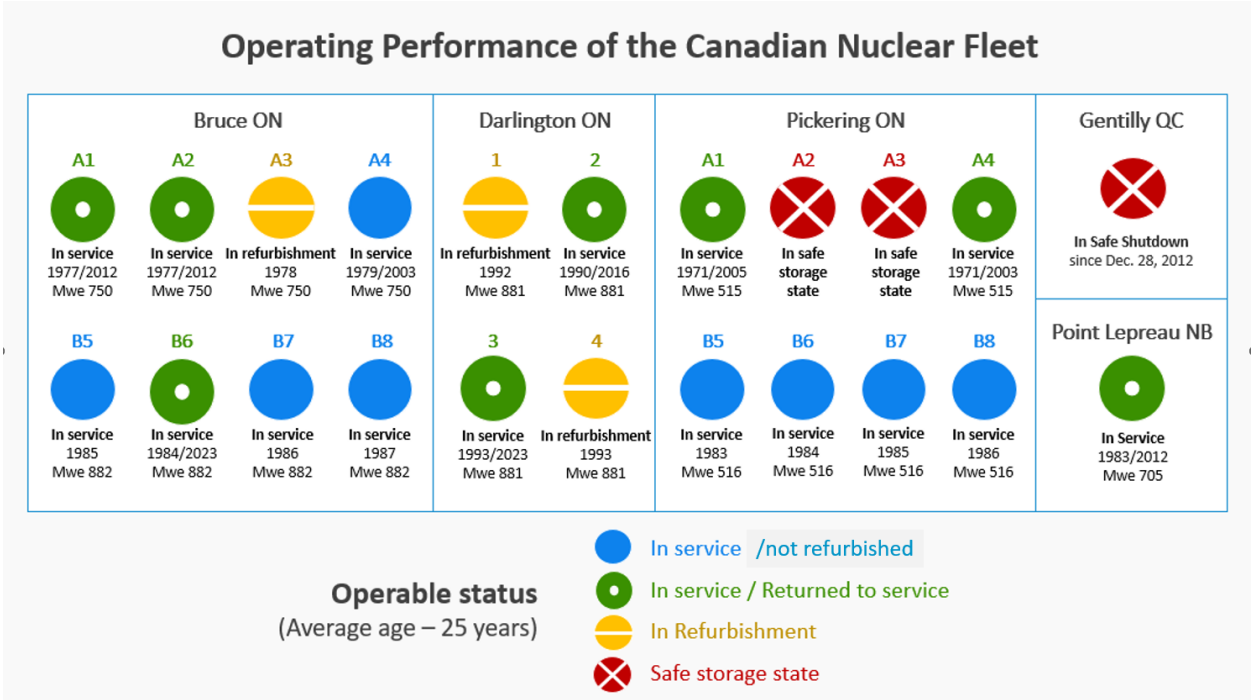
Point Lepreau Nuclear Generating Station (cnsc-ccsn.gc.ca)	Lepreau, New Brunswick	New Brunswick Power Corporation
Nuclear Facility – Gentilly-2 (cnsc-ccsn.gc.ca)	Bécancour, Québec	Hydro-Québec

*The RWOS-1 site is no longer receiving waste and is in a state of storage with surveillance by OPG

1.4 NPPs

Figure 2 provides data for each NPP, including the generating capacity of the reactor units, their initial start-up dates, and reactor status in 2023. Additional information on the NPPs and licences is provided in Section 2.

Figure 2: Basic Information for all NPPs, as of December 31, 2023



As indicated in Figure 2:

- BNGS Unit 3 was offline for Major Component Replacement (MCR) and Unit 6 returned to service from MCR.
- DNGS Units 1 and 4 were offline for refurbishment, and Unit 3 returned to service from refurbishment.
- PNGS includes Units 2 and 3, which remained defueled and in safe storage.

    - The non-operating reactors are included in the same power reactor operating licence (PROL) as the operating units.
- The NPP at Gentilly-2 is shut down and is governed by a power reactor decommissioning licence.

Learn more about Nuclear Power Plants in Canada

New NPPs

In 2012, the Commission issued a nuclear power reactor site preparation licence (PRSL) to Ontario Power Generation (OPG) for the Darlington New Nuclear Project (DNNP) at the Darlington site for a period of 10 years. This PRSL required OPG to continue to implement the commitments and measures identified during the environmental assessment (EA) process, the Joint Review Panel hearings, as well as measures identified in the EA follow-up program. OPG has been implementing the EA follow-up program and mitigation measures since the issuance of the initial PRSL.

In October 2021, the Commission renewed the site preparation licence for a period of 10 years (PRSL 18.00/2031), and in December of that year, OPG announced the selection of the GE Hitachi BWRX-300 as the new reactor technology for the DNNP. As required by the licence, OPG submitted required documentation to proceed with site preparation activities. In August 2022, the CNSC authorized OPG to commence limited site preparation work such as vegetation clearing and placement of environmental protective measures. Subsequently, in April 2023, after reviewing the remaining documentation, CNSC staff authorised OPG to proceed with the additional site preparation activities. These activities encompassed the installation of stormwater management systems and essential site services , such as water, electrical infrastructure, and IT services. In October 2022, OPG submitted an application for a licence to construct a single BWRX-300 reactor.

UPDATE: In January 2024, a Commission hearing was held to determine the applicability of the of the DNNP EA to the BWRX 300 reactor. In April of that year, the Commission released its Record of Decision, confirming that the BWRX-300 reactor was bounded by the EA. A Commission hearing on OPG's application for a licence to construct will take place in late 2024, where CNSC staff will present the results of its review and recommendation to the Commission.

New Brunswick Power (NB Power), in partnership with ARC Clean Technology Canada, is proposing to deploy one ARC-100 small modular reactor (SMR) at the Point Lepreau Nuclear Generating Station site in New Brunswick. In June 2023, CNSC staff received an application for a licence to prepare site for the proposed SMR, and the application is currently undergoing regulatory review under the *Nuclear Safety and Control Act*, which will include an environmental protection review.

The proposed project Is also undergoing a comprehensive environmental impact assessment (EIA) by the Government of New Brunswick. CNSC staff are providing technical support throughout the provincial EIA process as members of the Technical Review Committee.

In December 2022, the federal Minister of Environment and Climate Change responded to a designation request for the ARC project and concluded that the project did not warrant designation pursuant to subsection 9(1) of the *Impact Assessment Act*.

In October 2023, CNSC staff received a formal notice of Bruce Power's intent to apply for a licence to prepare site and to commence an Impact Assessment (IA) for new nuclear generation on the Bruce site in Kincardine, Ontario. Bruce Power plans to submit the Initial Project Description (IPD) to the Impact Assessment Agency of Canada (IAAC) and the CNSC in 2024.

Learn more about New Reactor Facility Projects in Canada

1.5 Waste Management Facilities

The WMFs that are included in this regulatory oversight report are licensed independently from the associated NPP except for the Solid Radioactive Waste Management Facility (SRWMF) at the Point Lepreau site. The WMFs include the Darlington Waste Management Facility (DWMF), Pickering Waste Management Facility (PWMF) and Western Waste Management Facility (WWMF), each of which is owned and operated by OPG under a waste facility operating licence (WFOL). The Radioactive Waste Operations Site-1 (RWOS-1) facility is licensed under a waste nuclear substance licence (WNSL). More information on the WMFs is discussed in Section 2 of this report.

Learn more about Radioactive Waste

1.6 Regulatory oversight

The CNSC regulates the nuclear sector in Canada through:

- compliance verification, which includes
    - assessment of performance
    - enforcement
    - reporting
- licensing

The CNSC uses a risk-informed regulatory approach to these activities, applying resources and regulatory oversight commensurate with the risk associated with the regulated facility and activity.

Additional information on the CNSC's regulatory framework and oversight is provided in this section and in General Description of Regulatory Framework for Nuclear Power Generating Sites [2].

Periodic safety reviews

For operating nuclear power plants (NPPs), implementation of a periodic safety review (PSR) process is required every 10 years and is usually concluded prior to the end of the licensing period (which are currently also 10 years) so that it can be used as an input to support an application for licence renewal.

The PSR involves an assessment of the current plant design, programs and performance against modern codes, standards and practices, to identify practical safety improvements to be made to the facility as well as to identify any factors that could limit safe operation for the subsequent operating and/or licensing period. The final output of the PSR is to develop a scheduled improvement plan to be implemented during the next 10-year period of facility operation. A PSR may also include a longer-term assessment as a means of informing project plans for life extension of a facility (e.g., refurbishment), however the frequency of PSRs remains every 10 years.

A PSR is not a requirement for the Gentilly-2 Facilities and the WMFs because, relative to operating NPPs, the associated hazards are fewer and smaller, and the requirements change on a less frequent basis, such that the regular licensing process and implementation of updated CNSC regulatory documents and CSA Group standards are sufficient to ensure safe operation.

> Learn more about Periodic Safety Reviews (REGDOC 2.3.3)

Reporting

Licensees are required to provide various reports and notices to the CNSC in accordance with regulations made under the *Nuclear Safety and Control Act*.

In addition to, and in conjunction with, the reporting requirements in the regulations, a licence condition requires NPP licensees to report to the CNSC in accordance with CNSC REGDOC-3.1.1, *Reporting Requirements for Nuclear Power Plants*.

- REGDOC-3.1.1 requires licensees to submit quarterly and annual reports on various subjects, including the safety performance indicators that are discussed in this report, as well as event reports and notifications.
- For the Gentilly-2 Facilities, the requirements in REGDOC-3.1.1 have been adjusted in accordance with its current state and the associated risks.

For WMFs, OPG is required to submit annual compliance reports as described in REGDOC-3.1.2, *Reporting Requirements, Volume I: Non-Power Reactor Class I Facilities and Uranium Mines and*

Mills. In addition, OPG is required to provide quarterly operations reports for all 3 WMFs as part of the conditions listed in the LCH.

CNSC staff reviewed the reports and are satisfied with the reported licensee values and concluded they have provided the required information.

1.6.1 Compliance verification

Regular inspections and evaluations verify that licensees are complying with laws and regulations, as well as the conditions of their licence. In this way, the CNSC can assure licensees are operating safely and adhering to their licence conditions.

The CNSC staff conclusions presented in this report were based on the results of risk informed, performance-based activities planned through the CNSC compliance verification program (CVP).

> Learn more about the CNSC Compliance Verification Program
>
> Learn more about CNSC's approach to compliance verification and enforcement

1.6.2 Licensing

- Each facility has a licence granted by the Commission, which defines the licence period, licensed activities, and licence conditions.
- A licensee may apply for a licence renewal and/or amendment and must submit information demonstrating that they are qualified to conduct activities authorized by the licence.
- All licensees are required to operate in accordance with the licensing basis as set by the Commission.
- When a licence is issued, CNSC staff develop a **licence conditions handbook** (LCH) to identify the specific requirements that apply to that licensee.

1.7 Highlights from 2023 regulatory oversight activities

CNSC Staff at NPG Sites in 2023

- Total hours working on compliance in 2023: 155,656 hours.
- Total hours working on licensing/refurbishment in 2023: 35,113 hours.
- Number of inspection reports produced in 2023: 85.

- Number of inspectors dedicated to NPG sites in 2023: 38.
- Number of CNSC staff other than inspectors dedicated to NPG sites in 2023: 57.
    - Not including the many technical specialists that support the regulatory program.

Inspections

The total number of inspections by type is provided in Table 2 below.

Table 2: Total Number of Each Type of Inspection and Findings per NPP in 2023

Site	# of Type I inspections	# of Type II Inspections	# of Desktop Inspections	# of Field Inspections	# of Findings[1]
Darlington	0	13	6	86	312
DWMF	0	2	1	0	46
Pickering	0	20	7	44	430
PWMF	0	1	1	0	34
Bruce	1	22	2	47	319
WWMF	0	4	1	0	109
RWOS-1	0	0	0	0	0
Point Lepreau	0	13	3	48	284
Gentilly-2	0	4	0	0	54
Total	0	70	19	217	1578

Event Reporting

- In accordance with CNSC *REGDOC-3.1.1, Reporting Requirements for Nuclear Power Plants*, NPP licensees, including Hydro-Québec, reported to CNSC staff on 185 events.
- In accordance with the *General Nuclear Safety and Control Regulations*, the WMF licensee, OPG, also submitted 8 reportable events to CNSC staff in 2023.

[1] The number of findings include both compliant and non-compliant findings.

- Table 3 below presents the number of event reports that were reported per site and reviewed by CNSC staff in 2023.

Table 3: Total number of events reported to CNSC staff in the last three years per site

Site	# of Events in 2023	# of Events in 2022	# of Events in 2021
Darlington NGS	29	40	60
Darlington WMF	4	1	2
Pickering NGS	44	38	48
Pickering WMF	1	1	2
Bruce NGS A and B	87	67	92
Western WMF	3	0	5
Point Lepreau NGS	22	44	29
Gentilly-2	11	0	2
RWOS-1	0	0	0
Total	193	191	241

Actions from the Commission

This report includes information requested by the Commission from previous regulatory oversight reports and licensing hearings. These requests are tracked through the CNSC Regulatory Information Bank (RIB) system. Table 4 provides the RIB tracking number, a description of the request, and where the request is addressed by CNSC staff in this report.

Table 4: Details on RIB requests from the Commission

RIB #	Action	Report Section
14757	Report on the maximum [Heq] of the pressure tubes as part of the NPP Status Report during each Commission Meeting Through the NPP Status Report, as well as in the NPP ROR. CNSC staff recommend that this request remain open.	Appendix G
14761	Monitor Bruce Power's continuing efforts to bring internal fire risk to below the safety goal target for the BNGS A units, and report on Bruce Power's progress regarding internal fire risk improvements at the BNGS A station in the Annual NPGS ROR.	Section 2.5.4

	CNSC staff recommend that this request remain open at least until the 2024 Fire PSA update is reviewed by CNSC staff.	
31670	CNSC staff's responses to the recommendations from CMD 23-M27.29, Nuclear Transparency Project Written Intervention. CNSC staff recommend that this request be closed.	Presented to the Commission in a separate CMD

2 Assessment of Safety and Control Areas

- This report presents safety performance ratings for each Safety and Control Area (SCA) at each NPP and WMF, derived from compliance verification activities.
- All findings are categorized into appropriate specific areas within the SCAs and are assessed against a set of high-level performance objectives and regulatory requirements.
- Since the CVP consists of a rolling (typically 5-year) cycle of regulatory activities, not all specific areas are directly evaluated every year.
- The SCAs and their associated specific areas are described in more detail in General Description of Regulatory Framework for Nuclear Power Generating Sites [2].
- A list of inspections that were considered in this ROR are listed in : List of Inspections Reports at each NPP and WMF.
- All sites in this report received a rating of satisfactory for 2023.

Learn more about the rating definitions and methodology.

2.1 Darlington Nuclear Generating Station

Overview

Figure 3: Darlington Nuclear Generating Stations

The Darlington site is located on the north shore of Lake Ontario in Clarington, Ontario, 5 kilometres outside the town of Bowmanville and 10 kilometres southeast of Oshawa. The Darlington site lies within the lands and waters of the Michi Saagiig Anishinaabeg, the Gunshot Treaty (1877-88), the Williams Treaties (1923), and the Williams Treaties Settlement Agreement (2018).

Licence: PROL 13.03/2025

- Licence term: January 1, 2016, to November 30, 2025.
- Licence last amended: October 26, 2021.
- Licensee: Ontario Power Generation.
- Location: Clarington, Ontario.
- Fisheries and Oceans Canada (DFO) Authorization expiration: June 24, 2015, to December 31, 2031.
- Unit 1 entered refurbishment activities in February 2022.
- Unit 2 was fully operational in 2023.
- Unit 3 returned to service following refurbishment in July 2023.
- Unit 4 entered refurbishment activities in July 2023.

Learn more about Darlington Nuclear Generating Station

Table 5: Summary of the number of inspections performed for Darlington
(Full inspection list found in: List of Inspections Reports at each NPP and WMF)

Type 1	Type 2	Desktop	Field	Number of findings
0	13	5	86	Compliant: 252 Non-Compliant: 60 Total: 312

Table 6: 2023 Ratings and number of inspections for DNGS: total inspections covering an SCA and inspections with a primary focus[2] on the SCA (primary focus figures in parentheses)

SCA	Rating	Number of Type 1 inspections	Number of Type 2 inspections	Number of Desktop inspections
Management System	Satisfactory	0	11 (2)	4 (1)
Human Performance	Satisfactory	0	11 (1)	4 (2)
Operating Performance	Satisfactory	0	9 (4)	1
Safety Analysis	Satisfactory	0	1	0
Physical Design	Satisfactory	0	5 (2)	1
Fitness for Service	Satisfactory	0	6 (2)	0
Radiation Protection	Satisfactory	0	6 (2)	1 (1)
Conventional Health and Safety	Satisfactory	0	4	0
Environmental Protection	Satisfactory	0	2	0
Emergency Preparedness and Fire Protection	Satisfactory	0	4	0
Waste Management	Satisfactory	0	2	0
Security	Satisfactory	0	0	0
Safeguards and Non-Proliferation	Satisfactory	0	2	0
Packaging and Transport	Satisfactory	0	1	0

[2] Inspections typically center on a main focus area or program related to a specific SCA. This main focus is referred to as the primary focus SCA for that inspection. Additionally, the inspection may include other criteria that fall under different SCAs.

Periodic Safety Review (PSR)

- In February 2020, OPG notified the CNSC of its intent to commence a Periodic Safety Review (PSR), intended to review the status of the DNGS to support operations beyond 2025.
- The PSR Basis Document was submitted in September 2020 and accepted by CNSC staff in January 2021. Fifteen Safety Factor Reports were submitted to CNSC staff between July and September 2021.
- OPG submitted the Global Assessment Report (GAR) in December 2022 and CNSC staff completed reviews in June 2023.
- The PSR Integrated Implementation Plan (IIP) was submitted to CNSC staff for acceptance, per REGDOC-2.3.3, *Periodic Safety Reviews,* in September 2023.
- The PSR-IIP for Darlington NGS to support operations from 2025-2035 was accepted by CNSC staff on March 25, 2024.

Event Initial Reports (EIRs)

One EIR pertaining to both the Pickering NGS and Darlington NGS was submitted to the Commission for the reporting period between January 1, 2023, to December 31, 2023:

- CMD 23-M16, Misplaced equipment during OPG training activity. March 2, 2023 Commission Meeting.
    - This EIR contains prescribed security information and is not publicly available.
    - This EIR is part of the overall assessment for the Security SCA, on page 22.

Refurbishment

Unit 3 Refurbishment in 2023:

- DNGS Unit 3 began its refurbishment outage in September 2020.
- Throughout the first half of 2023, the Unit 3 refurbishment project focused on the Return to Service phase of the project.
- Following removal of the first Regulatory Hold Point (RHP) - Fuel Load - in late 2022, and upon CNSC staff's confirmation that all pre-requisites had been satisfactorily addressed, the Executive Vice President, and Chief Regulatory Operations Officer (EVP-CROO) of the CNSC removed the remaining 3 RHPs, resulting in the unit's return to commercial operation in July 2023.

Unit 1 Refurbishment in 2023:

- DNGS Unit 1 began its refurbishment outage in February 2022.
- Regulatory oversight in 2023 was primarily focused on installation activities, with return to service activities, including moderator fill, occurring late in the year.

Unit 4 Refurbishment in 2023:

- OPG began defueling Unit 4 in July 2023, after Unit 3 was returned to service.
- Over the course of the year, work on this unit transitioned to the component removal phase. Unit 4 is expected to be returned to service in 2025.

Overall:

- Throughout the various refurbishment projects, CNSC staff conducted compliance verification activities as established in the Darlington Refurbishment Project Multi-Unit Compliance Plan and confirmed that OPG was in compliance with regulatory requirements.
- There were no inspection findings with a medium or high safety significance identified during refurbishment.
    - OPG continues to operate the Retube Waste Processing Building, where removed reactor core components are volume reduced before being sent to onsite storage facilities.

Table 7 summarizes the Darlington ISR-IIP tasks, or commitments, that were planned to be completed, those completed, and those closed following the CNSC review, in 2023.

Table 7: DNGS ISR-IIP Item Status (based on planned dates as of December 2023)

Total Commitments	Overall	2023	2022	2021
Planned	622	60	31	8
Completed by OPG	517	60	43	23
Closed by the CNSC	476	31	28	32

- By the end of 2023, OPG has completed their ISR-IIP commitments according to their plan, and CNSC staff are satisfied with OPG'S progress.

Production of Mo-99 at DNGS

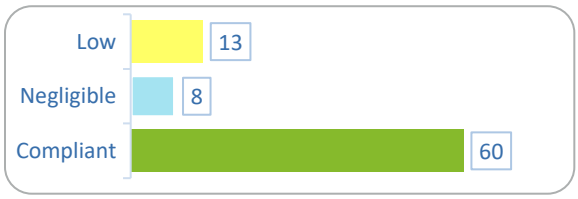
- In fall of 2021 the Commission amended OPG's PROL to include the production of Molybdenum-99 (Mo-99) through the use of a new Isotope Irradiation System (IIS) (also known as the target delivery system (TDS); the Mo-99 IIS / TDS) that would deliver natural molybdenum-98 into the core, and harvest Mo-99 after irradiation.

- During 2023, OPG progressed through activities related to commissioning & available for service (AFS) declarations, as well as fulfilling the associated regulatory commitments.
- CNSC staff are continuing to provide regulatory oversight of this project and are reviewing submissions, including AFS documentation, provided by OPG.
- In late 2023, OPG reported to CNSC staff a configuration management issue that resulted in minor components of the target elevator (TEL) of the TDS not being installed consistently across the 4 TELs on Unit 2, either being installed (1) as intended (functionally – but not in accordance with a technical drawing); or (2) as specified (in accordance with design documentation – but not functional), to CNSC staff.
    - UPDATE: The issue required physical modifications to be corrected, which were completed during the planned outage of Unit 2, conducted in early 2024.
    - CNSC staff started a reactive inspection of this issue in 2024.

2.1.1 Management System

Performance rating: Satisfactory

Number of findings by rating:



CNSC staff inspections in the records management area in 2023 identified non-compliances of low and negligible safety significance regarding completeness and properly approved records.

- While several of the non compliances are still being resolved, CNSC staff are satisfied with OPG's progress to-date in correcting the non-compliances.

- CNSC staff also conducted inspections related to configuration management that identified non-compliances of low safety significance regarding maintenance of design documentation, and placement of work request tags. CNSC staff continue to follow-up on, and verify, OPG's implementation of corrective actions.
- CNSC staff note that corrective actions to address non-compliances for the Management System SCA could be improved.
- OPG continued to meet business continuity requirements throughout 2023. OPG has adequate measures in place relating to business continuity in the event of disabling circumstances such as illness and severe weather.

2.1.2 Human Performance Management

Performance rating: Satisfactory

Number of findings by rating:

CNSC staff inspections in Human Performance in 2023 identified non-compliances of low and negligible safety significance, as well as 1 medium finding discussed below. The negligible and low safety significant findings were related to personnel certification, personnel training, fitness for duty and the human performance program.

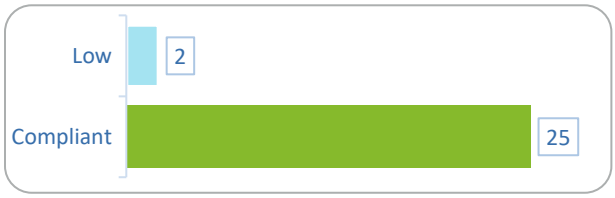
- In 2022, an inspection carried out on initial simulator certification examinations revealed some findings related to the administration and grading of these exams, prompting corrective actions to be implemented by OPG. Specifically, the findings pertained to the administration process and grading accuracy specific to one candidate group.
    - While no evidence of recurrence among other candidate groups has been noted, similar concerns persisted in subsequent compliance verification activities focused on the same group of candidates, which was divided into subgroups A, B and C due to its size.
    - This includes a desktop inspection conducted in 2023 on the grading phase of these examinations, which identified several low significance findings as well as one medium finding related to the requirements of CNSC- EG2, Rev.0, Requirements and Guidelines for Simulator-based Certification Examinations for Shift Personnel at Nuclear Power Plants.
    - In response, OPG initiated a Root Cause Investigation (RCI) and implemented corrective actions. CNSC staff continue to monitor OPG's corrective actions and applied reactive oversight activities in the form of field inspections and compliance assessments to ensure that this is not repeated, nor indicative of deficiencies in the overall certification program.
    - OPG continues to make progress on corrective actions and CNSC staff have not noted further similar findings in subsequent candidate groups.
- OPG reported 'hours of work' non-compliances in a timely manner and maintained adequate programs and processes to ensure worker fitness for duty.

- CNSC staff confirmed that OPG has maintained sufficient personnel at DNGS for all certified positions, and that all certified workers possessed the necessary knowledge and skills to perform their duties safely and competently.
- In 2023, OPG reported 1 Minimum Shift Complement (MSC) violation at the DNGS. This event lasted approximately 90 minutes and occurred when an employee suddenly became ill and required medical attention. Relief was sought promptly, and no follow-up actions were required.

2.1.3 Operating Performance

Performance rating: Satisfactory

Number of findings by rating:



In 2023, CNSC staff conducted 12 compliance verification activities in the area of Operating Performance, with several activities in other SCAs that also considered aspects of Operating Performance.

  - CNSC staff are reviewing the actions taken by OPG to address the noted shortcomings.
- In 2023, OPG continued to take steps to address outstanding non-compliance Action Items resulting from inspections conducted in previous years.
  - CNSC staff found that OPG was progressing well to address the outstanding notices of non-compliance (NNC), which led to the closure of two action items in early 2024.
  - OPG and CNSC staff continue to engage and discuss OPG's progress towards continuous improvements in this area.
- As found in Appendix F1 in 2023:
  - DNGS had three unplanned reactor power changes reported to the CNSC in accordance with REGDOC-3.1.1.
    - One event on Unit 3 was a reactor condition that required a manual power reduction.

  - One event on Unit 2 resulted in an automatic shutdown system (SDS) 2 reactor trip following a brief setback.
  - One event on Unit 3 was a reactor setback during unit commissioning activities during the refurbishment start-up activities.
- All transients were properly controlled, and power reduction was automatically initiated by the reactor control systems.
- All DNGS Units met World Associate of Nuclear Operators (WANO) Pressurized Heavy Water Reactor (PHWR) target of 1.0 trip per 7,000 hours of operation.

2.1.4 Safety Analysis

Performance rating: Satisfactory

Number of findings by rating: One compliant finding

Deterministic Safety Analysis

- OPG submitted a revision of Parts 1 and 2 of the Safety Report in November 2023, which is under review by CNSC staff. Parts 1 and 2 of the Safety Report describe the site where the facility is located (Part 1) as well as the facility, systems and equipment (Part 2) that make up the design basis of the station.
- OPG also submitted a revision to Part 3 of the Safety Report in November 2022, which was reviewed and comments by CNSC staff were appropriately addressed by OPG. Part 3 of the Safety Report describes the accident scenarios, predicted plant response and event frequencies considered in the station design-basis.

Large Break Loss of Coolant Accident (LBLOCA) Composite Analytical Approach (CAA) analysis

- Upon completing the review of the OPG determination of the Threshold Break Size (TBS) for use with the Composite Analytical Approach (CAA), CNSC staff concluded that the evaluation of the TBS is consistent with the OPG established methodology.
- The industry has developed the CAA to manage safety margin concerns related to LBLOCA. A significant component of the CAA involves reclassifying some LBLOCA scenarios from the Design Basis Accident (DBA) category to Beyond Design Basis Accident (BDBA) category. This reclassification is based on the rationale that breaks in large-diameter pipes above a certain size have a low probability of occurring.
- Based on the review of OPG proposed TBS for the in-scope piping systems equivalent to a single-ended guillotine break of nominal pipe size (NPS) of 12 inches, CNSC staff re-categorized the three LBLOCA-related CANDU Safety Issues (CSI) from Category 3 to a lower risk category, i.e. Category 2, for Darlington Nuclear Generating Station (DNGS).

- For the LBLOCA deterministic safety analysis (DSA) for Darlington reactors, OPG did not request to reclassify the pipe breaks larger than the TBS into the BDBA category. Demonstration of LBLOCA safety margins is based on the analysis using a more realistic limit of operating envelope (LOE) analysis method, submitted in 2018, for large pipe breaks. CNSC staff and OPG staff are engaged in discussions to resolve the residual technical issues associated with the OPG's more realistic LBLOCA safety analysis.

Probabilistic Safety Assessment

- OPG continues to be compliant with REGDOC-2.4.2, Probabilistic Safety Assessment (PSA) for Nuclear Power Plants. The Darlington Nuclear Generating Station updated PSA reports are expected to be submitted in 2025.

2.1.5 Physical Design

Performance rating: Satisfactory

Number of findings by rating: Seventeen compliant findings

Pressure boundary program

- In 2023, OPG maintained a formal agreement with an Authorized Inspection Agency.

Design Governance

Environmental Qualification (EQ):

- Based on the CNSC compliance activities in 2023, CNSC staff determined that EQ at DNGS met CNSC staff requirements. However, CNSC staff noted challenges in implementing planned corrective actions to address findings from a Type II inspection conducted in 2021, specifically regarding EQ room temperature monitoring. OPG is actively addressing these challenges, and CNSC staff will continue to monitor the implementation to ensure that corrective actions align with regulatory requirements.

System Design

Electrical Power systems:

- Based on the CNSC compliance activities in 2023, CNSC staff determined that electrical power systems including cables met CNSC staff requirements at DNGS.

Component Design:

- In 2023, CNSC staff reviewed OPG's 2022 Annual Report on Fuel Monitoring and Inspection.

- CNSC staff concluded that the report followed the applicable reporting requirements, and the overall fuel performance at the DNGS site remained safe in 2022.
- CNSC staff observed that DNGS continues to experience low defect rates and consistent trends in observed bundle wear.
- Fuel inspections during 2022 confirmed zero defects.
- OPG operated within the applicable design and operating limits, iodine limits and maximum bundle power and channel power limits. DNGS staff conducted a total of 47 standard fuel bundle inspections during 2022 which exceeds the minimum expectation of 20 bundles per operating unit per year (Units 1 and 3 were in refurbishment outage).
- There were no emergent trends indicative of a fuel program issue in 2022.

2.1.6 Fitness for Service

Performance rating: Satisfactory

Number of findings by rating:

Structural Integrity

- A risk-informed decision-making evaluation was performed by CNSC in 2022 in regard to the region of potentially elevated hydrogen equivalent concentration near the inlet rolled joints of pressure tubes in extended operation, in this case DNGS Unit 4. The evaluation concluded that continued operation of affected pressure tubes was acceptable for a period of at least 3 years.
  - In July 2023, DNGS Unit 4 was shut down for refurbishment (DNRU4).
  - With the refurbishment of DNGS Unit 4, all units at DNGS have either undergone refurbishment or are currently shut down undergoing refurbishment.
  - After refurbishment, there are no pressure tubes with elevated [Heq] left in operation.

Maintenance

- In 2023, the critical corrective maintenance backlog, deficient maintenance backlog and the number of critical preventive maintenance deferrals were zero.
- The average preventive maintenance completion ratio was 96%, which is indicative of good performance by OPG Darlington.
- There were no safety significant findings related to maintenance based on the review of the events reported by the licensee.

Equipment Fitness for Service/Equipment Performance

- In 2023, CNSC staff reviewed OPG's 2022 Annual Report on Risk and Reliability and found that DNGS showed satisfactory performance for Systems Important to Safety.
- CNSC staff confirm that all special safety systems for DNGS met their Actual Past Unavailability (APU) targets in 2023, except for Emergency Coolant Injection (ECI). The ECI system exceedances of their APU target for DNGS Units 2 and 4 were caused by unplanned coincident unavailability of equipment. The event did not cause a direct safety risk, however, there was a reduction in the ability of the plant to mitigate design basis accidents during the impairment. CNSC staff confirmed that corrective actions were acceptable and commensurate with the level of risk.

Chemistry Control

- Based on the review of chemistry safety performance indicators reported by the licensee, DNGS maintained acceptable chemistry control performance in 2023.

2.1.7 Radiation Protection

Performance rating: Satisfactory

Number of findings by rating:

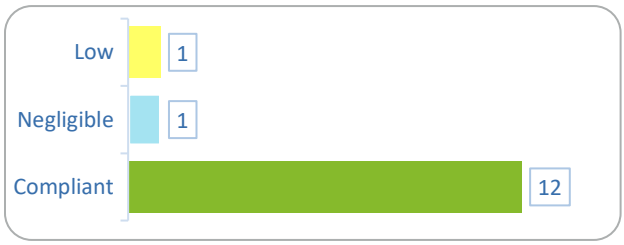
- CNSC staff determined that at the DNGS:
  - radiation doses to workers were below the regulatory dose limits
  - there were no exceedances of an action level listed in the licensee's Radiation Protection (RP) program

  - various measures were used to control occupational exposures and to keep doses ALARA
  - actions were taken to control radiological hazards to protect workers
- CNSC staff's compliance inspections of OPG's implementation of their RP program at the DNGS identified 7 non-compliant findings of low or negligible safety significance.
  - For these non-compliant findings, an action item was raised, which dealt with ensuring the calibration of radiation measurement devices that are located in the station and which could be used by workers.
  - CNSC staff are reviewing OPG's corrective actions to resolve this non-compliance.

2.1.8 Conventional Health and Safety

Performance rating: Satisfactory

Number of findings by rating:



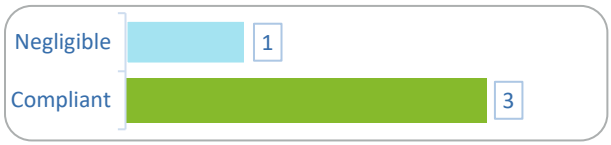
The non-compliances identified by CNSC staff during the inspection conducted were related to the specific area of awareness, and they were resolved or were actively worked on by the licensee to the satisfaction of CNSC staff.

- As indicated by data in Appendix F6, in 2023 indicators of workers' conventional safety at DNGS were at or below the industry average.
  - DNGS achieved over 6.3 million person-hours without a lost time injury
- There were no significant reportable issues in this SCA during the reporting year
- OPG has appropriate procedures in place to ensure the protection of the environment and the health of persons against hazardous materials

2.1.9 Environmental protection

Performance rating: Satisfactory

Number of findings by rating:



CNSC staff conducted a variety of compliance assessments, and inspections to verify compliance of all outputs associated with the Environmental Protection SCA specific areas.

- Results from CNSC staff's assessments of the quarterly and annual reports determined that OPG met regulatory requirements in REGDOC-3.1.1 and REGDOC-2.9.1 *Environmental Principles, Assessments and Protection Measures*
    - Dose to the public from the DNGS remained below the regulatory limit of 1 mSv/yr.
    - Releases of radiological nuclear substances were well below the Derived Release Limits (DRLs) for DNGS in 2023.
    - No action levels were exceeded for waterborne release.
    - There was one action level exceedance for tritium oxide in September 2023
        - Station tritium oxide release of 6,479.24 Ci. exceeded the station Action Limit of 2,670 Ci/week .
    - No hazardous substance releases exceeded provincial regulatory limits.
    - OPG has implemented and continues to maintain a corporate environmental management system in accordance with CNSC requirements.
    - All reported events were addressed satisfactorily by the licensee.
- CNSC staff reviewed the 2021 updated Environmental Risk Assessments (ERA) report for the DNGS, which included the DWMF.
    - CNSC staff concluded that these reports are compliant with CSA N288.6-12, Environmental risk assessments at class I nuclear facilities and uranium mines and mills.
    - The results of the ERA indicate that meaningful human health or ecological risks attributable to DNGS and DWMF operations are unlikely.

OPG has made adequate provision for the protection of the environment and health of persons and, OPG has demonstrated that people and the environment living near the DNGS remain protected.

2.1.10 Emergency Management and Fire Protection

Performance rating: Satisfactory

Number of findings by rating:

- In August 2023, CNSC staff conducted a reactive field inspection following the discovery of an adverse trend regarding audibility issues of the public address (PA) system throughout the station
    - Following the issuance of the field inspection report, OPG implemented corrective actions, however CNSC staff found that OPG had not adequately demonstrated compliance with several regulatory requirements and remained in non-compliance with licence conditions 10.1 and 10.2 of the PROL.
    - Upon analysis, CNSC staff assigned this finding medium safety significance.
    - CNSC staff issued a “Request pursuant to Subsection 12(2) of the General Nuclear Safety and Control Regulations” to ensure that sufficient analyses were performed to confirm the licensee maintains effective compensatory actions until the completion of the PA system upgrade project.
    - OPG has since implemented additional compensatory actions as they work through their corrective action plan, which includes repair and replacement of ageing portions of the public address system.
- OPG implemented CSA standard N293-12 (R2017), Fire protection for nuclear power plants, in 2023.

2.1.11 Waste Management

Performance rating: Satisfactory

Number of findings by rating:

In 2023, CNSC staff conducted two field inspections associated with Waste Management at DNGS.

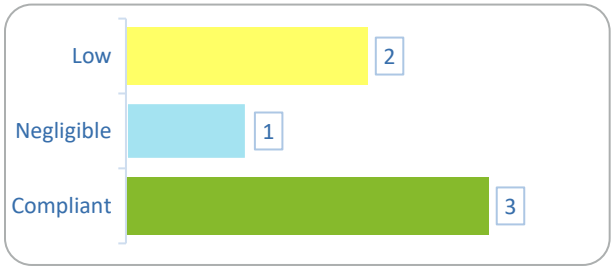
- One inspection contained three compliant findings, and the other inspection had three compliant findings and one non- compliant finding of low safety significance
- In December 2023, OPG submitted revisions to licensing basis documents to incorporate changes to comply with REGDOC-2.11.2, Decommissioning and REGDOC-3.3.1, Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities.
    - With this governance update, OPG is compliant with REGDOC-2.11.2 REGDOC-3.3.1, and Clause 10.5 of REGDOC-2.11.1, Waste Management, Volume I: Management of Radioactive Waste

CNSC staff were satisfied with OPG's reporting of the 2023 DNGS safety performance indicator for Low and Intermediate-Level Radioactive Solid Waste Generated.

2.1.12 Security

Performance rating: Satisfactory

Number of findings by rating:



CNSC staff conducted 2 field inspections in the Security SCA in 2023.

    - OPG initiated corrective actions to address these findings, which CNSC staff found acceptable.

- In 2023, CNSC staff reviewed OPG's 2022 threat and risk assessment and determined that the threat and risk assessment report was completed in accordance with regulatory requirements.
- In 2021, an action item containing 3 notices of non-compliance was raised, which identified that OPG's performance within the specific area of Facilities and Equipment significantly deviated from the applicable requirements and CNSC staff's expectations. This action item remained open in 2023. The details of the non-compliances contain prescribed information and are therefore classified as confidential.
    - In December 2023, OPG submitted corrective actions to address 2 of the 3 notices of non-compliance, which were satisfactory to CNSC staff.
- In 2023, the CNSC issued an Administrative Monetary Penalty (AMP) to OPG as a result of a failure to comply with a licence condition in relation to its security program at the PNGS and DNGS. The failure to comply with a licence condition, was based on findings communicated to OPG between March 1, 2022 and February 24, 2023. The AMP was issued to promote compliance and deter recurrence.
    - OPG has put corrective actions in place to address the non-compliances related to the AMP and has paid the penalty amount in full.
- On March 2, 2023, CNSC reported on an Event Initial Report (EIR) to the Commission related to misplaced equipment during an OPG training activity that took place in January 2023. CNSC staff determined that the corrective actions put in place were inadequate and issued a warning letter on February 21, 2023. OPG implemented additional corrective actions in March and April 2023 and CNSC were satisfied that adequate actions were taken. The EIR was presented to the Commission in March and discussed in a closed-door session with the Commission in December 2023.

UPDATE: On February 28, 2024, OPG submitted corrective actions to address the remaining non-compliance from the 2021 inspection. In addition, OPG submitted corrective actions to address all action items that remained open in 2023. CNSC staff are currently reviewing OPG's submission.

UPDATE: Following the downgraded performance of the security SCA in 2021 and 2022, and in order to assess the state of OPG's security program following programmatic improvements made by OPG to address the decline in performance, CNSC staff conducted a Type I inspection in January 2024. CNSC staff conduct Type I inspections in order to assess a licensee program or process, rather than assessing the output of the program or process. OPG has responded to the preliminary summary of findings and at the time of writing the ROR, the inspection report was

still being finalized. The preliminary results of the CNSC Type I Inspection indicate improvements to OPG's security program. CNSC staff continue to monitor the implementation of corrective actions. Once OPG has completed their corrective actions, they will meet the regulatory requirements. It is important to note that while OPG continues to work through their corrective action program for legacy compliance issues, there is no immediate risk to safety and security.

Cyber Security

- In 2023, CNSC staff requested that OPG provide an implementation plan for CSA N290.7-21, *Cyber security for nuclear facilities*. OPG provided a gap analysis and implementation plan, which indicated that they would be fully compliant with N290.7:21 by March 31, 2027. CNSC staff accepted this plan and will receive yearly implementation status updates from OPG.
- CNSC staff continue to track OPG's action plan to address the notices of non-compliance from the 2022 CNSC Type I inspection of OPG's cyber security program regarding the implementation of the new CSA N290.7-14, *Cyber security for nuclear power plants and small reactor facilities*.

UPDATE: On February 2, 2024, OPG submitted a letter on the completion of OPG's corrective measures on the five non-compliances of low safety significance from the 2022 fleet-wide cyber security desktop inspection. CNSC staff are satisfied with OPG's corrective measures. OPG addressed all non-compliance from the 2022 fleet-wide cyber security inspection.

2.1.13 Safeguards and Non-Proliferation

Performance rating: Satisfactory

Number of findings by rating: Two compliant findings

- In 2023, CNSC staff conducted a field inspection on Participation/facilitation in announced IAEA inspections.
- CNSC staff confirmed that OPG provided access and assistance to the IAEA inspectors to facilitate an IAEA's short notice random inspection.
- No actions were placed on OPG as a result of the inspection.

During the reporting period of 2023, OPG:

- provided the required nuclear material accountancy and control reports to the CNSC and the IAEA for safeguards verification activities.
- granted the required access and assistance to the IAEA for safeguards activities, including inspections, and for the maintenance of IAEA equipment at the DNGS.

- submitted the required annual operational programme with quarterly updates and the annual update to the Additional Protocol to the CNSC in a timely manner. CNSC staff reviewed these documents and determined that they met requirements and expectations.
- provided the support required for the IAEA's safeguards equipment, containment, and surveillance activities.

2.1.14 Packaging and Transport

Performance rating: Satisfactory

Number of findings by rating: One compliant finding

- In 2023, the Packaging and Transport program for DNGS was implemented effectively, and the transport of nuclear substances to and from the facility was conducted safely.
- There was one field inspection relating to this program in 2023.
    - OPG was compliant with the requirements of both the Packaging and Transport of Nuclear Substances Regulations, 2015 (PTNSR) and the Transportation of Dangerous Goods Regulations for this field inspection.

2.2 Darlington Waste Management Facility

Overview

The DWMF is located within the lands and waters of the Michi Saagiig Anishinaabeg, the Gunshot Treaty (1877-88), the Williams Treaties (1923), and the Williams Treaties Settlement Agreement (2018).

Figure 4: Darlington Nuclear Generating Stations

Licence: WFOL -W4-355.00/2033

Licence term: May 2023 – April 2033

Licence last issued or amended: May 2023

Licensee: Ontario Power Generation

Location: Clarington, Ontario

- The DWMF consists of an amenities building, one Dry Storage Container (DSC) processing building, two DSC storage buildings (Storage Buildings #1 and #2), and the Radioactive Waste Storage Building (RWSB).
- Storage Capacity: 983 Dry Storage Containers (DSCs) containing used nuclear fuel waste, and 490 Darlington Storage Overpacks (DSOs) containing refurbishment wastes.
- 57 DSCs transferred from DNGS to DWMF in 2023.
- The licence for the DWMF authorizes OPG to construct two additional DSC storage structures (Storage Structures #3 and #4), which would allow for an additional storage capacity of 1,200 DSCs. On March 31, 2023, OPG submitted the construction notification for Used Fuel Dry Storage Structure #3 (UFDSS3). On October 24, 2023, following CNSC

staff review of the notification, OPG was provided with written approval from the CNSC to carry out the site preparation and construction of the DWMF UFDSS3.

- A 2023 desktop review of OPG's Public Information Disclosure Program resulted in five compliant findings, one notice of non-compliance, and one negligible finding that are attributable to the Public Information Disclosure Program itself and not to any particular SCA in the following sub-sections.

Table 8: Summary of the number of inspections performed for DWMF (Full inspection list found in Appendix A: List of Inspections reports at each NPP and WMF)

Type 1	Type 2	Desktop	Field	Number of findings
0	2	1	0	Compliant: 34 Non-Compliant: 12 Total: 46

Table 9: 2023 Rating for DWMF per SCA

SCA	Rating	SCA	Rating
Management System	Satisfactory	**Conventional Health and Safety**	Satisfactory
Human Performance	Satisfactory	**Environmental Protection**	Satisfactory
Operating Performance	Satisfactory	**Emergency Preparedness and Fire Protection**	Satisfactory
Safety Analysis	Satisfactory	**Waste Management**	Satisfactory
Physical Design	Satisfactory	**Security**	Satisfactory
Fitness for Service	Satisfactory	**Safeguards and Non-Proliferation**	Satisfactory
Radiation Protection	Satisfactory	**Packaging and Transport**	Satisfactory

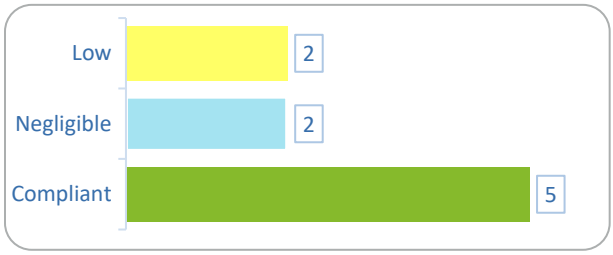
Event Initial Reports (EIRs)

No event initial reports pertaining to the DWMF were submitted to the Commission in 2023.

2.2.1 Management System

Performance rating: Satisfactory

Number of findings by rating:



CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Management System SCA at the DWMF in 2023.

- A 2023 desktop review focused on OPG's Public Information Disclosure Program identified two non-compliant findings of low safety significance and two non-compliant findings of negligible safety significance regarding minor discrepancies documentation and application of OPG procedures to that documentation. CNSC staff were satisfied with OPG's corrective actions.
- Changes to licensing-basis documents are reviewed by CNSC staff to ensure that OPG maintains its management system at the DMWF and that changes do not impact safety.
- OPG has adequate contingency plans in place to maintain or restore critical safety and business functions in the event of disabling circumstances.

2.2.2 Human Performance Management

Performance rating: Satisfactory

Number of findings by rating: Two compliant findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Human Performance Management SCA at the DWMF in 2023.
- CNSC staff reviewed OPG's 2023 quarterly and annual operations reports for DWMF and there were no issues identified for the specific area of Personnel Training and the Human Performance Management SCA overall.

2.2.3 Operating Performance

Performance rating: Satisfactory

Number of findings by rating: One compliant finding

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Operating Performance SCA at the DWMF in 2023.
- In 2023, OPG met their target of transferring 57 DSCs from DNGS to DWMF. OPG submitted all scheduled quarterly and annual reports as required and within the appropriate timelines. CNSC staff's reviews of OPG's operational reports confirmed that the licensed activities at the DWMF were being conducted safely . The reviews also confirmed that OPG's reporting and trending, and its responses to comments and requests for follow-up information and clarification, met CNSC staff's expectations.
- In 2023, OPG reported 4 events related to DWMF.
    - Two events were related to the Security SCA and were considered to be of low safety significance. OPG took corrective actions to prevent a similar occurrence in the future. CNSC staff were satisfied with the corrective actions.
    - One event was related to a power outage impacting safeguards equipment. This event was considered to be of low safety significance and CNSC staff were satisfied with corrective actions implemented by OPG.
    - The fourth event was related to OPG's late notification of a change to a person authorized to report to the CNSC. OPG submitted a final report on December 6, 2023, that included corrective actions to prevent a recurrence. CNSC staff considered the event to be of low safety significance and were satisfied with the corrective measures taken by OPG.

2.2.4 Safety Analysis

Performance rating: Satisfactory

Number of findings by rating: No findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Safety Analysis SCA at the DWMF in 2023.

2.2.5 Physical Design

Performance rating: Satisfactory

Number of findings by rating: No findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations, for the Physical Design SCA at the DWMF in 2023.
- CNSC staff confirmed that OPG maintains an effective design program and pressure boundary program, implements modifications to the facilities in accordance with established engineering control process to maintain the design basis.

2.2.6 Fitness for Service

Performance rating: Satisfactory

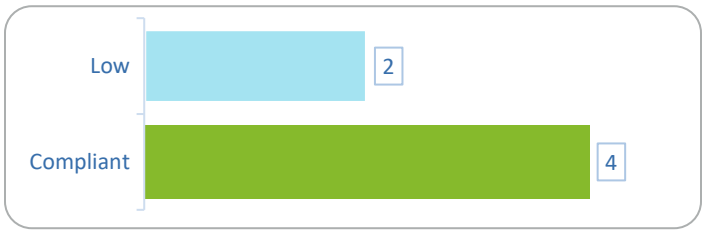
Number of findings by rating: No findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Fitness for Service SCA at the DWMF in 2023.
- As part of the aging management activities for DSCs, OPG submitted the aging management report for the DWMF. CNSC staff reviewed the submission and determined that it complied with OPG's aging management program.

2.2.7 Radiation Protection

Performance rating: Satisfactory

Number of findings by rating:



CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Radiation Protection SCA at the DWMF in 2023.

- In June 2023, CNSC staff conducted a general inspection of OPG's operations and programs at the DWMF. The inspection identified two (2) non-compliant findings of low

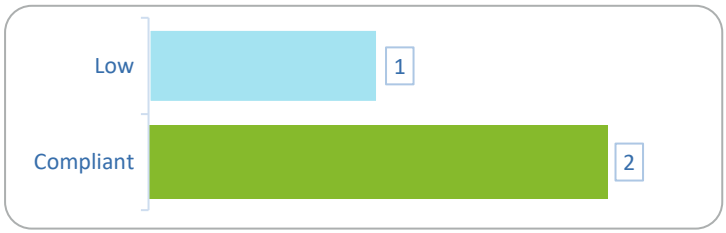
safety significance; the first dealt with keeping radiation hazard postings up-to-date, and the second dealt with performing source checks of contamination monitors and whole body monitors. Both issues were immediately resolved to the satisfaction of CNSC staff.

- CNSC staff's reviews of quarterly and annual compliance reports submitted by OPG confirmed that:
    - The DWMF achieved its year-end collective dose target.
    - OPG did not exceed any action levels for dose to workers and the annual effective doses for all DWMF Nuclear Energy Workers were well below the regulatory dose limit.
    - OPG did not exceed any action levels for contamination control.
    - The perimeter dose rates at the DWMF were within OPG's targets and consistent with the results of previous years.
    - Measures were implemented to ensure that the DWMF was compliant with regulatory requirements related to Radiation Protection.

2.2.8 Conventional Health and Safety

Performance rating: Satisfactory

Number of findings by rating:



CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Conventional Health and Safety SCA at the DWMF in 2023.

- In August 2023, CNSC staff conducted an Emergency Management and Fire Protection focused inspection at the DWMF. The inspection identified one non-compliant finding of low safety significance related to improper donning of personal protective equipment and use of garage door exits. CNSC staff are reviewing OPG's corrective actions.
- OPG did not report any lost-time injuries at the DWMF in 2023.

2.2.9 Environmental Protection

Performance rating: Satisfactory

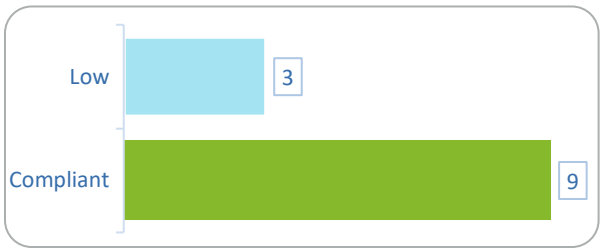
Number of findings by rating: One compliant finding

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Environmental Protection SCA at the DWMF in 2023. OPG made adequate provision for the protection of the public and the environment.
- CNSC staff reviews of quarterly and annual reports did not result in findings for the Effluent and Emission Control areas, and releases remained well below the Derived Release Limits and Action Levels.
- CNSC technical assessment did not result in findings related to the Assessment and Monitoring area. Dose to the public remained low (0.7 µSv), and in a similar range to the previous years, which shows that radionuclide concentrations measured in the environment remain low.
- In 2023, CNSC staff accepted a change to the effluent monitoring program. The requirement for particulate emission monitoring from the DSC processing building at the DWMF was discontinued effective January 2024. The monitoring results, previously reported quarterly to the CNSC, have consistently demonstrated that particulate emissions from the stack exhausts are less than 0.05% of the Derived Release Limits.

2.2.10 Emergency Management and Fire protection

Performance rating: Satisfactory

Number of findings by rating:



CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Emergency Management and Fire Protection SCA at the DWMF in 2023.

- OPG has a formal agreement in place with Clarington Emergency and Fire Services (CEFS) to provide primary fire response to the DWMF.

- In August 2023, CNSC staff conducted an Emergency Management and Fire Protection inspection that included a response from CEFS to a fire scenario. The inspection was a thorough review of OPG's emergency management and fire response programs and concluded that OPG has a satisfactory program. The inspection identified 3 non-compliant findings of low safety significance.
    - One involved inaccuracies in DWMF Pre-Fire Plans, and CNSC staff were satisfied with OPG's corrective actions.
    - Two resulted from a fire response drill and involved misaligned responsibilities between the drill's execution and OPG documents, as well as a need for OPG to improve site-specific training for off-site fire response agencies. Corrective actions addressing these two non-compliant findings are under review by CNSC staff.

Overall, OPG has an adequate Fire Protection Program (FPP) to minimize both the probability of occurrence and the consequences of fire at the DWMF. The FPP complies with the requirement of CSA N393-13, *Fire protection for facilities that process, handle or store nuclear substances*.

2.2.11 Waste Management

Performance rating: Satisfactory

Number of findings by rating: Five compliant findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Waste Management SCA at the DWMF in 2023.

- CNSC staff confirmed that OPG continued to maintain an effective Waste Management Program and preliminary decommissioning plan. CNSC staff were satisfied with the information provided by OPG in the quarterly and annual operations reports for the DWMF in 2023. OPG did not receive any non-compliances for the DWMF regarding the Waste Management SCA in 2023.
- In December 2023, OPG submitted revisions to licensing basis documents to incorporate changes to comply with REGDOC-2.11.2 Decommissioning and REGDOC-3.3.1 Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities. With this governance update, OPG is compliant with REGDOC-2.11.2, REGDOC-3.3.1, and Clause 10.5 of REGDOC-2.11.1 Waste Management, Volume I: Management of Radioactive Waste.

2.2.12 Security

Performance rating: Satisfactory

Number of findings by rating: No findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Security SCA at the DWMF in 2023. CNSC staff confirmed that OPG continued to maintain an effective security program for the DWMF in 2023.
- CNSC staff were satisfied with the information provided by OPG in the quarterly and annual operations reports for the DWMF in 2023.

2.2.13 Safeguards and Non-Proliferation

Performance rating: Satisfactory

Number of findings by rating: No findings

- CNSC staff concluded that OPG met the applicable CNSC regulatory requirements, and its performance met CNSC staff expectations for the Safeguards and Non-Proliferation SCA at the DWMF in 2023.
- CNSC staff determined that OPG's accountancy and control of nuclear material complied with the applicable regulatory requirements at the DWMF. OPG granted the required access and assistance to the IAEA for safeguards activities, including inspections, and for the maintenance of IAEA equipment at the DWMF.
- CNSC staff determined that OPG met the applicable regulatory requirements for operational and design information in 2023 at the DWMF. OPG provided the required operational and design information to facilitate IAEA safeguards activities. OPG also provided the support required for the IAEA's safeguards equipment, containment, and surveillance activities.

2.2.14 Packaging and Transport

Performance rating: Satisfactory

Number of findings by rating: No findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Packaging and Transport SCA at the DWMF in 2023.

- OPG maintains a Packaging and Transport program for the DWMF that ensures compliance with the *Packaging and Transport of Nuclear Substances Regulations,* 2015 and the *Transportation of Dangerous Goods Regulations*.

2.3 Pickering Nuclear Generating Station

Overview

Figure 5: Pickering Nuclear Generating Station

The Pickering site is located on the north shore of Lake Ontario in Pickering, Ontario, 32 kilometres northeast of Toronto and 21 kilometres southwest of Oshawa. The Pickering site lies within the lands and waters of the Michi Saagiig Anishinaabeg, the Gunshot Treaty (1877-88), the Williams Treaties (1923), and the Williams Treaties Settlement Agreement (2018).

Licence: PROL 48.01/2028.

Licence term: September 1, 2018 to August 31, 2028.

Licence last amended: April 9, 2020.

Licensee: Ontario Power Generation.

Location: Pickering, Ontario.

- **Fisheries and Oceans Canada (DFO) Authorization expiration**: December 31, 2028.
- Units 1, 4-8 were fully operational in 2023.
- Unit 2 and 3 were in safe storage .

Learn more about Pickering Nuclear Generating Station

Table 10: Summary of the number of inspections performed for PNGS (Full inspection list found in Appendix A: List of Inspections reports at each NPP and WMF)

Type 1	Type 2	Desktop	Field	Number of findings
0	20	5	44	Compliant: 340 Non-Compliant: 90

				Total: 430

Table 11: 2023 Rating and number of inspections for PNGS per SCA: total inspections covering an SCA and inspections with a primary focus[3] on the SCA (primary focus figures in parentheses)

SCA	Rating	Number of Type 1 inspections	Number of Type 2 inspections	Number of Desktop inspections
Management System	Satisfactory	0	20 (1)	3
Human Performance	Satisfactory	0	21 (2)	3 (2)
Operating Performance	Satisfactory	0	14 (6)	0
Safety Analysis	Satisfactory	0	1	0
Physical Design	Satisfactory	0	5	0
Fitness for Service	Satisfactory	0	13 (7)	0
Radiation Protection	Satisfactory	0	8 (2)	0
Conventional Health and Safety	Satisfactory	0	8	0
Environmental Protection	Satisfactory	0	3 (1)	0
Emergency Preparedness and Fire Protection	Satisfactory	0	5 (1)	0
Waste Management	Satisfactory	0	0	0
Security	Satisfactory	0	1 (1)	0
Safeguards and Non-Proliferation	Satisfactory	0	1	0
Packaging and Transport	Satisfactory	0	1	0

Refurbishment of Units 5-8

- In September 2022, the Ontario government directed OPG to update its feasibility assessment for refurbishing Pickering NGS Units 5–8 for operation beyond 2026. On

[3] Inspections typically center on a main focus area or program related to a specific SCA. This main focus is referred to as the primary focus SCA for that inspection. Additionally, the inspection may include other criteria that fall under different SCAs.

January 30, 2024, the Ontario government announced its support for OPG to proceed with a project to refurbish Units 5–8.

- OPG informed CNSC staff in a letter of its intent to initiate the project scope and definition phase of the Pickering NGS Units 5-8 refurbishment project.
- To support the refurbishment of Pickering NGS Units 5–8, OPG will be conducting a periodic safety review (PSR) in accordance with REGDOC-2.3.3, Periodic Safety Reviews.
- A PSR protocol was developed to establish the major deliverables and timelines for the production and review of the PSR.
- There were no physical activities related to refurbishment that took place in 2023.

Periodic Safety Review (PSR) Reassessment

- In June 2023, OPG submitted a licence amendment application requesting Commission authorization to operate Pickering NGS Units 5–8 to December 31, 2026.
- To support the licence amendment application, OPG completed a re-assessment of the periodic safety review (PSR) conducted in 2018 in accordance with the licensing basis for licence conditions 15.1 and 15.4 of its PROL for the PNGS.
- The purpose of the PSR re-assessment was to assess the impact of the extended operating period and to determine new or modified safety improvements to be included in an updated Integrated Implementation Plan (IIP).
- CNSC staff accepted the PSR re-assessment Integrated Implementation Plan (IIP) on July 11, 2023. A public Commission hearing to consider this licence amendment application was expected to be held in June 2024.
- All IIP commitments are due to be completed by end of 2024.

Table 12 summarizes the Pickering PSR re-assessment IIP tasks, or commitments, that were planned to be completed, those completed, and those closed following the CNSC review in 2023.

Table 12: Pickering IIP status

Total commitments	Overall	2023
Planned by OPG	32	1
Completed by OPG	3	3
Closed by the CNSC	1	1

OPG has completed their IIPs according to the plan, and CNSC staff are satisfied with OPG's progress.

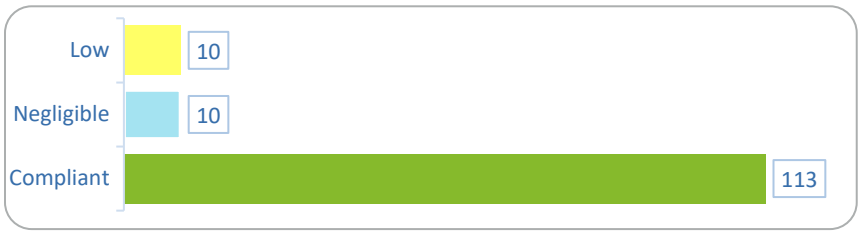
Event Initial Reports (EIRs) event initial report (EIR) pertaining to the PNGS and DNGS was submitted to the Commission for the reporting period between January 1, 2023, to December 31, 2023:

1. CMD 23-M16, Misplaced equipment during OPG training activity. March 2, 2023, Commission Meeting.
    a. CNSC staff were satisfied that OPG had implemented adequate corrective measures and considers the matter closed. The details of EIR contains prescribed security information and is not publicly available.

2.3.1 Management System

Performance rating: Satisfactory

Number of findings by rating:



CNSC staff inspections in 2023 identified non-compliances of low and negligible safety significance regarding organization, records management, OPEX, change management and performance assessment, improvement, and management review.

- In 2023, CNSC staff conducted a Type II inspection on OPG's Self-Assessment program:
    - This inspection resulted in twelve compliant findings and three non-compliant findings of negligible or low safety significance.
    - The non-compliant findings concerned documenting and approval of changes to audit frequency; reporting results of independent assessments (audits) to the level of management having sufficient authority to resolve any identified problems; and ensuring that OPG conducts self-assessments for all licensed programs.
    - OPG has implemented corrective actions to address the non-compliant findings to the satisfaction of CNSC staff and all are now closed.

- OPG continued to meet business continuity requirements, throughout 2023. OPG has adequate measures in place relating to business continuity in the event of disabling circumstances such as illness and severe weather.

2.3.2 Human Performance Management

Performance rating: Satisfactory

Number of findings by rating:

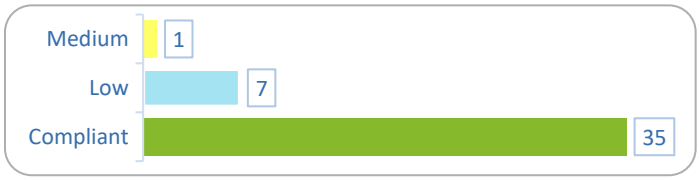
CNSC staff inspections in Human Performance in 2023 identified non-compliances of low and negligible safety significance related to personnel training, human performance program and personnel certification.

- CNSC staff conducted an inspection of OPG's Certified Training Program.
    - One non-compliant finding of low safety significance was identified related to deficiencies in Responsible Health Physicists (RHP) training documents.
    - OPG has implemented corrective actions to address the finding, and CNSC staff are satisfied with their implementation.
- CNSC staff conducted an inspection of OPG's Authorized Nuclear Operator (ANO) Certified Training Programs.
    - Two non-compliant findings of negligible safety significance were identified related to discrepancies in training documents, and discrepancies in conducting training meetings.
    - OPG has implemented corrective actions to address the findings, and CNSC staff will verify implementation of those actions.
- OPG reported hours of work non-compliances in a timely manner and maintained adequate programs and processes to ensure worker fitness for duty.
- CNSC staff confirmed that OPG has maintained sufficient personnel at PNGS for all certified positions, and that all certified workers possessed the necessary knowledge and skills to perform their duties safely and competently.
- In 2023, OPG reported 6 MSC violations in their security organization at the PNGS.

2.3.3 Operating Performance

Performance rating: Satisfactory

Number of findings by rating:



In 2023, CNSC staff conducted 15 inspections related to the area of Operating Performance, with several other compliance verification activities in other SCAs that considered aspects of Operating Performance.

- 5 non-compliant findings pertain to the safe operating envelope (SOE) of the PNGS, including the finding of medium safety significance, described below.
- During a field inspection, CNSC staff found that OPG was non-compliant with SOE requirements, including requirements to notify the CNSC of changes. OPG made non-conservative changes to station operating documentation pertaining to reactor building temperature limits that did not reflect the defined SOE.
    - OPG was requested to develop and implement a corrective action plan to ensure that any safe operating limit exceedance is identified as an impairment with clear actions and action times to return to compliance with the SOE.
    - To date, CNSC staff have been satisfied with OPG's corrective actions to address concerns related to the SOE, which included making repairs to air conditioning units.
    - CNSC staff will continue to verify that the PNGS is operated within the bounds of the defined SOE.
- As found in 2023:
    - PNGS Units 1 and 4 experienced no reactor trips or stepbacks and 1 setback.
    - In January, Unit 1 experienced a setback to 94% power following a valve failing open during an emergency coolant injection system test.
    - PNGS Units 5-8 experienced 1 reactor trip, no stepbacks, and 4 setbacks.
        - In May, Unit 7 experienced a setback to 2% full power following a main output transformer trip.
        - In July, Unit 8 tripped following the failure of a boiler level transmitter.

- In August, Unit 6 experienced a setback to 2% full power following a turbine trip during an algae debris run.
- Later in August, Unit 7 experienced a setback to 2% full power following a main output transformer trip that was the result of a spurious gas alarm.
- In December, Unit 7 experienced a setback to 2% full power that was the result of operator error.

- All transients were properly controlled, and power reduction was automatically initiated by the reactor control systems.
- The number of trips and setbacks at the PNGS, have increased in 2023 compared to 2022 but remain comparable to expected industry rates.
- All PNGS Units except Unit 8, which had reduced operating hours due to a planned maintenance outage, met WANO's PHWR target of 1.0 trip per 7,000 hours of operation.

2.3.4 Safety Analysis

Performance rating: Satisfactory

Number of findings by rating: One compliant finding

Deterministic Safety Analysis

- In 2023, CNSC staff reviewed and approved OPG's Safety Report Facility Description, Parts 1 and 2, for Pickering Units 5-8.
- CNSC Staff are reviewing OPG's 2024 submission of OPG's Safety Report Facility Description, Part 3, for Pickering Units 1-4.
- OPG are compliant with the requirement to update Safety Reports on a 5-year frequency.
- OPG continues to complete corrective action plans for five notices of non-compliance (NNC) which were discovered during the inspection of the Software QA Program (Action item 2021-48-23662).
    - All corrective action plans were found to be acceptable,
    - OPG is expected to provide an update on the implementation of the two outstanding corrective action plans by October 2024 to address the remaining non-compliances.

LBLOCA CAA analysis:

- OPG continues to make progress with the Recategorization of the CANDU safety issues (CSI) and have submitted the deterministic safety analysis for the Large Break Loss of Coolant Accident (LBLOCA) for Pickering Units 1-4.
- CNSC staff is currently reviewing the analysis.
- CNSC staff are awaiting OPG's submission on CSI recategorization for Pickering Units 5-8.

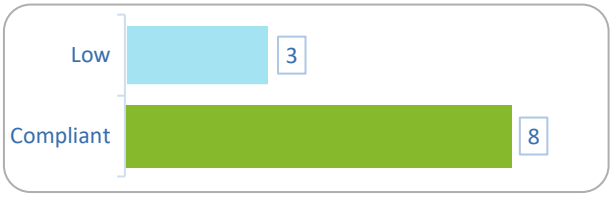
Probabilistic Safety Assessment

- In 2023, Ontario Power Generation completed the Pickering NGS Units 1-4 Probabilistic Safety Assessment (PSA) five-year update.
    - OPG submitted ten different reports as part of the update. As of the end of 2023, CNSC staff continue to review these reports.
- In 2023, CNSC staff reviewed the updated 2022 Pickering NGS Units 5–8 PSAs and found that the PSAs meet the intent of the submission requirements of REGDOC-2.4.2.
    - CNSC staff note that, as a result of postulated high-wind events, the large release frequency exceeds OPG's administrative safety goal but remains below the CNSC accepted safety goal and requested that OPG provide information on planned actions to address this exceedance.
    - CNSC staff's review of OPG's planned actions notes that OPG's risk improvement strategy includes both potential physical changes and analytical refinements and concludes that OPG response meets requirements.
    - CNSC staff review of the Pickering NGS Unit 5-8 seismic PSA included the review of site seismic hazard characterization. The site seismic hazard characterization was used in update of the seismic PSA.
    - CNSC staff's review notes that the site seismic hazard characterization was not prepared in accordance with OPG's seismic PSA guide and requested OPG provide additional information to support OPG's assessment that the Pickering site seismic hazard characterization remains a valid representation of the seismic conditions at PNGS.
    - CNSC staff are currently reviewing OPG's submission in response to CNSC's comments.

2.3.5 Physical Design

Performance rating: Satisfactory

Number of findings by rating:



Pressure boundary program:

- In 2023 OPG maintained a formal agreement with an Authorized Inspection Agency.
- In 2023 CNSC staff inspected the pressure boundary system which was found to be compliant.

Design Governance:

Environmental Qualification (EQ):

- CNSC staff conducted an EQ Field inspection in 2023 with all findings being compliant.

System Design

Electrical Power and Instrumentation and Control systems

- CNSC staff inspected the Pickering electrical power systems and found 2 non-compliances.
    - One non-compliance related to documentation control has been addressed by OPG.
    - One of the non-compliances related to cable aging management program remains open and OPG is executing a corrective action plan to address this non-compliance.
    - CNSC staff will continue to monitor OPG's progress on implementing the proposed corrective action plan. OPG has committed to provide an update on its implementation in February 2025.
    - CNSC staff are satisfied with OPG's progress to date and continue to monitor OPG's corrective actions.

Process Systems and Mechanical Components

- CNSC staff performed a Service Water System (SWS) compliance inspection in 2023 and found that OPG was compliant with process and mechanical design requirements.

2.3.6 Fitness for Service

Performance rating: Satisfactory

Number of findings by rating:

Maintenance

- The performance of PNGS's maintenance program met CNSC staff's expectations in 2023 except one non-compliance about deficiency in field walkdowns as explained below.
- PNGS maintained the critical corrective maintenance backlog very low.
- The average preventive maintenance completion ratio was 96%, which was acceptable.
- In 2023, CNSC Inspectors identified one non-compliant finding of medium safety significance in the maintenance specific area from an inspection on OPG's Fitness for Service program for monitoring structures, systems, and components.
    - Specifically, CNSC staff found that OPG engineering staff were not performing routine field walkdowns at the required frequency using approved checklists and were not maintaining appropriate records.
    - An action item was raised to track the satisfactory completion of OPG's corrective actions.
    - Despite this finding, CNSC staff acknowledge that multiple barriers exist and, while emphasizing that defence in depth has been maintained. OPG operations staff also conduct surveillance of SSCs by performing rounds and routines, and operability testing at frequencies that are set based on reliability models as reported to CNSC through the Annual Risk and Reliability Report.
    - CNSC staff will continue to monitor that engineering walkdowns are being performed by system engineers at the appropriate frequency and that appropriate records are maintained.

Equipment Fitness for Service/Equipment Performance

- In 2023, CNSC staff reviewed OPG's 2022 Annual Report on Risk and Reliability. In general, PNGS showed satisfactory performance for the Systems Important to Safety.
- CNSC staff confirmed that all special safety systems for PNGS met their Actual Past Unavailability (APU) targets in 2023.

Aging Management (Overall Integrated Aging Management Program)

- OPG continues to manage aging of PNGS structures, systems and components (SSCs) within a systematic and integrated framework in accordance with CNSC REGDOC-2.6.3, *Fitness for Service: Aging Management*.
- OPG demonstrated that continued operation of the Pickering Units 5-8 pressure tubes in extended operation is acceptable based on the very low likelihood that flaws greater than 0.15 mm in depth would exist in the regions of interest (ORJ and IRJ) in the population of uninspected pressure tubes in the Pickering Units.
- CNSC staff reviewed both the March and September 2023 elevated Heq Research and Development (R&D) updates for Pickering Units 5-8 pressure tubes in extended operation and conclude that they continue to adequately target the key issues raised by CNSC staff regarding pressure tube fitness for service evaluations.
    - In both updates, OPG has not reported any substantive delays in the R&D work that may adversely impact the overall project schedule.
    - OPG will continue to provide semi-annual updates, as per OPG's commitment and CNSC staff will continue to provide the Commission with updated information during future Power Reactor Status Updates.

Periodic Inspection and Testing

- CNSC staff determined that OPG's Periodic Inspection Program at PNGS is implemented and is consistent with regulatory requirements.

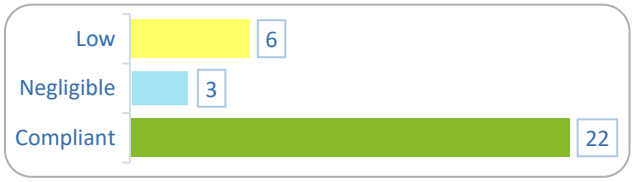
Chemistry Control

PNGS maintained acceptable system chemistry performance in 2023. A review of the chemistry data in REGDOC-3.1.1 reports and safety performance indicators (SPIs) demonstrated that the PNGS performance was acceptable.

2.3.7 Radiation Protection

Performance rating: Satisfactory

Number of findings by rating:



CNSC staff determined that at the PNGS:

  - radiation doses to workers were below the regulatory dose limits.
  - there was one action level exceedance (P-2023-00547) for an unplanned internal intake of tritium oxide resulting in a total effective dose of 3.03 mSv to a Nuclear Energy Worker, which is below the regulatory dose limit of 50 mSv/year for Nuclear Energy Workers.
    - CNSC staff confirmed that OPG implemented corrective actions to prevent a recurrence.
  - there were no exceedances of an action level listed in the licensee's RP program for contamination control.
  - various measures were used to control occupational exposures and to keep doses ALARA.
  - actions were taken to control radiological hazards to protect workers.

- CNSC staff's compliance inspections of OPG's implementation of their RP program at the PNGS identified nine non-compliant findings of low or negligible safety significance.
  - For these non-compliant findings, two RP-related enforcement items were raised, which dealt with the development of corrective action plans to ensure that the appropriate information is affixed to a container and to ensure proper Radiation Protection practices and behaviours are demonstrated and followed during emergency exercises.
  - CNSC staff are reviewing OPG's corrective actions to resolve these non-compliances.

2.3.8 Conventional Health and Safety

Performance rating: Satisfactory

Number of findings by rating:

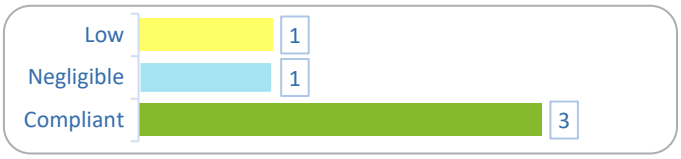
Through inspections conducted in 2023, CNSC staff identified two non-compliances. The non-compliances were related to the specific areas of practices and awareness, which were resolved

by the licensee to the satisfaction of CNSC staff. As indicated by data in Appendix F6, in 2023 indicators of workers' conventional safety at PNGS were below the industry average.

2.3.9 Environmental Protection

Performance rating: Satisfactory

Number of findings by rating:



CNSC staff conducted a variety of assessments, and inspections to verify compliance of all outputs associated with the Environmental Protection SCA specific areas.

- Results from CNSC staff's assessments of the quarterly and annual reports determined that OPG met regulatory requirements in REGDOC-3.1.1 and REGDOC-2.9.1.
    - Dose to the public from the Pickering site remained below the regulatory limit of 1 mSv/yr.
    - Releases of radiological nuclear substances were well below the DRLs for PNGS in 2023.
    - There was an environmental action level (EAL) exceedance for gross beta/gamma in sewage. OPG took corrective action to prevent recurrence and CNSC staff are satisfied with the actions taken by OPG. The event did not impact the health of the public or the environment.
    - No releases of hazardous (non-radiological) substances exceeded provincial regulatory limits. There was a minor exceedance of the provincial limit for differential temperature of the cooling water intake and outfall, attributed to seasonal algae debris. The condition has been resolved and the event has been documented for monitoring trends.
    - OPG has implemented and continues to maintain a corporate environmental management system in accordance with CNSC requirements.
    - Events addressed satisfactorily to date.
- CNSC staff reviewed the 2022 updated ERA report for Pickering Nuclear and 2022 Predictive Effects Assessment (PEA) for Pickering Nuclear Safe Storage 2022 Addendum Report.

  - CNSC staff concluded that these reports are compliant with CSA N288.6-12, *Environmental risk assessments at class I nuclear facilities and uranium mines and mills*.
  - The results of the ERA and PEA indicate that meaningful human health or ecological risks attributable to PNGS operations are unlikely.

- In 2023, CNSC staff and Fisheries and Oceans Canada each independently reviewed OPG's PNGS 2022 Fish Impingement Monitoring report and concluded that the report met the conditions of the Fisheries Act Authorization (FAA). The combined biomass of all species and ages impinged in 2022 was 2,478.96 kg. This amount, along with the biomass from 2021 remained below the two consecutive year threshold of 3619 kg (FAA condition 3.2.1.1).

OPG has made adequate provision for the protection of the environment and health of persons, and OPG has demonstrated that people and the environment living near the PNGS remain protected.

2.3.10 Emergency Management and Fire Protection

Performance rating: Satisfactory

Number of findings by rating:

In 2023, CNSC staff conducted a field inspection on the fire response facilities and equipment and three field inspections of fire brigade drills.

- In 2023, CNSC staff conducted a Type 2 inspection on emergency preparedness and response during a full-scale nuclear emergency exercise at PNGS, a field inspection on the fire response facilities and equipment and three field inspections of fire brigade drills.
- CNSC identified a total of 26 findings, one non-compliance of negligible safety significance, nine non-compliances of low safety significance, and one non-compliance of medium safety significance.
- The non-compliances pertained to updates of pre-fire plans, fire brigade drill assessment, fire brigade fire response performance, identification of fire zones, correct use of fire fighting equipment, proper fire fighting technique, and testing the implementation of emergency measures.

- The non-compliance of medium safety significance pertained to maintenance of staged fire equipment.
    - CNSC staff found that monthly inspections being performed by OPG personnel, were not identifying and resolving issues related to the maintenance fire extinguishers, monitors, attack and supply hoses.
    - In response, OPG submitted a corrective plan which included performing an extent of condition and addressing deficiencies identified, coaching of staff, and implementing independent verification of inspection and maintenance forms.
    - CNSC staff continue to actively monitor the implementation of the corrective plan and evaluate its effectiveness.
- Annually, OPG commissions a qualified third party to conduct the plant condition inspection at PNGS that covers all PNGS Units and the exterior areas of the station.
    - The objective of the third-party plant condition inspection was to assess OPG compliance with the operational requirements of CSA N293-12, Fire protection for nuclear power plants and National Fire Code of Canada (NFCC).
    - In 2023, CNSC staff completed the review of the 2022 Annual Third Party Plant Condition Inspection Report and found that the report met the operational requirements of CSA N293-12 and NFCC. CNSC staff's review of the 2023 report is on-going.
    - OPG implemented CSA standard N293-12 (R2017) in 2023.

2.3.11 Waste Management

Performance rating: Satisfactory

Number of findings by rating: No findings

- CNSC staff were satisfied with OPG's reporting of the 2023 PNGS safety performance indicator for Low and Intermediate-Level Radioactive Solid Waste Generated.
- In September 2023, OPG submitted an update on the status of Pickering NGS Units 2 and 3, in relation to REGDOC-2.11.2, Decommissioning.
    - CNSC staff reviewed OPG's submission against REGDOC-2.11.2, section 7.3 Storage with surveillance plan. CNSC staff deemed OPG's submission acceptable.
    - OPG plans to submit Storage with Surveillance (SWS) plan for Units 2 and 3 in the next formal submission of the Detailed Decommissioning Plan for PNGS Units 1-4, scheduled for August 2025.

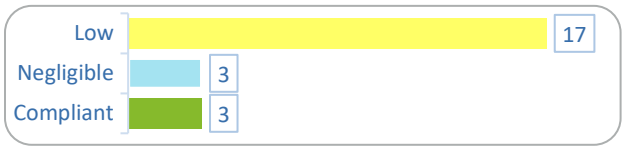
- In December 2023, OPG submitted revisions to licensing basis documents to incorporate changes to comply with REGDOC-2.11.2, Decommissioning and REGDOC-3.3.1, Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities.

With this governance update, OPG is compliant with REGDOC-2.11.2, REGDOC-3.3.1, and Clause 10.5 of REGDOC-2.11.1, Waste Management, Volume I: Management of Radioactive Waste.

2.3.12 Security

Performance rating: Satisfactory

Number of findings by rating:



In 2023, CNSC staff reviewed OPG's 2022 threat and risk assessment and determined that the threat and risk assessment report was completed in accordance with regulatory requirements.

- In 2023, CNSC staff conducted a Type II and two field inspections of the PNGS Nuclear Security Program. As a result of the inspection, CNSC staff identified 3 compliant findings, 3 non-compliant findings of negligible safety significance, and 17 non-compliant findings of low safety significance.
    - The details of the inspections' findings contain prescribed information and are classified confidential.
    - In response to the inspection findings, OPG took actions to address the non-compliances and submitted corrective action plans to the CNSC.
    - CNSC staff continue to monitor the implementation of corrective actions.
    - There is no immediate risk to safety and security.
- In 2023, the CNSC issued an Administrative Monetary Penalty (AMP) to OPG as a result of a failure to comply with a licence condition in relation to its security program at the Pickering and Darlington Nuclear Generating Stations, dating back to 2022. The AMP was issued to promote compliance and deter recurrence. OPG has paid the penalty amount and has put corrective actions in place to address the non-compliances. CNSC staff are reviewing OPG's corrective actions.
- CNSC staff presented an EIR to the Commission in March 2023, and provided an update on the matter, in December 2023, during an in-camera session. CNSC staff are satisfied

that OPG had implemented adequate corrective measures to prevent recurrence and considers the matter closed. The details of EIR contains prescribed security information and is not publicly available.

- CNSC staff acknowledge that OPG has made changes to its nuclear security program to improve OPG compliance performance going forward. To evaluate the implementation of these changes, CNSC staff conducted a Type I inspection on OPG's nuclear security program in 2024.

Cyber Security

- In 2023, CNSC staff requested OPG to provide an implementation plan for CSA N290.7-21 Cyber security for nuclear facilities. OPG provided a gap analysis and implementation plan, which indicated that they would be fully compliant with N290.7:21 by March 31, 2027. The implementation includes creating new governance documents, updates to the existing governance and supporting documents, and modifications to the relevant systems at the NPP. CNSC staff accepted this plan and requested yearly implementation status updates.

UPDATE: On February 29, 2024, CNSC staff confirmed that OPG has addressed all non-compliance from the 2022 fleet-wide cyber security inspection.

2.3.13 Safeguards and Non-Proliferation

Performance rating: Satisfactory

Number of findings by rating: One compliant finding

- In 2023, CNSC staff conducted a field inspection on *Participation/facilitation in announced IAEA inspections.*
    - CNSC staff confirmed that OPG provided access and assistance to the IAEA inspectors to facilitate the IAEA's physical inventory verification.
    - No actions were placed on OPG as a result of the inspection.

During the reporting period for 2023, OPG:

- Provided the required nuclear material accountancy and control reports to the CNSC and the IAEA for safeguards verification activities.
- Granted the required access and assistance to the IAEA for safeguards activities, including inspections, and for the maintenance of IAEA equipment at the PNGS.
- Submitted the required annual operational programme with quarterly updates and the annual update to the Additional Protocol to the CNSC in a timely manner. The CNSC

reviewed these documents and determined that they met requirements and expectations.

- Provided the support required for the IAEA's safeguards equipment, containment, and surveillance activities.

2.3.14 Packaging and Transport

Performance rating: Satisfactory

Number of findings by rating: Two compliant findings

- In 2023, the Packaging and Transport program for PNGS was implemented effectively, and the transport of nuclear substances to and from the facility was conducted safely.
- In 2023, there was one field inspection relating to this program.
    - OPG was compliant with the requirements of both the *Packaging and Transport of Nuclear Substances Regulations, 2015* (PTNSR) and the *Transportation of Dangerous Goods Regulations* for this field inspection.
- There was one reportable event related to Packaging and Transport.
    - Although this event was not safety significant, CNSC staff reviewed the corrective actions taken by OPG to prevent their recurrence and are satisfied with the actions taken.

2.4 Pickering Waste Management Facility

Overview

The PWMF is located within the lands and waters of the Michi Saagiig Anishinaabeg, the Gunshot Treaty (1877-88), the Williams Treaties (1923), and the Williams Treaties Settlement Agreement (2018).

Figure 6: Pickering Waste Management Facility

Licence: WFOL -W4-350.00/2028.

Licence term: April 2018 – August 2028.

Licence last issued or amended: July 2020.

Licensee: Ontario Power Generation.

Location: Pickering, Ontario.

- The PWMF spans two separate areas - Phase I (Storage Buildings #1 and #2, and the Retube Component Storage Area) and Phase II (Storage Building #3 and #4) - within the overall boundary of the Pickering site.
- The licence for the PWMF authorizes OPG to construct two additional DSC storage buildings in Phase II and one DSC processing building to replace the current DSC Processing Building.
- Storage Capacity: 1,778 DSCs containing used nuclear fuel waste.
- 70 DSCs transferred from PNGS to PWMF in 2023.

- In June 2023, OPG submitted an application to the CNSC requesting an amendment to the PWMF licensing basis to authorize OPG to process and store a maximum of 100 DSCs containing a minimum of 6-year cooled fuel at the PWMF. CNSC staff's CMD and OPG's hearing documents are available on the CNSC website.
- A 2023 desktop review of OPG's Public Information Disclosure Program resulted in 5compliant findings, 1 notice of non-compliance, and 1 negligible finding that are attributable to the Public Information Disclosure Program itself and not to any particular SCA in the following sub-sections.

Table 13: Summary of the number of inspections performed for PWMF (Full inspection list found in Appendix A: List of Inspections reports at each NPP and WMF)

Type 1	Type 2	Desktop	Field	Number of findings
0	1	1	0	Compliant: 26 Non-Compliant: 8 Total: 34

Table 14: 2023 Rating for PWMF per SCA

SCA	Rating	SCA	Rating
Management System	Satisfactory	**Conventional Health and Safety**	Satisfactory
Human Performance	Satisfactory	**Environmental Protection**	Satisfactory
Operating Performance	Satisfactory	**Emergency Preparedness and Fire Protection**	Satisfactory
Safety Analysis	Satisfactory	**Waste Management**	Satisfactory
Physical Design	Satisfactory	**Security**	Satisfactory
Fitness for Service	Satisfactory	**Safeguards and Non-Proliferation**	Satisfactory
Radiation Protection	Satisfactory	**Packaging and Transport**	Satisfactory

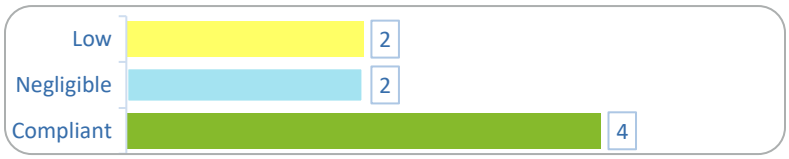
Event Initial Reports (EIRs)

No event initial reports pertaining to the PWMF were submitted to the Commission in the year 2023.

2.4.1 Management system

Performance rating: Satisfactory

Number of findings by rating:



CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Management System SCA at the PWMF in 2023.

- A 2023 desktop review focused on OPG's Public Information Disclosure Program identified 2 non-compliant findings of low safety significance and 2 non-compliant findings of negligible safety significance regarding minor discrepancies in documentation and application of OPG procedures to that documentation. CNSC staff were satisfied with OPG's corrective actions.
- Changes to licensing-basis documents are reviewed by CNSC staff to ensure that OPG maintains its management system at the PMWF and that changes do not impact safety.
- OPG has adequate contingency plans in place to maintain or restore critical safety and business functions in the event of disabling circumstances.

2.4.2 Human Performance Management

Performance rating: Satisfactory

Number of findings by rating: Three compliant findings

- CNSC staff concluded that OPG met the requirements, and its performance met CNSC staff expectations for the Human Performance Management SCA at the PWMF in 2023.
- CNSC staff reviewed OPG's 2023 quarterly and annual operations reports for PWMF and there were no issues identified for the specific area of Personnel Training and the Human Performance Management SCA overall.

2.4.3 Operating Performance

Performance rating: Satisfactory

Number of findings by rating: One compliant finding

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Operating Performance SCA at the PWMF in 2023.
- In 2023, OPG met their target of transferring 70 DSCs from PNGS to PWMF. OPG submitted all scheduled quarterly and annual reports as required and within the appropriate timelines. CNSC staff reviewed the reports and determined the licensed activities at PWMF were safe. The reviews also confirmed that OPG's reporting and trending, and its responses to comments and requests for follow-up information and clarification, met CNSC staff's expectations.
- In 2023, OPG had one reportable event related to OPG's late notification of a change to a person authorized to report to the CNSC. OPG submitted a final report on December 6, 2023, that included corrective actions to prevent a recurrence. CNSC staff considered this of low safety significance and were satisfied with the corrective measures taken by OPG.

2.4.4 Safety Analysis

Performance rating: Satisfactory

Number of findings by rating: No findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Safety Analysis SCA at the PWMF in 2023.
- OPG submitted an updated Safety Report for PWMF in 2023 for CNSC staff review.

2.4.5 Physical Design

Performance rating: Satisfactory

Number of findings by rating:

CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations, for the Physical Design SCA at the PWMF in 2023.

- In May-June 2023, CNSC staff conducted a general inspection of OPG's operations and programs at the PWMF. The inspection identified 1 non-compliant finding of low safety

significance involving maintenance of a section of asphalt membrane. CNSC staff were satisfied with OPG's corrective action.

- CNSC staff confirmed that OPG maintains an effective design program, pressure boundary program and implements modifications to the facilities in accordance with established engineering control process to maintain the design basis.

2.4.6 Fitness for Service

Performance rating: Satisfactory

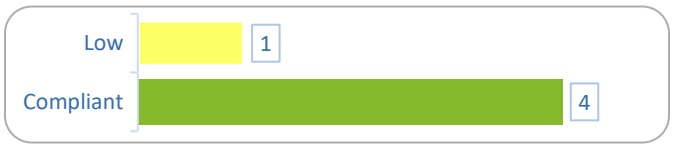
Number of findings by rating: No findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Fitness for Service SCA at the PWMF in 2023.
- As part of the aging management activities for DSCs, OPG submitted the aging management report for the PWMF. CNSC staff reviewed the submission and determined that it complied with OPG's aging management program.

2.4.7 Radiation Protection

Performance rating: Satisfactory

Number of findings by rating:



CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Radiation Protection SCA at the PWMF in 2023.

- In May-June 2023, CNSC staff conducted a general inspection of OPG's operations and programs at the PWMF. The inspection identified one non-compliant finding of low safety significance regarding radiological surveys at the PWMF. The issue was resolved to the satisfaction of CNSC staff.
- CNSC staff's reviews of quarterly and annual compliance reports submitted by OPG confirmed that:
    - PWMF achieved its year-end collective dose target.

- OPG did not exceed any action levels for dose to workers and the annual effective doses for all PWMF Nuclear Energy Workers were well below the regulatory dose limit.
- OPG did not exceed any action levels for contamination control.
- The perimeter dose rates at the PWMF were within OPG's targets and consistent with the results of the previous years.
- Measures were implemented to ensure that the PWMF was compliant with regulatory requirements related to Radiation Protection.

2.4.8 Conventional Health and Safety

Performance rating: Satisfactory

Number of findings by rating: Three compliant findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the SCA Conventional Health and Safety at the PWMF in 2023.
- In 2023, CNSC staff compliance verification activities did not identify any non-compliant findings relevant to Conventional Health and Safety. OPG did not report any lost-time injuries at the PWMF in 2023.

2.4.9 Environmental Protection

Performance rating: Satisfactory

Number of findings by rating: One compliant finding

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Environmental Protection SCA at the PWMF in 2023. OPG made adequate provision for the protection of the public and the environment.
- CNSC staff reviews of quarterly and annual reports did not result in findings for the Effluent and Emission Control area, and releases remained well below the Derived Release Limits and Action Levels.
- CNSC technical assessment did not result in findings related to the Assessment and Monitoring area. Dose to the public remained low (1.5 µSv), and in a similar range to the previous years, which shows that radionuclide concentrations measured in the environment remain low.

- In 2023, CNSC staff accepted a change to the effluent monitoring program. The requirement for particulate emission monitoring from the DSC processing building at the PWMF was discontinued effective January 2024. The monitoring results, previously reported quarterly to the CNSC, have consistently demonstrated that particulate emissions from the stack exhausts are less than 0.05% of the Derived Release Limits.

2.4.10 Emergency Management and Fire Protection

Performance rating: Satisfactory

Number of findings by rating: No findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Emergency Management and Fire Protection SCA at the PWMF in 2023.
- The OPG Pickering Emergency Response Team is responsible for acting as the primary responder to PWMF phase I which is within the PNGS protected area, and OPG has a formal agreement in place with Pickering Fire Services to provide primary fire response to PWMF Phase II.
- OPG has an adequate Fire Protection Program (FPP) to minimize both the probability of occurrence and the consequences of fire at the PWMF. The FPP comply with the requirements of CSA N393-13, *Fire protection for facilities that process, handle or store nuclear substances*.

2.4.11 Waste Management

Performance rating: Satisfactory

Number of findings by rating: Five compliant findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Waste Management SCA at the PWMF in 2023.
- CNSC staff confirmed that OPG continued to maintain an effective Waste Management program and preliminary decommissioning plan. CNSC staff were satisfied with the information provided by OPG in the quarterly and annual operations reports for the PWMF in 2023.
- OPG did not receive any non-compliances for the PWMF regarding the Waste Management SCA in 2023.

- In December 2023, OPG submitted revisions to licensing basis documents to incorporate changes to comply with REGDOC-2.11.2, Decommissioning and REGDOC-3.3.1, Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities. With this governance update, OPG is compliant with REGDOC-2.11.2, REGDOC-3.3.1, and Clause 10.5 of REGDOC-2.11.1, Waste Management, Volume I: Management of Radioactive Waste.

2.4.12 Security

Performance rating: Satisfactory

Number of findings by rating: No findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Security SCA at the PWMF in 2023. CNSC staff confirmed that OPG continued to maintain an effective security program for the PWMF in 2023.
- CNSC staff were satisfied with the information provided by OPG in the quarterly and annual operations reports for the PWMF in 2023.

2.4.13 Safeguards and Non-Proliferation

Performance rating: Satisfactory

Number of findings by rating: No findings

- CNSC staff concluded that OPG met the applicable CNSC regulatory requirements, and its performance met CNSC staff expectations for the Safeguards and Non-Proliferation SCA at the PWMF in 2023.
- CNSC staff determined that OPG's accountancy and control of nuclear material complied with the applicable regulatory requirements at the PWMF. OPG granted the required access and assistance to the IAEA for safeguards activities, including inspections, and for the maintenance of IAEA equipment at the PWMF.
- CNSC staff determined that OPG met the applicable regulatory requirements for operational and design information in 2023 at the PWMF. OPG provided the required operational and design information to facilitate IAEA safeguards activities. OPG also provided the support required for the IAEA's safeguards equipment, containment, and surveillance activities.

2.4.14 Packaging and Transport

Performance rating: Satisfactory

Number of findings by rating: No findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Packaging and Transport SCA at the PWMF in 2023.
- OPG maintains a Packaging and Transport program for the PWMF that ensures compliance with the Packaging and Transport of Nuclear Substances Regulations, 2015 and the Transportation of Dangerous Goods Regulations.

2.5 Bruce Nuclear Generating Station

Overview

Figure 7: Bruce Nuclear Generating Stations A and B

Bruce Nuclear Generating Stations A and B (hereinafter "BNGS A and B") are located on the shores of Lake Huron, in the Municipality of Kincardine, Ontario. The facilities are operated by Bruce Power under a lease agreement with the owner, Ontario Power Generation (OPG). The Bruce site lies 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.

Licence: PROL 18.03/2028.

Licence term: ctober 1, 2018, to September 30, 2028.

Licence last amended: 2023.

Licensee: Bruce Power.

Location: Tiverton, Ontario.

- **Fisheries and Oceans Canada (DFO) Authorization expiration**: December 31, 2028
    - In 2023, an amendment to the BNGS A and B PROL (PROL 18.03/2028) was made to require that Bruce Power implement and maintain an enhanced Fitness for Service program for fuel channels in extended operation.
    - Six units were fully operational in 2023.
    - Unit 3 started the major component replacement (MCR) outage in March 2023.
    - Unit 6 returned to service in September 2023 following the MCR outage.

Learn more about BNGS A and B

Table 15: Summary of the number of inspections performed for BNGS A and B in 2023 (Full inspection list found in Appendix A: List of Inspections reports at each NPP and WMF)

Type 1	Type 2	Desktop	Field	Number of Findings
1	24	2	47	Compliant:262 Non-Compliant:57 Total:319

Table 16: 2023 Rating and number of inspections for BNGS per SCA: total inspections covering an SCA and inspections with a primary focus on the SCA (primary focus figures in parentheses)

SCA	Rating	Number of Type 1 inspections	Number of Type 2 inspections	Number of Desktop inspections
Management System	Satisfactory	0	19 (5)	2 (1)
Human Performance	Satisfactory	0	16 (2)	2 (1)
Operating Performance	Satisfactory	0	13 (5)	1
Safety Analysis	Satisfactory	0	4	0
Physical Design	Satisfactory	0	9 (4)	0
Fitness for Service	Satisfactory	0	9 (6)	0
Radiation Protection	Satisfactory	0	3	0
Conventional Health and Safety	Satisfactory	0	4 (1)	0
Environmental Protection	Satisfactory	0	4 (1)	0
Emergency Preparedness and Fire Protection	Satisfactory	0	3	0
Waste Management	Satisfactory	0	3	0
Security	Satisfactory	1 (1)	0	0
Safeguards and Non-Proliferation	Satisfactory	0	1	0
Packaging and Transport	Satisfactory	0	0	0

Periodic Safety Review (PSR)

- In 2023, Bruce Power continued to implement its integrated implementation plan (IIP) resulting from the 2016 PSR.
- Bruce Power has continued to progress through their IIP actions according to their plan. Some of the planned IIP actions are related to future MCR activities and thus cannot be completed until the unit undergoes the MCR.
- CNSC staff are satisfied with Bruce Power's progress.

UPDATE: Bruce Power submitted the 2023 IIP annual report in March 2024 and identified that thirteen IIP actions were completed.

Table 17 summarizes the IIP tasks, or commitments, that were planned to be completed, those completed, and those closed following the CNSC review in 2023.

Table 17: BNGS A and B IIP Item Status (based on planned dates as of December 2023)

Total Commitments	Overall	2023	2022	2021
Planned	191	12	7	8
Completed by Bruce Power	74	13	8	7
Closed by the CNSC	69	13	9	8

Major Component Replacement (MCR)

The MCR project includes Units 3 to 8

Unit 3 MCR in 2023:

- Project progressed through the preparation phase in 2023.
- MCR outage started on March 1st 2023.
- Fuel was removed from the reactor; systems were drained and dried and bulkheads were installed to isolate the defueled reactor from the rest of containment.
- Lower feeder removal was also completed in 2023.

UPDATE: The component removal phase of MCR was expected to be completed by the end of July 2024.

- CNSC staff conducted inspections on MCR activities, as well as contractor management, radiation protection, training, fire protection and engineering change control.
- Findings were either compliant or had negligible safety significance.

- CNSC staff observed a trend of events in the area of contractor safety performance, specifically with issues related to conventional safety, fire protection, and rigging and lifting.
    - While Bruce Power implemented appropriate corrective actions for each event individually, CNSC staff raised Action Item 2023-07-30964 which required Bruce Power to develop a more holistic corrective action plan to address the trend.
    - CNSC staff reviewed and agree with the corrective action plan that was developed.
    - An Action Item remains open until corrective actions have been demonstrated to be effective in improving contractor performance.

Unit 6 MCR in 2023:

- CNSC oversight of MCR execution began in January 2020.
- Unit 6 was returned to service in September 2023.
- The unit returned to service through a staged approach, including the removal of the following regulatory hold points:

Regulatory Hold Point	Date
Fuel Load	May 10th, 2023
Guaranteed Shutdown State Removal	August 2nd, 2023
Prior to Increasing above 1% Power	September 1st, 2023
Prior to Increasing above 35% Power	September 9th, 2023

Following the return to service, regulatory oversight of Unit 6 continued through the CNSC's normal compliance verification program.

Event Initial Reports (EIRs)

Two EIRs pertaining to the BNGS A and B were submitted to the Commission for the reporting period between January 1, 2023 and December 31, 2023:

1. CMD 23-M20, "Bruce A Unit 4 Heat Transport Purification System Heavy Water Leak", June 28, 2023 Commission Meeting.
2. CMD 23-M24, "Improper Disposal of Tritium Contaminated Waste by Bruce Power", June 28, 2023 Commission Meeting.

Lutetium-177 Project

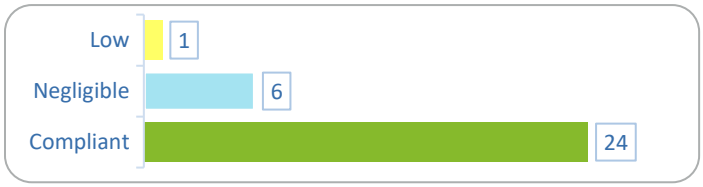
- In 2021, the Commission amended the PROL to allow the production of lutetium-177 (Lu-177) at the BNGS.
- Through a partnership with Isogen, Bruce Power installed and commissioned the Isotope Production System (IPS) in 2022 at BNGS B Unit 7 to begin commercial production of Lu-177, an isotope which is used in medical treatments.
- Bruce Power and the SON have entered a partnership to jointly market new isotopes produced at Bruce Power, creating new economic opportunities within SON territory.

UPDATE: In 2023, Bruce Power notified CNSC staff of plans to install a second target tube line at BNGS B Unit 7 to increase production of Lu-177. BNGS has adopted a four-phased execution strategy for the Isotope Production System (IPS) modification project. In 2023, CNSC staff have completed the review and approval of BNGS submission for classification of IPS Containment Boundary Modifications for New Target Finger Tube and are currently in the process of reviewing BNGS Notification of Equipment Installation for Lu-177 IPS and Commissioning and Integrated Safety Analysis Report.

2.5.1 Management System

Performance rating: Satisfactory

Number of findings by rating:



In 2023, CNSC staff conducted field inspections on Supply Management, Contractor Management and Configuration Management.

- CNSC staff concluded that all findings related to these Management System field inspections were compliant.

In 2023, CNSC staff also conducted a desktop inspection on Problem Identification and Resolution.

- This inspection resulted in 8 compliant findings and 3 non-compliant findings of negligible safety significance.
- CNSC staff are satisfied with Bruce Power's corrective action plans to address the non-compliant findings.

- Bruce Power continued to meet business continuity requirements, throughout 2023. Bruce Power has adequate measures in place relating to business continuity in the event of disabling circumstances such as illness and severe weather.
- For Unit 6 MCR, CNSC staff conducted Type II inspections on Bruce Power's completion assurance documentation and commissioning tests prior to releasing regulatory control hold points.
    - Based on the scope of the inspections, CNSC staff concluded that all findings were compliant. In summary, CNSC staff performed the following compliance verification activities with respect to Unit 6 MCR's regulatory control hold points:
        - Completion assurance documentation prior to fuel load.
        - Commissioning tests prior to fuel load.
        - Completion assurance documentation prior to releasing reactor shutdown guarantees (RSGs).
        - Completion assurance documentation prior to raising >1% power.
        - Completion assurance documentation prior to raising >35% reactor power.
- For Unit 3 MCR, CNSC staff conducted a Type II inspection of Bruce Power's Engineering Change Control process.
    - Based on the scope of the inspection, CNSC staff concluded that no non-compliant findings were identified. CNSC staff will continue conducting MCR Unit 3 regulatory oversight activities until the project is completed.
    - Near the end of 2023, CNSC staff observed a number of contractor-performance issues with the Unit 3 MCR project, such as near-misses related to lifting and rigging, and other Conventional Health and Safety areas.
    - While no major events have occurred, CNSC staff observed a trend in contractor performance that could lead to significant injuries to workers.
    - As a result, an Action Item was raised for Bruce Power to develop and implement a corrective action plan to improve contractor performance.
    - Although improvements to contractor-performance were noted, CNSC staff will continue to monitor Bruce Power's implementation of corrective actions. The Action Item will remain open until performance is satisfactory to CNSC staff.

2.5.2 Human Performance Management

Performance rating: Satisfactory

Number of findings by rating:

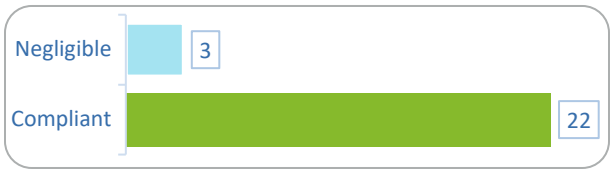
CNSC staff inspections in Human Performance in 2023 identified non-compliances of low and negligible safety significance related to personnel training, human performance program and personnel certification.

- CNSC staff conducted eight inspections related to Human Performance during 2023.
    - CNSC staff identified three procedural and training qualification requirement non-compliances related to Personnel Training, Personnel Certification and Human Performance during relevant inspections. All 3 were of low/negligible safety significance.
    - Bruce Power took corrective actions to address these non-compliances, and CNSC staff are monitoring the implementation of outstanding corrective actions.
- Non-compliances identified during field inspections conducted in 2023 were promptly and adequately addressed.
- Bruce Power reported any hours of work non-compliances in a timely manner and maintained adequate programs and processes to ensure worker fitness for duty.
- CNSC staff confirmed that Bruce Power has maintained sufficient personnel at BNGS A and B for all certified positions, and that all certified workers possessed the necessary knowledge and skills to perform their duties safely and competently.
- In 2023, Bruce Power reported 6 MSC violations at the BNGS A and B.
    - These were due to sudden staff sickness, family emergency, and inadequate communication.
    - CNSC staff reviewed the event reports and found that Bruce Power took appropriate corrective actions to resolve these issues and prevent their recurrence.

2.5.3 Operating Performance

Performance rating: Satisfactory

Number of findings by rating:



In 2023, CNSC staff conducted 14 inspections of BNGS A and B related to Operating Performance, with several other compliance verification activities in other SCAs that considered aspects of Operating Performance. The non-compliant findings identified were promptly and effectively addressed by Bruce Power.

- BNGS A had one planned outage which started on May 23, 2023 and the unit was returned to service on June 5, 2023 (Unit 4).
    - BNGS B had one planned outage which started on September 15 and the unit was returned to service on December 17, 2023 (Unit 8).
    - CNSC staff conducted compliance inspections on these planned outages and confirmed that all outage-related undertakings, such as reactor shutdown guarantees, and heat sink strategy management were performed safely by Bruce Power.
    - CNSC staff concluded that Bruce Power appropriately managed all planned outages.
- As found in Appendix F1 : in 2023, BNGS A and B experienced twelve forced outages:
    - BNGS A:
        - One at Unit 1 due to a turbine trip that occurred on September 7, 2023. The unit returned to service on September 12, 2023.
        - Two at Unit 2 due to:
            - Shutoff Rod fully dropping into core during an SST on May 8. The unit returned to service on May 10.
            - a Primary Heat Transport (PHT) instrument line leak. Removed from service on June 11. The unit returned to service on June 18th.

    - Five at Unit 4 due to:
        - a Primary Heat Transport instrument line leak. Removed from service on February 22. The unit returned to service on March 6.
        - Reactor Regulating System (RRS) responding to inaccurate level indications in the Liquid Zone Control System. Removed from service on March 28. The unit returned to service on March 30.
        - Hose failure resulting in leakage of D_2O. Removed from service on April 25. The unit returned to service on April 30.
        - Turbine trip. Removed from service on July 4. Unit returned to service on July 6.
        - Primary Heat Transport Pump 2 seal failure. Removed from service on November 18. The unit was returned to service on November 24.
- BNGS B:
    - One at Unit 5 to repair a Primary Heat Transport instrument line leak. Removed from service on October 23, 2023. The unit returned to service on November 1.
    - Three at Unit 8 due to:
        - a trip alarm from the Unit 8 Main Output Transformer. Removed from service on February 11. The unit returned to service on February 13.
        - repairs needed on the West Reactor Area Bridge. Removed from service on March 12. Unit returned to service on March 20.
        - a turbine trip. Removed from service on September 6. The unit returned to service on September 8.

- All forced outages were manual shutdowns.
- CNSC staff concluded that all forced outages were adequately followed up by Bruce Power.
- All BNGS Units met WANO's PHWR target of 1.0 automatic trip per 7,000 hours of operation.
- Bruce Power submitted a total of 58 REGDOC-3.1.1 event reports, including 2 related specifically to Operating Performance in 2023. Both reported events related to this SCA were non-safety significant and were adequately evaluated by Bruce Power. CNSC staff

followed up on all reportable events and confirmed that Bruce Power took appropriate corrective actions to prevent their reoccurrence.

2.5.4 Safety Analysis

Performance rating: Satisfactory

Number of findings by rating: Four compliant findings

Deterministic Safety Analysis

- In December 2022, Bruce Power submitted Part 3 (Safety Analyses) of the updated Safety Report (SR) for BNGS A and B and subsequently in February 2023, Part 1 (Plant and Site Description) and 2 (Plant Components and Systems) were submitted.
    - In 2023, CNSC staff reviewed Part 1 and 2 of the SR and determined that it met REGDOC-2.4.1 requirements; Part 3 is currently being reviewed by CNSC staff.

Major Component Replacement (MCR) Safety Analysis

- In May 2023, Bruce Power submitted all remaining safety analysis reports required to support the restart of Unit 6 from MCR. The analyses were required to characterize the Safe Operating Envelope for a pre-defined period of time after restart and were considered as pre-requisites prior to the release of the regulatory hold point for unit restart (release of Guaranteed Shutdown State).
    - CNSC staff reviewed the analyses and determined that they met REGDOC-2.4.1 requirements.
- In April 2022, Bruce Power submitted its Regulatory Communication Plan (RCP) for MCR Units 3 and 4 safety analysis.
    - CNSC staff reviewed Bruce Power's Safety Analysis Impact Report for MCR Units 3 and 4 and concluded that it met the requirements of REGDOC-2.4.1.
    - CNSC staff have reviewed the Technical Basis Document for Loss of Reactivity Control and provided the results of their review to Bruce Power in September 2023.
- In November 2023, Bruce Power submitted the Large Break LOCA analysis work plan for Unit 3 and 4.
    - CNSC staff reviewed Bruce Power's plan and concluded it aligns with the MCR LBLOCA analysis approach accepted by CNSC staff in the past for Unit 6.
    - Similar to the work completed for MCR Unit 6, CNSC staff will review the Large Break LOCA analyses to ensure that they meet REGDOC-2.4.1 requirements.

Large Break LOCA Safety Margins

- The industry has developed a composite analytical approach (CAA) to assess the large break LOCA (LBLOCA) safety margins more accurately. A key aspect of the CAA is reclassifying a portion of LBLOCA scenarios from DBA category to BDBA category, based on the rationale that breaks of a large diameter pipe above a certain break size have a very low probability of occurrence.
- Bruce Power has taken a lead role in implementing the CAA for BNGS B reactors.
- The first major activity was to determine the threshold break size (TBS) – a delineation between the DBA- and BDBA-breaks, based on a pipe break frequency assessment. In August 2020, CNSC accepted Bruce Power's request to reclassify breaks above the TBS from DBA to BDBA for BNGS B reactors, given the estimated very low likelihood of breaks above the TBS (CNSC letter of August 6, 2020).
- In February 2022, Bruce Power requested for CNSC staff acceptance of DBA analysis at or below the TBS, while continuing discussions with CNSC staff on the BDBA-LBLOCA realistic analysis. CNSC staff and Bruce Power were not able to come to an agreement on the CAA methodology. To ensure successful resolutions of the issues, a protocol was signed between Bruce Power and CNSC staff in June 2023 to formally document the necessary steps for addressing the LBLOCA CAA methodology issues. Four technical panels were setup which will evaluate the following subjects:
    - #1 Re-classification impact on relevant specific safety areas
    - #2 LBLOCA BDBA analysis
    - #3 Safe Operating Envelope
    - #4 Risk Integration from the LBLOCA CAA specific areas (using RIDM)

UPDATED: In 2024, technical panels #1, #2, and #3 were actively working.

Project 2030

- In August 2022, Bruce Power informed CNSC staff of its plans to recover power for the BNGS A and B Units. Specifically, Bruce Power plans to operate the BNGS A and B Units at 100% Full Power (FP) as those units are currently operating at 92-3% FP.
- The project will involve the installation of new components that incorporate design and nuclear safety improvements to recover and improve safety margins. The project will be supported by other initiatives at Bruce Power such as refined safety analysis, core conversion, refurbishment of Units 1 and 2, MCR, and the Lifetime Asset Management Plan (LAMP).

- CNSC staff are currently reviewing the submissions associated with Project 2030, this includes Technical Basis Documents, Analysis Reports and Assessments Reports to ensure that they meet REGDOC-2.4.1 requirements.
- The Safety Analysis review work is expected to take approximately 2 years to complete.

UPDATE: In January 2024, Bruce Power informed CNSC staff of its plan for a two-step process to demonstrate that there is adequate safety margin to operate to 100% FP. The plan will consist of demonstrating adequate safety margin up to 96% FP as a first step, then 100% FP as a second step.

Probabilistic Safety Analysis

- In November 2023, Bruce Power submitted the Level 1 at-power internal events PSA for CNSC staff's review.

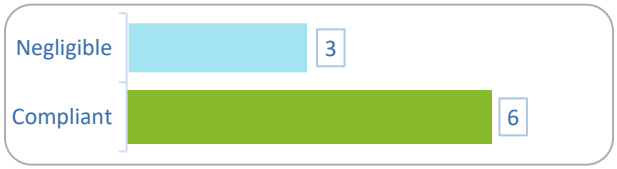
UPDATE: The external hazards assessment and Level 2 At-Power Internal Events and Internal Flood PSA were subsequently submitted in March 2024. CNSC staff are currently reviewing those assessments.

- Bruce Power sought practical changes to reduce BNGS A Fire PSA risk below the administrative target, resulting in a major engineering change. In November 2023, Bruce Power informed CNSC staff that they have completed and implemented the Very Early Smoke Detection Apparatus (VESDA) upgrade in the field to reduce risk associated with fire related events. CNSC staff will review the Fire PSA, which will be submitted as part of 2024 PSA update.

2.5.5 Physical Design

Performance rating: Satisfactory

Number of findings by rating:



Pressure boundary program

- As a follow-up to a 2022 Type II inspection on Pressure Boundary, Bruce Power's corrective actions for the NNCs raised for the non-compliant findings from this inspection were submitted to CNSC staff in 2023 and were found to be acceptable.

Design Governance:

Environmental Qualification

- CNSC staff inspection in 2023 identified a total of three (3) findings in the area of Environmental Qualification of equipment observed, all of which were compliant and met regulatory requirements.

System Design:

Electrical Power systems:

- Based on the CNSC compliance activities in 2023, CNSC staff determined that electrical power systems including cables met regulatory requirements.

Seismic Qualification

- In 2023, CNSC staff issued 3 non-compliant findings in the specific area of seismic qualification; these were based on observations of unsecured equipment/materials during quarterly field inspections.
    - All 3 findings were determined to be negligible, and CNSC staff found Bruce Power's corrective actions for the observed non-compliances to be acceptable.

Human factors in design

- In 2023, CNSC staff conducted a Type II Inspection of Unit 3 MCR Engineering Change Control. One (1) compliant finding was associated with Human Factors in Design (Physical Design – Design Governance), identifying that Bruce Power's human factors in design activities were controlled according to their implemented procedures and guidance that met the requirements of CSA N290.12, *Human factors in design for nuclear power plants*, and N286-12, *Management system requirements for nuclear facilities*.

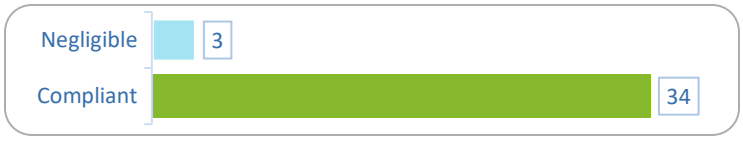
Fire protection design

- In 2023, CNSC staff reviewed Bruce Power's revised Fire Protection Assessment reports for BNGS A and B (Code Compliance Review, Fire Safe Shutdown Analysis and Fire Hazard Assessment) and found them to be acceptable.

2.5.6 Fitness for Service

Performance rating: Satisfactory

Number of findings by rating:



In 2023, CNSC staff determined that Bruce Power's Fitness for Service program at BNGS A and B continues to meet applicable regulatory requirements, with the exception its application to

regions of elevated hydrogen equivalent concentration near the inlet rolled joints of pressure tubes in extended operation.

  - A risk-informed decision-making evaluation (2022) concluded that continued operation of affected pressure tubes is acceptable for a period of at least three years.
  - For pressure tubes potentially affected by regions of elevated hydrogen equivalent concentration near the outlet rolled joints, alternate fitness for service criteria were satisfied during the reporting period.
  - Regular updates on the status of industry's research and development program on elevated hydrogen equivalent concentration are provided to the Commission through the Status Report on Power Reactors.

Maintenance

- BNGS A and B maintained the critical corrective maintenance backlog, critical deficient maintenance backlog and the number of critical preventive maintenance deferrals very low.
- In 2023, the average preventive maintenance completion ratio was around 96% and 92% for BNGS A and B respectively, which was acceptable.

Equipment Fitness for Service/Equipment Performance

- In 2023, CNSC staff reviewed Bruce Power's 2022 Annual Report on Risk and Reliability. In general, BNGS A and B showed good performance for systems important to safety in 2022.
- CNSC staff confirmed that all special safety systems for BNGS A and B met their Actual Past Unavailability (APU) targets in 2023, except for the Negative Pressure Containment (NPC). The NPC system unavailability exceeded its APU target for BNGS A in 2023 due to a configuration management issue. The event was assessed to be of low safety significance, and CNSC staff found that Bruce Powers corrective actions were acceptable.
- CNSC staff conducted two system inspections in BNGS A and B in 2023 that confirmed compliance with regulatory requirements.

Structural Integrity

- In 2023, Bruce Power was performing work to confirm the fitness for service of the field welds in Units 1 and 2 feeders.
  - CNSC staff issued an extension for the methodology used to disposition legacy feeder weld flaws in Units 1 and 2. Actions are in progress to remediate deficiencies in weld inspection data, including a Phased Array Ultrasonic Inspection campaign and a research project intended to enhance knowledge of predicted failure modes. CNSC staff continue to receive feeder inspection reports

from outage inspections to ensure results continue to be acceptable and fitness for service modelling continues to be improved.

  - CNSC staff will continue to monitor progress in 2024.

Aging Management

- In 2023, Bruce Power introduced operational changes and additional training to minimize the possibility of cold overpressure transients and commenced a Research and Development (R&D) program to update hydrogen equivalent concentration (Heq) predictive model capabilities and analytical tools for the rolled joint regions of pressure tubes.
  - CNSC staff has assessed progress in 2023 to be satisfactory.
- CNSC staff conducted one Aging Management Program inspection in 2023 that confirmed that Bruce Power met the intent of the document control requirements concerning the control of aging management documentation during this inspection.
  - However, procedural non-compliances were observed relating to the document control of Lifecycle Management Plans (LCMP). Bruce Power has satisfactorily addressed the enforcement action.

Periodic Inspection and testing

- CNSC staff determined that Bruce Power's Periodic Inspection Program at BNGS A and B is effectively implemented and is consistent with regulatory requirements.
  - Minor non-conformances related to document control were satisfactorily addressed by Bruce Power.
- Following maintenance outages in 2023, continued operation of Units 4 and 8 pressure tubes with flaws in the inlet region of interest was accepted by CNSC staff based on risk-informed considerations.
- CNSC staff conducted a Periodic Inspection Program (PIP) compliance inspection and found that Bruce Power was compliant with regulatory requirements.
- Two minor procedural non-compliances were observed; both non-conformances were satisfactorily addressed by Bruce Power.

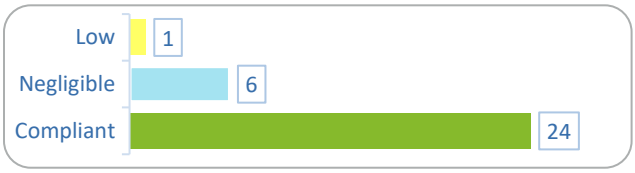
Chemistry Control

- Based on the review of chemistry safety performance indicators reported by the licensee, Bruce Power maintained acceptable chemistry control performance in 2023.

2.5.7 Radiation Protection

Performance rating: Satisfactory

Number of findings by rating:



In 2023, CNSC staff conducted three baseline RP field inspections, one RP-focused Type II inspections, and one reactive field inspection in response to the Unit 4 PHT leak event the took place in April 2023.

- CNSC staff determined that at the BNGS:
    - Radiation doses to workers were below the regulatory dose limits.
    - There was one action level exceedance where contamination by a nuclear substance was detected prior to exit from the Bruce site at the vehicle portal monitor.
    - Appropriate measures were used to control occupational exposures and to keep doses ALARA.
    - Actions were taken to control radiological hazards to protect workers.
- CNSC staff's compliance inspections of BP's implementation of their RP program at the BNGS identified 7 non-compliant findings that were rated as being of low or negligible safety significance.
    - No enforcement actions were raised. CNSC staff confirmed that Bruce Power promptly implemented acceptable corrective actions for all non-compliant findings.
- Regarding the RP action level exceedance, there was no dose consequence to plant personnel or members of the public as well there was no release to the environment.
    - CNSC staff identified no issues with Bruce Power's investigation and corrective actions.
- In 2023 Bruce Power completed the chemical decontamination of the Unit 3 PHT system as an ALARA initiative.

- Unit 3 had the highest source term of any of the reactors at site, and the dose rates were high to the extent it would have prevented the ability to execute the MCR project while controlling workers doses.
- However, the decontamination has seen the gamma radiation fields in the Unit 3 feeder cabinet drop by approximately 79%, resulting in a total dose savings of thousands of person-rem over the duration of the project

2.5.8 Conventional Health and Safety

Performance rating: Satisfactory

Number of findings by rating:

The non-compliances were related to Conventional Health and Safety practices as well as awareness and were promptly and adequately corrected by Bruce Power.

- As indicated by data in Appendix F6, in 2023 some indicators of workers' conventional safety at BNGS were above the industry average.
- All reported events relevant to this SCA were non-safety significant and were analysed with adequate root cause analysis.
  - In 2023, CNSC staff followed up on 3 reportable events related to Conventional Health and Safety and confirmed that Bruce Power implemented appropriate corrective actions.
  - The worker injuries from two out of three events did not result in a lost-time injury.

2.5.9 Environmental Protection

Performance rating: Satisfactory

Number of findings by rating: Nine compliant findings

- CNSC staff conducted a variety of assessments, and inspections to verify compliance of all outputs associated with the Environmental Protection SCA specific areas.
- Results from CNSC staff's assessments of the quarterly and annual reports determined that Bruce Power met regulatory requirements in REGDOC-3.1.1 and REGDOC-2.9.1.

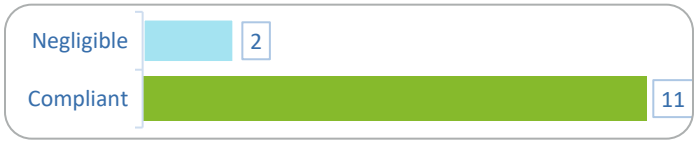
- Dose to the public from the Bruce site remained below the regulatory limit of 1 mSv/yr.
- Releases of radiological nuclear substances were well below the DRLs for BNGS A and B in 2023.
- No radiological releases to the environment from the facility exceeded the regulatory limits.
- No action levels were triggered for airborne and waterborne releases.
- No releases of hazardous (non-radiological) substances exceeded provincial regulatory limits.
- Bruce Power has implemented and continues to maintain a corporate environmental management system in accordance with CNSC requirements.

- CNSC staff reviewed Bruce Power's 2022 Environmental Risk Assessment (ERA) and concluded it was consistent with the overall methodology and complies with all the applicable requirements of CSA N288.6, Environmental risk assessments at Class I nuclear facilities and uranium mines and mills.
  - The results of the ERA indicate that meaningful human health or ecological risks attributable to current BNGS operations are unlikely.
- Bruce Power made adequate provision for the protection of the environment and health of persons and, Bruce Power has demonstrated that people and the environment living near the BNGS remain protected.

2.5.10 Emergency Management and Fire Protection

Performance rating: Satisfactory

Number of findings by rating:



CNSC staff conducted several compliance verification activities, such as desktop reviews of quarterly scheduled reports, events reports, as well as Emergency Preparedness and Fire Response on-site field inspections.

- All minor procedural non-compliances, identified during field inspections, related to the fire protection response equipment availability requirements were promptly and adequately addressed by Bruce Power.

- CNSC staff conducted 4 Fire Response field inspections, and found Bruce Power's performance satisfactory, and met regulatory requirements.
    - Several recommendations were identified by CNSC staff, namely procedures to be updated in Bruce Power's Management System.
    - Bruce Power completed corrective actions, to the satisfaction of CNSC staff.
- Bruce Power conducted a comprehensive 2 day full-scale, live and simulated on and off-site response emergency exercise with multiple jurisdictions, including CNSC participation.
    - CNSC Emergency Operations Centre (EOC) was activated and responded during the entire exercise.
    - In addition, CNSC staff conducted a Corporate Emergency Exercise and Severe Accident Management Guideline (SAMG) field inspection (during the exercise and found Bruce Power's performance during the exercise satisfactory and met regulatory requirements.
- There were 2 non-compliant findings with negligible safety significance, related to fire protection equipment availability and egress requirements.
    - Overall, CNSC staff are satisfied with Bruce Power's performance and corrective actions.
- Bruce Power has responded satisfactorily to NNCs, and minor issues identified during field inspections as well as events reported in this SCA area.

2.5.11 Waste Management

Performance rating: Satisfactory

Number of findings by rating:

CNSC staff confirmed through field inspections that Bruce Power complied with the applicable Waste Management regulatory requirements for waste transfer documents. Minor waste management procedural non-compliances were identified during these inspections and were promptly and adequately addressed by Bruce Power.

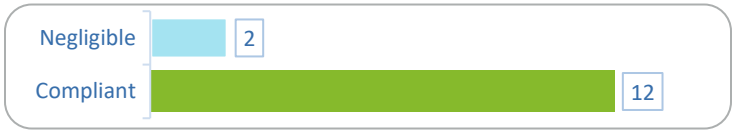
- During the reporting year there was one REGDOC-3.1.1 event report in this area.

  - On February 2, 2023, 84 drums containing 4,073 kg of charcoal filter media were incorrectly identified as hazardous waste instead of radioactive waste; therefore, they were shipped to a waste management vendor that is licensed to receive hazardous waste only.
  - CNSC staff reviewed the event report and found that Bruce Power took appropriate corrective and preventive actions to resolve the issue and to prevent its recurrence. There were no other significant reportable issues in this area during the reporting year.
- CNSC staff were satisfied with Bruce Power's reporting of the 2023 BNGS safety performance indicator for Low and Intermediate-Level Radioactive Solid Waste Generated.

2.5.12 Security

Performance rating: Satisfactory

Number of findings by rating:



In 2023, CNSC staff reviewed Bruce Power's 2022 threat and risk assessment and determined that it was completed in accordance with regulatory requirements.

- Four physical security inspections were conducted resulting in 1 non-compliant finding with negligible safety significance. A cyber security inspection was conducted as well, also resulting in 1 non-compliant finding with negligible safety significance.
- In 2023, Bruce Power continued to make progress in addressing Vital Area issues raised during a 2022 inspection.
- A limited scope exercise was conducted; Bruce Power's performance has been deemed adequate, although several areas for improvement have been identified.
- Bruce Power conducted a vital area reassessment in 2023 and is currently in the process of analysing the results. Results from the analysis are expected to have implications on the findings and recommendations generated from the site inspections conducted in 2022. The target completion date of the vital area analysis has been extended into September 2024.

Cyber Security

In 2023, CNSC staff requested Bruce Power to provide an implementation plan for CSA N290.7, *Cyber security for nuclear facilities*. Bruce Power provided a gap analysis and implementation plan, which indicated that they plan to be fully compliant with N290.7 by March 31, 2027. Bruce Power's implementation plan is currently under review by CNSC staff.

2.5.13 Safeguards and Non-Proliferation

Performance rating: Satisfactory

Number of findings by rating: Two compliant findings.

- In 2023, CNSC staff conducted a field inspection on Participation/facilitation in announced IAEA inspections at BNGS A.
    - CNSC staff confirmed that Bruce Power provided access and assistance to the IAEA inspectors to facilitate the IAEA's physical inventory verification.
    - No actions were placed on Bruce Power as a result of the inspection.

During the 2023 reporting period, Bruce Power:

- provided the required nuclear material accountancy and control reports to the CNSC and the IAEA for safeguards verification activities.
- granted the required access and assistance to the IAEA for safeguards activities, including inspections, and for the maintenance of IAEA equipment at the BNGS.
- submitted the required annual operational programme with quarterly updates and the annual update to the Additional Protocol to the CNSC in a timely manner. CNSC staff reviewed these documents and determined that they met requirements and expectations.
- provided the support required for the IAEA's safeguards equipment, containment, and surveillance activities.

2.5.14 Packaging and Transport

Performance rating: Satisfactory

Number of findings by rating: No findings

- In 2023, the Packaging and Transport program for BNGS A and B was implemented effectively, and the transport of nuclear substances to and from the facility was conducted safely.

- There was no field inspection completed during the calendar year 2023.
- There was one reportable event related to Packaging and Transport.
    - Although this event was not safety significant, CNSC staff reviewed the corrective actions taken by Bruce Power to prevent their recurrence and are satisfied with the actions taken.

2.6 Western Waste Management Facility

Overview

The WWMF lies 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.

Figure 8: Western Waste Management Facility

Licence: WWMF: WFOL -W4-314.00/2027; RWOS-1: WNSL-W1-320.05/2029.

Licence term: WWMF June 2017 – May 2027; RWOS-1: October 2019 – October 2029.

Licence last issued or amended: WWMF: June 2017; RWOS-1: October 2019.

Licensee: Ontario Power Generation.

Location: Tiverton, Ontario.

- The WWMF spans two separate areas – the Low and Intermediate-level wastes (L&ILW) Storage Facility and the Western Used Fuel Dry Storage Facility (WUFDSF) – within the overall boundary of the Bruce site.
- The L&ILW Storage Facility consists of the Amenities Building, the Waste Volume Reduction Building, the Transportation Package Maintenance Building, 14 above-ground, low-level storage buildings (LLSBs), and two above-ground, refurbishment waste storage buildings; and various in-ground containers, trenches, and tile holes for the storage of ILW.

- The WUFDSF consists of one DSC processing building and 6 DSC storage buildings (Storage Buildings #1, #2, #3, #4, #5 and #6).
- The licence for the WWMF authorizes OPG to construct 2 additional DSC storage buildings (Storage Buildings #7 and #8), 11 additional LLSBs, 270 additional in-ground containers, 30 in-ground containers for heat exchangers, one large object processing building, and one waste sorting building.
- The nearby RWOS-1 site is in a state of care and maintenance and regulated under a WNSL.
- WWMF Storage Capacity: 2,984 DSCs containing used nuclear fuel waste.
- 113 DSCs transferred to WUFDSF in 2023.
- A 2023 desktop review of OPG's Public Information Disclosure Program resulted in 5compliant findings, 1 notice of non-compliance, and 1 negligible finding that are attributable to the Public Information Disclosure Program itself and not to any particular SCA in the following sub-sections.

Table 18: Summary of the number of inspections performed for WWMF (Full inspection list found in Appendix A: List of Inspections reports at each NPP and WMF)

Type 1	Type 2	Desktop	Field	Number of findings
0	4	1	0	Compliant: 96 Non-Compliant: 13 Total: 109

Table 19: 2023 Rating for WWMF per SCA

SCA	Rating	SCA	Rating
Management System	Satisfactory	**Conventional Health and Safety**	Satisfactory
Human Performance	Satisfactory	**Environmental Protection**	Satisfactory
Operating Performance	Satisfactory	**Emergency Preparedness and Fire Protection**	Satisfactory
Safety Analysis	Satisfactory	**Waste Management**	Satisfactory
Physical Design	Satisfactory	**Security**	Satisfactory
Fitness for Service	Satisfactory	**Safeguards and Non-Proliferation**	Satisfactory

Radiation Protection	Satisfactory	**Packaging and Transport**	Satisfactory

Event Initial Reports (EIRs)

No event initial reports pertaining to the WWMF were submitted to the Commission in 2023.

2.6.1 Management System

Performance rating: Satisfactory

Number of findings by rating:

CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Management System SCA at the WWMF and RWOS-1 in 2023.

- A 2023 desktop review focused on OPG's Public Information Disclosure Program identified 2 non-compliant findings of low safety significance and 2 non-compliant findings of negligible safety significance regarding minor discrepancies documentation and application of OPG procedures to that documentation. CNSC staff were satisfied with OPG's corrective actions.
- Changes to licensing-basis documents are reviewed by CNSC staff to ensure that OPG maintains its management system at the WMWF and RWOS-1 and that changes do not impact safety. OPG has adequate contingency plans in place to maintain or restore critical safety and business functions in the event of disabling circumstances.

2.6.2 Human Performance Management

Performance rating: Satisfactory

Number of findings by rating: Three compliant findings

- CNSC staff concluded that OPG met the requirements, and its performance met CNSC staff expectations for the Human Performance Management SCA at the WWMF and RWOS-1 in 2023.

- CNSC staff reviewed OPG's 2023 quarterly and annual operations reports for the WWMF and RWOS-1 and there were no issues identified for the specific area of Personnel Training and the Human Performance Management SCA overall.

2.6.3 Operating Performance

Performance rating: Satisfactory

Number of findings by rating:

CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Operating Performance SCA at the WWMF and RWOS-1 in 2023.

- In total, OPG processed a total of 113 DSCs at the WUFDSF in 2023. The total volume of radioactive waste received at the Western Low and Intermediate Level Waste Storage Facility (WLILWSF) in 2023 was 5069.3 m^3. During 2023, the incinerator operated for 223 days on solids and 143 days on liquids. In 2023, OPG submitted all scheduled quarterly and annual reports as required and within the appropriate timelines.
- In 2023, OPG reported 3 events.
    - One event was related to the Security SCA and was considered to be of low safety significance. OPG took corrective actions to prevent a similar occurrence in the future. CNSC staff were satisfied with the corrective actions.
    - One event was related to the painting of a safeguards seal. This event is discussed further in the safeguards section of this ROR.
    - One event was related to OPG's late notification of a change to a person authorized to report to the CNSC. OPG submitted a final report on December 6, 2023, that included corrective actions to prevent a recurrence. CNSC staff considered this of low safety significance and were satisfied with the corrective measures taken by OPG.
- In February 2023, CNSC staff conducted a general inspection of OPG's operations and programs at the WWMF. The inspection identified 1 non-compliant finding of low safety significance involving the absence of an accessible notice in the WUFDSF providing direction to readers on how they may access records referenced in the licence.

- CNSC staff's review of OPG's quarterly and annual reports confirmed that there were no issues or situations indicating any safety concerns with the licensed activities at the WWMF were unsafe. The reviews also confirmed that OPG's reporting and trending, and its responses to comments and requests for follow-up information and clarification, met CNSC staff's expectations.

RWOS-1 is in a state of care and maintenance; no waste was placed in or removed from RWOS-1 in 2023.

2.6.4 Safety Analysis

Performance rating: Satisfactory

Number of findings by rating: One compliant finding

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Safety Analysis SCA at the WWMF in 2023. The Safety Analysis SCA is not applicable to the RWOS-1.
- The WWMF Safety Report was last revised in 2022 and submitted to the CNSC for review. During 2023, CNSC staff accepted OPG's disposition to the comments provided by CNSC staff. Revision 5 of the Safety Report was accepted by CNSC staff on January 9, 2024, with the final version provided by OPG on January 30, 2024.

2.6.5 Physical Design

Performance rating: Satisfactory

Number of findings by rating: No findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations, for the Physical Design SCA at the WWMF and RWOS-1 in 2023.
- CNSC staff confirmed that OPG maintains an effective design program and pressure boundary program and implements modifications to the facilities in accordance with established engineering control process to maintain the design basis.

2.6.6 Fitness for Service

Performance rating: Satisfactory

Number of findings by rating: Four compliant findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Fitness for Service SCA at the WWMF and RWOS-1 in 2023.
- As part of the aging management activities for DSCs, OPG submitted the aging management report for the WWMF and RWOS-1. CNSC staff reviewed the submission and determined that it complied with OPG's aging management program.

2.6.7 Radiation Protection

Performance rating: Satisfactory

Number of findings by rating:

CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Radiation Protection SCA at the WWMF and RWOS-1 in 2023.

- In March 2023, CNSC staff conducted an Emergency management and Fire protection inspection. In November 2023, a general inspection of OPG's operations and programs at the WWMF was conducted. The inspections identified 2 non-compliant findings of low safety significance; the first dealt with posting of radiation warning signs at access points across the facility, and the second dealt with posting the information needed to validate the expected response range for different types of radiation protection instrumentation. Both non-compliances have been resolved to the satisfaction of CNSC staff.
- CNSC staff's reviews of quarterly and annual compliance reports submitted by OPG confirmed that:
    - The WWMF achieved its year-end collective dose target.
    - WWMF/RWOS-1 did not exceed any action levels for dose to workers and the annual effective doses for all WWMF/RWOS-1 Nuclear Energy Workers were well below the regulatory limit.
    - WWMF/RWOS-1 did not exceed any action levels for contamination control
    - There were no recordable radiological exposures for OPG staff performing caretaking duties at RWOS-1.

- The perimeter dose rates at the WWMF were within OPG's targets and consistent with the results of the previous years.
- Measures were implemented to ensure that the WWMF was compliant with regulatory requirements related to Radiation Protection

2.6.8 Conventional Health and Safety

Performance rating: Satisfactory

Number of findings by rating: Eight compliant findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the SCA Conventional Health and Safety at the WWMF and RWOS-1 in 2023.
- In 2023, CNSC staff compliance verification activities did not identify any non-compliant findings relevant to Conventional Health and Safety. OPG did not report any lost-time injuries at the WWMF and RWOS-1 in 2023.

2.6.9 Environmental Protection

Performance rating: Satisfactory

Number of findings by rating: Six compliant findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Environmental Protection SCA at the WWMF and RWOS-1 in 2023. OPG made adequate provision for the protection of the public and the environment.
- CNSC staff reviews of quarterly and annual reports did not result in findings for the Effluent and Emission Control SpA, and releases remained well below the Derived Release Limits and Action Levels.
- CNSC technical assessment did not result in findings related to the Assessment and Monitoring Specific Area (SpA). Dose to the public remained low (1.4 uSv), and in a similar range to the previous years, which shows that radionuclide concentrations measured in the environment remain low.
- In 2023, CNSC staff accepted a change to the effluent monitoring program. OPG is planning to discontinue particulate emissions monitoring from the DSC processing building at the WWMF. The monitoring results, previously reported quarterly to the CNSC, have consistently demonstrated that particulate emissions from the stack exhausts are less than 0.05% of the Derived Release Limits.

2.6.10 Emergency Management and Fire Protection

Performance rating: Satisfactory

Number of findings by rating:

CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Emergency Management and Fire Protection SCA at the WWMF and RWOS-1 in 2023

- OPG has a facility emergency program for the WWMF that includes basic fire response for facility staff to respond to small fires with fire extinguishers. Main fire response is done by Bruce Power Emergency Response Team (BP ERT). To ensure familiarity with the facility, BP ERT are given orientation tours in addition to participating in annual fire response drills.
- In March 2023, CNSC staff conducted an Emergency Management and Fire Protection inspection. The inspection was a focused review of fire protection at WWMF and concluded that OPG has a satisfactory program. The inspection identified 4 non-compliant findings of low safety significance that involved storage of combustible material in unacceptable areas, an exit sign illumination issue, improper storage of select compressed gas cylinders, and blocked access to a sprinkler control valve. CNSC staff were satisfied with all corrective actions implemented by OPG.
- OPG has an adequate Fire Protection Program (FPP) to minimize both the probability of occurrence and the consequences of fire at the WWMF and RWOS-1. The FPP complies with the requirements of CSA N393-13, Fire protection for facilities that process, handle or store nuclear substances.
- CNSC staff also reviewed one reportable event report of low safety significance and confirmed that OPG met all the applicable regulatory requirements pertaining to all specific areas.

2.6.11 Waste Management

Performance rating: Satisfactory

Number of findings by rating: Seven compliant findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Waste Management SCA at the WWMF and RWOS-1 in 2023.
- CNSC staff confirmed that OPG continued to maintain an effective Waste Management program and preliminary decommissioning plan. CNSC staff were satisfied with the information provided by OPG in the quarterly and annual operations reports for the WWMF and RWOS-1 in 2023.
- OPG did not receive any non-compliances for the WWMF and RWOS-1 regarding the Waste Management SCA in 2023.
- In December 2023, OPG submitted revisions to licensing basis documents to incorporate changes to comply with REGDOC-2.11.2 Decommissioning, and REGDOC-3.3.1 Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities. With this governance update, OPG is compliant with REGDOC-2.11.2 REGDOC-3.3.1, and Clause 10.5 of REGDOC-2.11.1 Waste Management, Volume I: Management of Radioactive Waste.

2.6.12 Security

Performance rating: Satisfactory

Number of findings by rating: Two compliant findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Security SCA at the WWMF in 2023. The Security SCA is not applicable to the RWOS-1.
- There was 1security-related reportable event at the WWMF in 2023. CNSC staff considered the event to be of low safety significance and found that OPG took appropriate corrective actions to address the event.
- CNSC staff reviewed the WWMF quarterly, annual operational reports, as well as the threat and risk assessment report, and confirmed that OPG met all the applicable regulatory requirements pertaining to all specific areas for the Security SCA.

2.6.13 Safeguards and Non-Proliferation

Performance rating: Satisfactory

Number of findings by rating: No findings

- CNSC staff concluded that OPG met the applicable CNSC regulatory requirements, and its performance met CNSC staff expectations for the Safeguards and Non-Proliferation SCA at WWMF in 2023.
- CNSC staff determined that OPG's accountancy and control of nuclear material complied with the applicable regulatory requirements at the WWMF. OPG granted the required access and assistance to the IAEA for safeguards activities, including inspections and for the maintenance of IAEA equipment at the WWMF.
- In November 2023 OPG had a reportable event related to the painting of a weld flange on a sealed and gamma profiled DSC. Painting seals can invalidate the reference signature for the use of the laser mapping for containment verification (LMCV). The IAEA was able to be onsite on November 22, 2023 to reverify the seal and take a new reference scan. OPG took corrective actions to prevent a similar event from occurring again. CNSC staff and the IAEA were satisfied with OPG's corrective actions.
- CNSC staff determined that OPG met the applicable regulatory requirements for operational and design information in 2023 at the WWMF. OPG provided the required operational and design information to facilitate IAEA safeguards activities. OPG provided the support required for the IAEA's safeguards equipment, containment, and surveillance activities.

2.6.14 Packaging and Transport

Performance rating: Satisfactory

Number of findings by rating: No findings

- CNSC staff concluded that OPG met the applicable regulatory requirements, and its performance met CNSC staff expectations for the Packaging and Transport SCA at the WWMF in 2023. This SCA is not applicable to the RWOS-1.
- OPG maintains a Packaging and Transport program for the WWMF that ensures compliance with the Packaging and Transport of Nuclear Substances Regulations, 2015 and the Transportation of Dangerous Goods Regulations.

2.7 Point Lepreau Nuclear Generating Station

Overview

Figure 9: Point Lepreau Nuclear Generating Station

The Point Lepreau site is located on the Lepreau Peninsula, 40 kilometres southwest of Saint John, New Brunswick. The Point Lepreau site lies within the traditional territory covered by the Peace and Friendship Treaties with the Wolastoqey, Peskotomuhkati and Mi'gmaq peoples.

Licence: PROL 17.00/2032.

Licence term: July 1, 2022 to June 30, 2032.

Licence last amended: N/A.

Licensee: New Brunswick Power Corporation.

Location: Lepreau Peninsula, New Brunswick.

- **Fisheries and Oceans Canada (DFO) Authorization expiration**: December 31, 2032.
- The unit was fully operational in 2023.
- The PROL includes the Solid Radioactive Waste Management Facility (SRWMF) which comprises the following Phase I, II and III sites:
    - Phase I of the facility is used to store operational waste
    - Phase II is a dry storage facility for used fuel
    - Phase II Extension is an additional area prepared in 2006 to allow for dry storage of used fuel. Approval is required in accordance with the PROL prior to its commissioning and use

- Phase III of the facility stores waste from fuel channel replacement and other activities completed during the refurbishment outage

Learn more about Point Lepreau Nuclear Generating Station

Table 20: Summary of the number of inspections performed for Point Lepreau (Full inspection list found in Appendix A: List of Inspections reports at each NPP and WMF)

Type 1	Type 2	Desktop	Field	Number of findings
0	12	4	48	Compliant:226 Non-Compliant:58 Total:284

Table 21: 2023 Rating and number of inspections for PLNGS per SCA: total inspections covering an SCA and inspections with a primary focus[4] on the SCA (primary focus figures in parentheses)

SCA	Rating	Number of Type 1 inspections	Number of Type 2 inspections	Number of Desktop inspections
Management System	Satisfactory	0	12 (5)	4 (1)
Human Performance	Satisfactory	0	12 (2)	4 (1)
Operating Performance	Satisfactory	0	10 (5)	2
Safety Analysis	Satisfactory	0	2	0
Physical Design	Satisfactory	0	5 (4)	1
Fitness for Service	Satisfactory	0	10 (6)	0
Radiation Protection	Satisfactory	0	5	0
Conventional Health and Safety	Satisfactory	0	5 (1)	0
Environmental Protection	Satisfactory	0	4 (1)	0
Emergency Preparedness and Fire Protection	Satisfactory	0	3	0
Waste Management	Satisfactory	0	1	0
Security	Satisfactory	0	3	0

[4] Inspections typically center on a main focus area or program related to a specific SCA. This main focus is referred to as the primary focus SCA for that inspection. Additionally, the inspection may include other criteria that fall under different SCAs.

Safeguards and Non-Proliferation	Satisfactory	0	0	0
Packaging and Transport	Satisfactory	0	1	0

Periodic Safety Review (PSR)

CNSC staff noted that the PSR conducted in 2021 did not identify any major gaps between the current state of the NPP and modern requirements for the PSR validity period (2022–2032). Table 22 summarizes the IIP tasks, or commitments, that were planned to be completed, those completed, and those closed following the CNSC review, in 2023.

Table 22: NB Power IIP Item Status (based on planned dates as of December 2023)

Total Commitments	Overall	2023
Planned	346	14
Completed by NB Power	312*	11*
Closed by the CNSC	272	6

*According to the NB Power internal tracking system, 11 IIP items out of 14 were completed in 2023 and 312 overall. Three IIP items were deferred from 2023 to 2024. As of Dec. 31st 2023, a total of 291 IIP items have been submitted to CNSC staff for closure review

NB Power have been completing their IIPs according to their plan and CNSC staff are satisfied with NB Power's progress.

Event Initial Reports (EIRs)

One EIR pertaining to PLNGS was submitted to the Commission for the reporting period between January 1, 2023 and December 31, 2023:

1. CMD 23-M7, Partial Loss of Class IV Power and Heavy Water Leak at the Point Lepreau Nuclear Generating Station. January 25, 2023 Commission Meeting.
    a. An update was provided to the Commission on September 20, 2023, CMD 23-M41.
    b. CNSC staff conducted several reviews and inspections and conclude that the licensee took appropriate actions such that the safety of workers, the public and the environment were maintained.

2.7.1 Management System

Performance rating: Satisfactory

Number of findings by rating:

CNSC staff inspections in Management System in 2023 identified several non-compliant findings. Further details on the three low safety significant findings are discussed follow. CNSC staff will continue to monitor NB Power's implementation of corrective actions.

- The Preservation of Seismic Design Basis Type II Inspection resulted in 1low finding in the specific area of Configuration Management.
    - Several cabinets were observed that were not anchored per the design. NB Power has taken on the corrective actions for this finding and CNSC staff are satisfied with these actions.
- The Boiler Feedwater System Inspection resulted in 1 low finding in the specific area of Records Management.
    - Discrepancies were found in documents attached to SAP Software orders.
    - No regulatory actions were required as NB Power had an ongoing Nuclear Oversite (NOS) escalation associated with quality, retention, and retrievability of forms and records, which captured record deficiency issues such as those identified in this inspection.
- In the Quarter 1 FY 23/24 Quarterly Field Inspection Report, 1 low finding was identified in the specific area of Records Management.
    - During field inspections, work packages were identified that contained obsolete procedures and 1 form was modified in an uncontrolled manner.
    - NB Power is currently in the process of developing a corrective action plan to ensure that procedures used by maintenance staff in the field are up to date.
- NB Power continued to meet business continuity requirements, throughout 2023. NB Power has adequate measures in place relating to business continuity in the event of disabling circumstances such as illness and severe weather.

2.7.2 Human Performance Management

Performance rating: Satisfactory

Number of findings by rating:

CNSC staff inspections in Human Performance in 2023 identified non-compliances of low and negligible safety significance related to personnel certification, personnel training, fitness for duty and the human performance program.

- As part of the Quarterly Field Inspection Reports 3 non-compliant findings were identified in Human Performance Management.
    - One low safety significant finding was related to a contractor performing work without the required training.
    - One low safety significant finding was due to some workers in safety-sensitive positions exceeded their hours of work limits.
    - One finding of negligible safety significance was related to worker training and qualifications not being updated in a timely manner.
- During the Preservation of Seismic Design Basis Type II Inspection, 1low finding was identified in the specific area of Personnel Training.
    - Seismic Qualification (SQ) training and qualification requirements were found for staff in Electrical Design and Civil Design, however no required training, or qualification in SQ was found for Mechanical Design Staff. In addition, SQ related work was found to be performed by individuals that were not qualified in accordance with the existing Electrical/ Civil SQ requirements.
    - This resulted in an NNC. This NNC was closed in December 2023 as NB Power updated training related documentation to ensure that all design staff performing SQ activity would be trained and qualified regardless of the engineering discipline.
- The additional non-compliant findings of negligible safety significance were related to training, qualification, procedure adherence and simulator video issues.
- CNSC staff have reviewed and were satisfied with NB Power's corrective actions to address the Human Performance Management findings identified in 2023.

- CNSC staff will continue to monitor NB Power's progress in implementing the corrective actions through ongoing compliance verification activities.
- NB Power reported any hours of work non-compliances in a timely manner and maintained adequate programs and processes to ensure worker fitness for duty.
- CNSC staff confirmed that NB Power has maintained sufficient personnel at PLNGS for all certified positions, and that all certified workers possessed the necessary knowledge and skills to perform their duties safely and competently.
- Through routine monitoring and event reporting, CNSC staff identified an increase in events at the PLNGS where human performance was a contributing factor to the cause of the event.
    - As a result, CNSC staff increased regulatory scrutiny as part of graduated enforcement and an action item was opened to track NB Power’s corrective actions.
    - NB Power submitted a closure request for this action item.
    - UPDATE: The Increased Regulatory Scrutiny and Action Item was closed on May 9, 2024, as NB Power had implemented a set of measures that had a positive impact on the recurrence of events.
- In 2023, NB Power reported one MSC violation at the PLNGS.
    - This was due to an Emergency Response Team (ERT) member who left before confirming their replacement had arrived on site, as required, leading to NB Power being below MSC for approximately 20 minutes.
    - CNSC staff reviewed and were satisfied with NB Power’s corrective actions to reinforce the expectations with all members on physical verification of the next shift.
- CNSC staff continue to track NB Power’s action plan to address the NNCs raised during the 2022 CNSC Type I inspection of NB Power’s implementation of REGDOC-2.2.4, Fitness for Duty: Managing Worker Fatigue. NB Power will continue to provide progress updates for their action plan.

2.7.3 Operating Performance

Performance rating: Satisfactory

Number of findings by rating:

CNSC staff completed a desktop inspection in the specific area of Accident Management resulting in one finding of negligible safety significance, which requested improvements to the Severe Accident Management (SAM) program documents.

  - NB Power submitted an action plan which was accepted by CNSC staff.

- NB Power submitted updated Safe Operating Envelope (SOE) documentation and an analysis of a Multiple Boiler Tube Rupture (MBTR) accident as a Design Basis Accident (DBA).
  - This submission was the last item required to close an Action Item which CNSC staff had raised to track NB Power commitments to update the safety analysis limit of the reactor inlet header temperature.
  - CNSC staff found the information provided acceptable and closed the Action Item.
- CNSC staff continued the follow-up of an Action Item related to an inspection report which included a NNC to ensure adhesive/duct tape requirements are followed to preserve the function of the Emergency Core Cooling (ECC) strainers.
  - In response, NB Power formalized the updated margin analysis by updating their procedures to include information on the methodology used to calculate the amount of aluminium in the systems.
  - NB Power is also working at assessing the relevance of installing additional ECC strainers.
  - CNSC staff find the progress made on this Action Item acceptable.
- PLNGS experienced one planned outage from April 15 to May 25, 2023.
  - NB Power completed all planned regulatory commitments during the planned outage.
  - CNSC staff conducted an outage inspection and 1 finding of negligible safety significance was identified in the specific area of outage management.

    - NB Power completed all required actions and CNSC staff closed the Action Item in November 2023.

- As found in : , in 2023:
    - PLNGS experienced no unplanned reactor trips, setbacks or stepbacks.
    - PLNGS met WANO's PHWR target of 1.0 trip per 7,000 hours of operation.
- PLNGS experienced a 5-day unplanned outage November 15-20, 2023, following the discovery of a small leak on a stainless steel coil used for plant monitoring. The licensee decided to shut down the reactor to make repairs, after which the reactor was brought back to power. CNSC staff oversight included inspections in the Main Control Room (MCR) and attendance of outage meetings.

2.7.4 Safety Analysis

Performance rating: Satisfactory

Number of findings by rating: Two compliant findings

Deterministic Safety Analysis

- Inspections for boiler feedwater and electrical power systems, identified findings under Safety Analysis that were compliant.
- NB Power continued to implement REGDOC-2.4.1 in 2023 with the expectation to complete implementation by April 2024. CNSC staff reviewed deterministic safety analysis (DSA) basis updates submitted in accordance with NB Power’s REGDOC-2.4.1 implementation schedule.
- In 2023, CNSC staff reviewed and accepted NB Power submissions for boiler feedwater failures event trip coverage analysis, main steam line break analysis and multiple boiler tube rupture analysis. CNSC staff are satisfied with NB Power’s progress for REGDOC-2.4.1 implementation.

Large Break LOCA Safety Margins

- NB Power requested to re-classify LBLOCA with the break size equivalent or more than 5% reactor inlet header guillotine breaks to be BDBA instead of DBA.
- The request is based on the composite analytical approach (CAA) that determines the threshold break size that has frequency less than the BDBA cut-off frequency of 10^{-5} per reactor year.

- NB Power indicated that the existing LBLOCA analysis using DBA rules shows sufficient margins; conducting these analyses following BDBA rules, which consider realistic assumptions compared to DBA ones, would demonstrate even larger margins.
- NB Power's request is still under CNSC staff review.

Probabilistic Safety Assessment

- NB Power continues to be compliant with REGDOC-2.4.2 and their updated PSA reports are expected to be submitted in 2026.

2.7.5 Physical Design

Performance rating: Satisfactory

Number of findings by rating:

Design Governance

Human factors in design

- CNSC staff conducted a desktop inspection for the implementation of Human Factors in Design.
    - One negligible non-compliant finding was identified in the area of Physical Design relevant to documenting human factors requirements.
    - CNSC staff concluded that NB Power's response and corrective actions to address this finding are acceptable.

Design governance:

Environmental Qualification

- Based on the CNSC compliance activities in 2023, CNSC staff determined that the environmental qualification of equipment met CNSC staff requirements at PLNGS.

Component Design

Seismic Qualification

- CNSC staff conducted a compliance inspection on the Preservation of Seismic Design Basis.
    - Findings in the area of Physical Design were compliant.

- In the CNSC Quarter 4 Fiscal Year (FY) 22/23 and Quarter 1 FY 23/24 Quarterly Field Inspection Reports, two negligible findings were identified regarding existence of unrestrained items in the seismic control area and the improper orientation of the seismic control area floor tape. NB Power took immediate corrective actions that were satisfactory to CNSC staff.

Fuel Design

- Based on the Annual Fuel Performance Report, the frequency of sheath scrapes was reduced; however, the frequency of endcap stop marks (i.e., marks found on the fuel element endcaps caused by fuelling machines during the fuelling process) has increased, surpassing the previous high in 2020.
    - The marks are judged to have low safety significance.
- A total of 4defects were confirmed which is more than the CNSC expected defect rate of one defect per unit per year.
    - All the defects are judged to be due to foreign material interaction with the fuel elements.
    - A main PHT pump overhaul was performed during a planned outage in 2022 and degradation of the mesh screens in the pump hydrostatic bearing was discovered, with some screening material found missing and likely being the source of foreign material in the cooling system.
    - NB Power decided to discontinue the use of wire mesh screens on PHT pump bearings.
    - One PHT pump bearing is planned for replacement without screens in the 2024 outage and a second PHT pump bearing is planned for replacement without screens in the 2026 outage.
    - The average defect residency time (detection to discharge) for the reporting year was 13 days, which is an improvement compared to both the past performance and the industry average.
- NB Power met the expectations for fuel bundle inspections and has established a strategy to address the recent elevated defects levels. Overall, the inspection observations show satisfactory fuel condition. CNSC staff will continue monitoring NB Power mitigating strategies to resolve the elevated fuel defect rate.

System Design

Electrical Power Systems

- CNSC staff conducted a Type II system inspection of NB Power's Electrical Power System.
    - All findings arising from this inspection were compliant.
    - Four recommendations were identified for continuous improvement.

2.7.6 Fitness for Service

Performance rating: Satisfactory

Number of findings by rating:

Maintenance

- The average preventative maintenance completion ratio was around 94%, which was acceptable.
- The critical deficient maintenance backlog was above the industry average (noting that the industry average improved in the last 5 years).
- CNSC staff is monitoring the number and trending of the critical deficient maintenance backlog through baseline compliance activities, and if necessary, reactive compliance activities.
- In the CNSC Quarter 4 FY 22/23 Quarterly Field Inspection Report, a finding of negligible safety significance was identified for the practices associated with implementing the Foreign Material Exclusion (FME) plans in the field. NB Power took appropriate immediate corrective actions.
- CNSC staff had one finding of low safety significance for the Quarter 2 FY 23/24 Quarterly Field Inspection Report in the specific area of maintenance practices. Several fire extinguishers were not hydrostatically tested at the required intervals. Inspection, Testing, and Maintenance (ITM) records for fire extinguishers were not complete. Several radios were found to have batteries with poor capacity/health. NB Power is progressing on the related action plan.

Equipment Fitness for Service/Equipment Performance

- CNSC staff conducted a Type II system inspection of NB Power's Boiler Feedwater system.

  - No NNCs were placed on NB Power as a result of this inspection.
  - Two recommendations were identified for continuous improvement.
- In 2023, CNSC staff reviewed NB Power's 2022 Annual Report on risk and Reliability. In general, PLNGS showed good performance for their Systems Important to Safety.

Aging Management

- CNSC staff conducted a Type II inspection on Aging Management.
  - One finding of low significance associated with Aging Management was identified because the Spent Fuel Bays and the Solid Radioactive Waste Management Facility did not have defined Aging Management Plans (AMPs) and the Calandria and Shield Tank AMP did not address an identified potential Aging Related Degradation Mechanism (ARDM).
  - NB Power submitted an Action Plan which CNSC staff found acceptable.
  - Four recommendations were identified for continuous improvement.

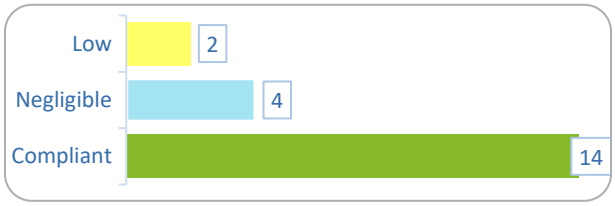
Chemistry control

- In the area of chemistry control, CNSC staff reviewed the findings from field activities and scheduled reports and conclude that NB Power meets regulatory requirements.

2.7.7 Radiation Protection

Performance rating: Satisfactory

Number of findings by rating:



CNSC staff conducted four baseline RP field inspections, one Radiological Hazard Control Type II inspection, and one SRWMF-focused Type II inspection.

- CNSC staff determined that at the PLNGS:
  - radiation doses to workers were below the regulatory dose limits\there were no exceedances of an action level listed in the licensee's RP program.
  - appropriate measures were in place to control occupational exposures and to keep doses ALARA.

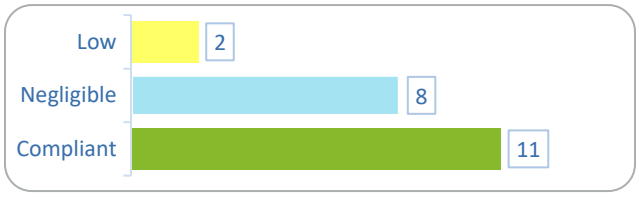
  - actions were taken to control radiological hazards to protect workers.

- CNSC staff's compliance inspections of NB Power's implementation of their RP program at the PLNGS identified 6 non-compliant findings.
  - The 2 low non-compliant findings were associated with the maintenance for some contamination control areas and the calibration of a portable monitor.
  - The negligible non-compliant findings were due to the management of air lines and the use of radioactive warning labels.
  - NB Power developed corrective actions to address the deficiencies, and CNSC staff were satisfied with NB Power's corrective actions.
  - CNSC staff will continue to monitor NB Power's progress in implementing the corrective actions through ongoing compliance verification activities.

2.7.8 Conventional Health and Safety

Performance rating: Satisfactory

Number of findings by rating:



- Two low safety significance findings were related to housekeeping issues identified during several field inspections.
  - Immediate actions were taken by NB Power to rectify the identified housekeeping issues.
  - One NNC was raised in this area and was closed in November 2023 due to NB Power's focus and corrective actions taken to ensure housekeeping expectations are adhered to.
- As indicated by data in Appendix F6, in 2023 indicators of workers' conventional safety at PLNGS were below the industry average for ASR and ISAR. The AF for PLNGS was higher than the industry average.
  - There were no fatalities, lost-time injuries or disabling injuries. However, there were 5 medically treated injuries (e.g., body twist, slipping and finger injuries).

2.7.9 Environmental Protection

Performance rating: Satisfactory

Number of findings by rating:

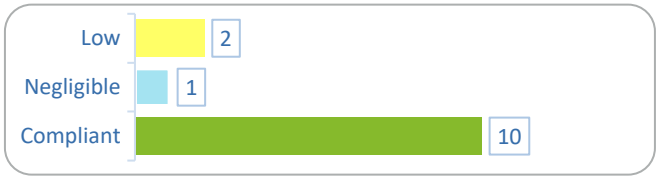
- CNSC staff conducted a variety of assessments, and inspections to verify compliance of outputs associated with the Environmental Protection SCA specific areas.
    - The 1 negligible finding resulted from a Hazardous Waste field inspection which was summarized in the Q4 FY 22/23 Quarterly Field Inspection Report where some hazardous materials were not stored in the correct waste cabinets, and waste inventory sheets were not updated as required. NB Power was notified of this finding, and immediately rectified the issues.
- Results from CNSC staff's assessments of the quarterly and annual reports determined that NB Power met regulatory requirements in REGDOC-3.1.1 and REGDOC-2.9.1.
    - Dose to the public from the Point Lepreau site remained well below the regulatory limit of 1 mSv/yr.
    - Releases of radiological nuclear substances were well below the DRLs for PLNGS in 2023.
    - No action levels were triggered for airborne and waterborne releases.
    - CNSC staff did not note any safety-significant environmental exceedances or spills at the PLNGS in 2023.
    - NB Power has implemented and continues to maintain an environmental management system in accordance with CNSC requirements.
    - Events addressed satisfactorily to date.
- CNSC staff reviewed Point Lepreau's 2021 Environmental Risk Assessment (ERA) and concluded it was consistent with the overall methodology and complies with all the applicable requirements of CSA N288.6-12, Environmental risk assessments at Class I nuclear facilities and uranium mines and mills.
    - The results of the ERA indicate that meaningful human health or ecological risks attributable to current PLNGS operations are unlikely.

- NB Power made adequate provision for the protection of the environment and health of persons and, NB Power has demonstrated that people and the environment living near the PLNGS remain protected.

2.7.10 Emergency Management and Fire Protection

Performance rating: Satisfactory

Number of findings by rating:



- During field inspections summarized in the Q3 FY 23/24 Quarterly Field Inspection Report, CNSC staff identified two low safety significant non-compliant findings.
    - One finding was due to the timeline requirement not being met for achieving effective and sustained intervention during an observed fire response drill.
        - NB Power's corrective action plan is in progress with an update for CNSC staff expected in Fall of 2024.
    - The other finding included deficiencies with the storage and placement of fire extinguishers.
        - As the corrective actions were immediately implemented by NB Power, no further actions were required by CNSC staff.
        - Overall, CNSC staff is satisfied with the licensee's performance and corrective actions.
- In 2023, CNSC received and is currently reviewing NB Power submission regarding updated Fire Hazard Assessment and Fire Safe Shutdown Analysis.

2.7.11 Waste Management

Performance rating: Satisfactory

Number of findings by rating: One compliant finding

- CNSC staff completed a Type II inspection of NB Power's Solid Radioactive Waste Management Facility (SRWMF).

  - The compliant findings were in the areas of waste management, management systems, fitness for service, environmental protection, and security Three non-compliant findings of negligible safety significance were identified in the areas of personnel training, worker dose control, and conventional health and safety.
  - Due to immediate corrective actions completed by NB Power, no enforcement actions were required.

- CNSC staff were satisfied with NB Power's reporting of the 2023 PLNGS safety performance indicator for Low and Intermediate-Level Radioactive Solid Waste Generated.
- The PROL for PLNGS requires NB Power to submit a quarterly report on the Solid Radioactive Waste Management Facility (SRWMF). CNSC staff were satisfied with all reports and additional information submitted by NB Power for the SRWMF in 2023.
- In 2023, 10 canisters (5400 spent fuel bundles) were transferred to Phase II of the SRWMF from the PLNGS, as documented in the scheduled reports submitted by NB Power. CNSC staff review of NB Power's reports did not identify any issues or concerns regarding the licensed activities at the SRWMF.

2.7.12 Security

Performance rating: Satisfactory

Number of findings by rating: Five compliant findings

- A Force-on-Force exercise was completed in June of 2023 and a post exercise debrief was conducted. NB Power also conducted a self-assessment of the exercise. CNSC staff observed the exercise and did not identify any regulatory concerns.
- Field inspections were conducted and summarized in the CNSC Quarterly Field Inspection Reports for the specific areas of Facilities and Equipment, Security Practices, Response Arrangements and Drills and Exercises, and CNSC staff concluded that NB Power was compliant with the regulatory requirements of security.

Cyber Security

- CNSC staff continue to track NB Power's action plan to address the NNCs from the 2021 CNSC Type I inspection of NB Power's cyber security program regarding the implementation of the new CSA N290.7-14 standard. NB Power will continue to provide progress updates for their action plan.
- In 2023, CNSC staff requested NBP to provide an implementation plan for CSA N290.7-21 Cyber security for nuclear facilities. NBP provided a gap analysis and implementation

plan, which indicated that they plan to be fully compliant with N290.7:21 by April 1, 2026.
    - UPDATE: CNSC staff accepted this plan in April 2024 and requested annual implementation status updates.

2.7.13 Safeguards and Non-Proliferation

Performance rating: Satisfactory

Number of findings by rating: No findings

- CNSC staff participated in an announced IAEA inspection in December of 2023.
    - CNSC staff observed that NB Power provided access and assistance to the IAEA inspectors to facilitate the IAEA's physical inventory verification.
    - No actions were placed on NB Power as a result of the IAEA inspection.
- Due to an issue with the nuclear material accounting software, the General Ledger (GL) report for July 2023 presented incorrect information.
    - A corrected GL report was received from NB Power in a timely manner.
    - This delay did not impact the CNSC's monthly reporting to the IAEA.
    - An event report was submitted to the CNSC as a result and measures were taken by the licensee to prevent reoccurrence.
- During the 2023 reporting period, NB Power:
    - Provided the required nuclear material accountancy and control reports to the CNSC and the IAEA for safeguards verification activities.
    - Granted the required access and assistance to the IAEA for safeguards activities, including inspections, and for the maintenance of IAEA equipment at PLNGS.
    - Submitted the required annual operational programme with quarterly updates and the annual update to the Additional Protocol to the CNSC in a timely manner. CNSC staff reviewed these documents and determined that they met requirements and expectations.
    - Provided the support required for the IAEA's safeguards equipment, containment, and surveillance activities.

2.7.14 Packaging and Transport

Performance rating: Satisfactory

Number of findings by rating: One compliant finding

- The Packaging and Transport program for PLNGS was implemented effectively, and the transport of nuclear substances to and from the facility was conducted safely.
- There was one field inspection relating to this program that was summarized in the Q1 FY 23/24 Quarterly Field Inspection Report.
    - NB Power was compliant with the requirements of both the Packaging and Transport of Nuclear Substances Regulations, 2015 (PTNSR) and the Transportation of Dangerous Goods Regulations for this field inspection.

2.8 Gentilly-2 Facilities

Overview

The Gentilly-2 site is located on the traditional territory of the Abenaki of Wôlinak and Odanak, represented by the Grand Council of the Waban-Aki Nation (GCNWA), and the Huron-Wendat Nation.

Figure 10: Gentilly-2 Facilities

- **Licence:** PDRP 10.00/2026.
- **Licence term:** July 2016 - June 2026.
- **Licence last issued or amended:** July 2016.
- **Licensee:** Hydro-Québec.
- **Location:** Bécancour, Québec.

Find out more about Gentilly-2 Facilities

Table 23: Summary of the number of inspections performed at Gentilly-2 (Full inspection list found in Appendix A)

Type 1	Type 2	Desktop	Field	Number of findings
0	4	0	0	Compliant: 48 Non-compliant: 6 Total: 54

Table 24: 2023 Rating for Gentilly-2 per SCA

SCA	Rating	SCA	Rating
Management System	Satisfactory	Conventional Health and Safety	Satisfactory
Human Performance	Satisfactory	Environmental Protection	Satisfactory
Operating Performance	Satisfactory	Emergency Preparedness and Fire Protection	Satisfactory
Safety Analysis	Satisfactory	Waste Management	Satisfactory
Physical Design	Satisfactory	Security	Satisfactory
Fitness for Service	Satisfactory	Safeguards and Non-Proliferation	Satisfactory
Radiation Protection	Satisfactory	Packaging and Transport	Satisfactory

Event Initial Reports (EIRs)

- No event initial reports pertaining to the Gentilly-2 Facilities were submitted to the Commission in 2023.

2.8.1 Management System

Performance rating: Satisfactory

Number of findings:

CNSC staff concluded that Hydro-Québec met the applicable regulatory requirements and CNSC staff's expectations for the Management System SCA at the Gentilly-2 Facilities in 2023.

- In July 2023, CNSC staff conducted Management System focused inspection. The inspection consisted of an in-depth review of Hydro-Québec's records management program and concluded that Hydro-Québec has a satisfactory program in place. The inspection identified 4 non-compliances of negligible or low safety significance. However, Hydro-Québec must revise its record management and supplier acceptability processes to include documentation interfaces with Hydro-Québec.

2.8.2 Human performance management

Performance rating: Satisfactory

Number of findings: Three compliant findings

- CNSC staff concluded that Hydro-Québec met the applicable regulatory requirements and that its performance met CNSC staff's expectations for the Human Performance Management SCA at the Gentilly-2 Facilities in 2023.

2.8.3 Operating performance

Performance rating: Satisfactory

Number of findings: Two compliant findings

- CNSC staff concluded that Hydro-Québec met the applicable regulatory requirements and its performance met CNSC staff's expectations for the Operating Performance SCA at the Gentilly-2 Facilities in 2023.
- The quarterly, semi-annual and annual reports submitted by Hydro-Québec in 2023, documenting the activities carried out, demonstrated compliance with licence requirements. During CNSC staff's review of these reports, no deficiencies or situations were noted that would indicate that activities at the Gentilly-2 Facilities were unsafe or below staff's expectations. Hydro-Québec provided satisfactory responses within an acceptable timeframe to CNSC staff. In 2023, Hydro-Québec notified the CNSC of 11 events. Five of these events involved false fire alarms. Hydro-Québec reported these events to the CNSC and provided corrective action to CNSC staff.

2.8.4 Safety analysis

Performance rating: Satisfactory

- CNSC staff concluded that Hydro-Québec met the applicable regulatory requirements and that its performance met CNSC staff's expectations for the Safety Analysis SCA at the Gentilly-2 Facilities in 2023.

2.8.5 Physical design

Performance rating: Satisfactory

- CNSC staff concluded that in 2023 Hydro-Québec maintained an effective design program and pressure boundary program, implemented facility modifications in accordance with the established engineering control process to maintain design basis.

- CNSC staff concluded that Hydro-Québec continues to implement its fire protection program at Gentilly-2 in accordance with the requirements of CSA N293-F12, *Fire Protection for Nuclear Power Plants*.

2.8.6 Fitness for service

Performance rating: Satisfactory

Number of findings:

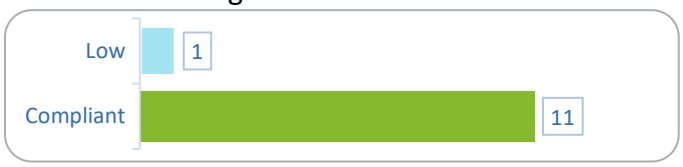
CNSC staff concluded that Hydro-Québec met the applicable regulatory requirements and that its performance met CNSC staff's expectations for the Fitness for Service SCA at the Gentilly-2 Facilities in 2023.

- In July 2023, CNSC staff conducted a Management System focused inspection. The inspection consisted of a thorough review of the Records Management program. The inspection also identified a non-compliance in the Fitness for Service SCA. All findings were of negligible or low safety significance.
- CNSC staff was satisfied with the report on safety system pressure boundary degradation for the year 2023.
- Hydro-Québec reported a brief loss of the phone network (Télébec), which prevented long-distance calls from going in and out. Corrective measures have been put in place by Hydro-Québec to ensure that communication is not impeded.

2.8.7 Radiation protection

Performance rating: Satisfactory

Number of findings:



CNSC staff concluded that Hydro-Québec met the applicable regulatory requirements and that its performance met CNSC staff's expectations for the Radiation Protection SCA at the Gentilly-2 Facilities in 2023.

- In February 2023, CNSC staff conducted a general inspection that included aspects of Hydro-Québec's radiation protection program. The inspection identified one non-compliance of negligible or low safety significance.
- In 2023, there were no exceedances of regulatory limits for doses received by workers at Gentilly-2. Also, no regulatory action levels were exceeded.
- The safety performance indicator for personnel contamination events identified a few minor events, but no significant events were reported in 2023.
    - Safety performance indicators for unplanned doses reported 0 for all 2023 quarters.
    - Loose contamination events occurred at the Gentilly-2 site in 2023. However, none of these events indicated a loss of control of the radiation protection program. This indicated that there were no significant problems related to this area at Hydro Québec in 2023.

2.8.8 Conventional health and safety

Performance rating: Satisfactory

Number of findings: One compliant finding

- CNSC staff concluded that Hydro-Québec met the applicable regulatory requirements and CNSC staff's expectations for the Conventional Health and Safety SCA at the Gentilly-2 Facilities in 2023.
- CNSC staff note that there was one lost time injury event reported..
    - In November, a worker fell from a 12-foot ladder when the ladder slipped and caught on the cabinet at the back. The worker was thrown to the ground, mainly on his wrists and right knee.
- Hydro-Québec also reported an event requiring medical attention without loss of work time. An employee was supporting a hose in a fire cabinet. When the valve was opened by a second employee, the first employee was surprised by the pressure and was unable to hold on to the end of the hose. He lost his balance and struck his right temple on the corner of the wall.
- Hydro-Québec reported these events to the CNSC and provided appropriate corrective actions to CNSC staff.
- In 2023, CNSC staff carried out a Type II general compliance inspection and found no non-compliances.

2.8.9 Environmental protection

Performance rating: Satisfactory

- CNSC staff concluded that Hydro-Québec met the applicable regulatory requirements, and that its performance met CNSC staff's expectations for the Environmental Protection SCA at the Gentilly-2 Facilities in 2023.
- A review of the various compliance reports and inspection results showed that the quantities of radioactive and non-radioactive releases to the environment in 2023 remained well below established limits. The annual dose to the public in the vicinity of the Gentilly site (1 µSv) was below the regulatory dose limit of 1 mSv/year and remains in the same order of magnitude as the dose in previous years, demonstrating that radionuclide concentrations in the environment remain low.
- Performance information from the technical assessment of these reports shows that Hydro-Québec has met effluent and emission control expectations for 2023.
- CNSC staff note that there were 2 event reports.
    - One report concerned the presence of hydrocarbons in a sump. The second event concerned the leakage of 40 liters of oil.
    - Hydro-Québec reported these events to the CNSC and provided appropriate corrective actions to CNSC staff.

2.8.10 Emergency management and fire protection

Performance rating: Satisfactory

Number of findings: Eight compliant findings

- CNSC staff concluded that Hydro-Québec met the applicable regulatory requirements, and that its performance met CNSC staff's expectations for the Emergency Management and Fire Protection SCA at the Gentilly-2 Facilities in 2023.
- CNSC staff reviewed the safety performance indicators for the Emergency Response Organization Exercise Participation Index and the Emergency Response Resources Verification Index and was satisfied with Hydro-Québec's reported results in 2023.
- CNSC staff conclude that Hydro-Québec continues to maintain a fire response capability and a fire protection program that meet applicable regulatory requirements, including the requirements of CSA N293-F12, Fire Protection for Nuclear Power Plants.
- Fire emergency response is now provided by surrounding municipalities, including a memorandum of understanding that was renewed in 2022 with the “Service de sécurité

incendie de la ville de Bécancour" (SSIB) to formalize and strengthen the SSIB's fire response and emergency service at the Gentilly-2 site.

- In December 2023, Hydro-Québec conducted the first visit and annual fire exercise with 6 fire fighters and 2 officers from the SSIB. As part of the annual exercise, the remote warehouse at the Gentilly-2 site was visited, followed by a desktop exercise.

Following this exercise and a review of Hydro-Québec's exercise report, CNSC staff noted an opportunity for improvement, identified by Hydro-Québec staff. Specifically, the dissemination to all SSIB personnel of Hydro-Québec's Emergency Procedure-100, Appendix 100X, in order to avoid any possibility of error or omission during an intervention on the Gentilly-2 site.

- CNSC staff are satisfied with Hydro-Québec's corrective actions.
- In 2023, Hydro-Québec reported 5 false fire alarms. Each alarm was reviewed by CNSC staff, and the CNSC is satisfied with the actions taken by Hydro-Québec.

2.8.11 Waste management

Performance rating: Satisfactory

Number of findings: Ten compliant findings

- CNSC staff concluded that Hydro-Québec met the applicable regulatory requirements and its performance met CNSC staff's expectations for the Waste Management SCA at the Gentilly-2 Facilities in 2023.
- CNSC staff reviewed two semi-annual reports from 2023 for the management of Gentilly-2's solid radioactive waste and irradiated fuel facilities. The reports met regulatory requirements and CNSC staff had no comments.

2.8.12 Security

Performance rating: Satisfactory

- CNSC staff concluded that Hydro-Québec met the applicable regulatory requirements and that its performance met CNSC staff's expectations for the Security SCA at Gentilly-2 in 2023.
- CNSC staff reviewed the annual Site Security Threat and Risk Assessment reports, as well as the four Gentilly-2 quarterly security reports, and confirmed that Hydro-Québec met all applicable regulatory requirements for the Facilities and Equipment specific area in 2023.

- though Gentilly-2 has implemented its Business Continuity Plan (BCP), it has been able to maintain an effective training program. Performance information from the licensee's quarterly reports and training and exercise program meets regulatory requirements and CNSC staff expectations.
- On December 5, 2022, a CNSC inspector issued an order to Hydro-Québec's Gentilly-2 Facilities following security inspection conducted by CNSC staff from November 28 to 30, 2022. As a result of this inspection, the licensee was informed that corrective measures had to be put in place to comply with the Nuclear Security Regulations.
    - The right to be heard on the order took place on April 12, 2023, in Ottawa, Ontario. Following this meeting, the Designated Officer concluded that the inspector’s decision was well-founded. Certain conditions were closed and modified by the Designated Officer. The decision was rendered in Ottawa on May 2, 2023.
    - Following the Designated Officer’s review of the Order, Hydro Québec updated its Memorandum of Understanding with the Sûreté du Québec and conducted a desktop exercise with the Sûreté du Québec on December 8, 2023, and submitted a report of the exercise to CNSC staff to meet the conditions of the Order.
    - All open actions of the Order are now considered closed.
    - The new tactical plan was tested during a force-on-force safety exercise that was held in May 2024 in collaboration with the Sûreté du Québec. The next step is for Hydro-Québec to draft the report on the exercise.
- In 2023, Hydro-Québec reported one event. The CNSC is currently reviewing the corrective measures provided by Hydro-Québec.

2.8.13 Safeguards and non-proliferation

Performance rating: Satisfactory

- CNSC staff concluded that Hydro-Québec met the applicable regulatory requirements and that its performance met CNSC staff's expectations for the Safeguards and Non-Proliferation SCA at the Gentilly-2 in 2023.
- CNSC staff concluded that nuclear material accounting and control at Gentilly-2 met all relevant regulatory requirements in 2023. Hydro-Québec provided the CNSC and the International Atomic Energy Agency (IAEA) with the nuclear material accountancy and control reports required for safeguards activities, including inspections in 2023.

- In 2023, Hydro-Québec provided the necessary access and assistance for IAEA activities, including inspections and maintenance of IAEA equipment. CNSC staff concluded that the operational and design information at Gentilly-2 met all applicable regulatory requirements in 2023. Hydro-Québec provided the operational and design information required to facilitate IAEA safeguards and non-proliferation activities. Following confirmation that all fuel had been transferred from the pool to dry storage in 2020, CNSC staff updated its safeguards requirements for Gentilly-2.
- Hydro-Québec provided support required for IAEA safeguards containment and surveillance activities. During an activity in September 2022, the IAEA was able to confirm that all on-site fuel had been transferred to dry storage and proceeded to remove additional monitoring equipment from the facility.

2.8.14 Packaging and transport

Performance rating: Satisfactory

- CNSC staff concluded that Hydro-Québec met the applicable regulatory requirements and that its performance met CNSC staff's expectations for the Packaging and Transport SCA at the Gentilly-2 Facilities in 2023.
- Hydro Québec maintains a packaging and transport program at Gentilly-2 that ensures compliance with the *Packaging and Transport of Nuclear Substances Regulations (2015)* and the *Transportation of Dangerous Goods Regulations*.
- The program was implemented effectively, and the transportation of nuclear substances to and from the facility was carried out safely. During 2023, no incidents related to packaging or transportation were reported.

3 Consultation, Engagement and Public Disclosure

The nuclear power generating sites fall within the traditional and treaty territories of many Indigenous Nations and communities, as listed in Appendix C.

3.1 Indigenous Consultation and Engagement

The common-law duty to consult with Indigenous Nations and communities applies when the Crown contemplates actions that may adversely affect potential or established Indigenous and/or treaty rights. The CNSC ensures that all of its licence decisions under the NSCA uphold the honour of the Crown and consider Indigenous peoples' potential or established Indigenous and/or treaty rights pursuant to section 35 of the Constitution Act, 1982.

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 ongoing Indigenous engagement practices include:

- Sharing information and discussing topics of interest with Indigenous Nations and communities.
- Seeking feedback and input on CNSC processes.
- Responding to issues and concerns.
- Collaborating and two-way dialogue on an ongoing basis.
- Collaborating on drafting relevant sections of CNSC reports.
- Providing opportunities to participate in environmental monitoring through the CNSC's Independent Environmental Monitoring Program (IEMP).
- Funding opportunities through the CNSC's Participant Funding Program (PFP) to support participation in Commission proceedings and ongoing regulatory activities and build knowledge and capacity through the CNSC's Indigenous and Stakeholder Capacity Fund.

CNSC staff's efforts in 2023 supported the CNSC's ongoing commitment to meet its consultation obligations and build positive relationships with Indigenous peoples with interests in Canada's Nuclear Power Generating Sites. CNSC staff continued to work with Indigenous Nations, communities, and organizations to identify opportunities for formalized and regular engagement throughout the lifecycle of these facilities and welcomed the opportunity to meet with Indigenous Nations and communities to discuss and address topics of interest or concern.

3.1.1. CNSC Engagement Efforts

3.1.1.1 Pickering and Darlington sites

CNSC staff's engagement with Indigenous Nations and communities in 2023 related to Canada's Nuclear Power Generating Sites included activities specific to relevant licensing and Commission hearing processes, including OPG's Darlington Waste Management Facility (DWMF) license renewal. CNSC staff's engagement in relation to this licence renewal and regulatory processes included notifying Indigenous Nations and communities identified in Appendix C about the application, sharing information about opportunities to participate and get involved, making funding available through the CNSC's PFP, providing regular updates and offering to meet to discuss any questions or concerns. CNSC staff also conducted engagement relating to OPG's Licence amendment application for the production of Cobalt-60 and conducted IEMP sampling at the DNGS with input and participation from Indigenous Nations and communities. CNSC staff also carried out consultation related to OPG's licence to construct application for the Darlington New Nuclear Project.

In 2023, CNSC staff also received OPG's application for Commission authorization to extend the operation of PNGS Units 5 to 8 until December 31, 2026. CNSC staff's engagement in relation to this application and regulatory processes included notifying identified Indigenous Nations and communities about the application, sharing information about opportunities to participate in the Commission hearing, making funding available through the CNSC's PFP, providing regular updates through monthly meetings established under Terms of Reference (ToRs) for Long-Term Engagement, and offering to meet to discuss any questions or concerns. CNSC Subject Matter Experts attended meetings on request with Mississaugas of Scugog Island First Nation (MSIFN), Curve Lake First Nation (CLFN), and Hiawatha First Nation (HFN) in order to have in-depth discussions on OPG's application for Commission authorization to extend the operation of PNGS Units 5 to 8. CNSC staff also provided updates relating to OPG's application for a licensing basis amendment for the Pickering Waste Management Facility. Engagement on the Pickering Waste Management Facility licensing basis amendment included email notifications regarding the application, notifications regarding PFP opportunities, and offering to provide project-specific meetings to Indigenous nations and Communities with an interest in the site.

CNSC staff have existing Terms of Reference (ToR) for Long-Term Engagement with CLFN, the MSIFN and the Métis Nation of Ontario (MNO). In May 2023, CNSC staff and HFN signed a ToR for Long-Term Engagement. In 2023, engagement with these Indigenous Nations and communities included regular meetings and work plan items, as per the established ToRs.

3.1.1.2 Bruce Site

CNSC staff engages with the Saugeen Ojibway Nation (SON), on whose Treaty and traditional territory the Bruce site is located. CNSC staff also engages with the MNO and the Historic Saugeen Métis, on whose traditional harvesting territory the Bruce site is located, and the Chippewas of Kettle and Stony Point First Nation on areas of interest to them. CNSC staff engage with Indigenous Nations and communities through a variety of in-person and virtual forums. In 2023, CNSC staff engaged with Indigenous Nations and communities on Bruce Power's application to amend their operating licence to consolidate Fitness for Service requirements under one condition, and the associated hearing in writing. CNSC staff also engaged with Indigenous Nations and communities on reportable events at the Bruce site, the results of the 2022 IEMP campaign sampling around the Bruce site, Bruce Power's mid-term update to the Commission, and Bruce Power's expressed intent to pursue an Impact Assessment for potential new generating capacity on-site.

CNSC staff also attended and provided funding to support numerous community information and outreach events hosted by local Indigenous Nations and communities. One example includes the SON receiving funding through the CNSC's Indigenous Stakeholder Capacity Fund (ISCF) to support the administration of their Coastal Waters Monitoring Program (CWMP), which is an initiative implemented by the SON to monitor environmental conditions in the nearshore areas of the Saugeen Peninsula.

A summary of engagement in relation to CNSC's ToR can be found in Appendix E, which, as committed to with each of the communities as part of their respective ToR for long-term engagement, was prepared in collaboration with their representatives.

3.1.1.3 Point Lepreau Site

CNSC staff regularly engages and communicates with the interested First Nations and their representative organizations on areas of interest to them in relation to the Point Lepreau site.

In 2023, a major focus of CNSC's engagement activities was to formalize and continue to strengthen the relationship between the interested First Nations in New Brunswick and CNSC staff. CNSC staff provided information and updates to Mi'gmawe'l Tplu'taqnn Incorporated (MTI), Wolastoqey Nation of New Brunswick (WNNB), Kopit Lodge and the Passamaquoddy Recognition Group Inc (PRGI) and met with them individually regularly and upon request on to discuss topics of interest, including the on-going operation of the PLNGS, the CNSC's IEMP, the gathering and inclusion of Indigenous Knowledge, and further information on the CNSC's role with regards to regulating potential Small Modular Reactor (SMR) projects in New Brunswick. In May 2023, CNSC staff met with each representative organization in-person to discuss topics of interest, provide an update on the PLNGS and discuss the proposed ARC-100 project. In 2023, MTI, Kopit Lodge and WNNB expressed an interest in working with the CNSC to draft a ToR for

long-term and routine engagement. At this time, CNSC staff are waiting on a response from each Nation and organization with regards to their feedback on the draft ToRs and next steps. CNSC staff remain willing and continue to offer the opportunity to develop a ToR with interested Indigenous Nations and communities. CNSC staff are committed to ongoing engagement and collaboration with interested Indigenous Nations, communities and representative organizations in New Brunswick and will continue to provide opportunities for meaningful long-term engagement and regular meetings and collaboration.

3.1.1.4 Gentilly-2 site

In 2023, CNSC staff continued to keep Indigenous communities informed through the Regulatory Oversight Report for Canadian Nuclear Power Generating Sites for 2022, which was reviewed by the W8banaki Nation.

In January 2024, CNSC sent a letter to W8banaki in response to their 2022 NPGS ROR intervention. The response expanded on matters of interest such as the finding and mitigation of non-compliances, evaluation of cumulative environmental effects and effects on the rights of Indigenous peoples.

During summer 2023, a representative of the Environment Office of W8linak (EOW) joined the CNSC field team during sampling operations around the Gentilly-2 nuclear power plant. CNSC staff remains open to working with members of the W8banaki Nation and their representatives to tailor the IEMP sampling plans to meet their needs and interests.

3.1.2. 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. In 2023, CNSC staff continued to keep Indigenous Nations and communities up to date and informed with regards to CNSC staff's regulatory oversight activities at Nuclear Power Generating Sites including specific meetings on topics of interest, ongoing discussions with regards to responding to and addressing issues, concerns and recommendations raised in their interventions to the Commission.

In 2023, CNSC staff followed up with each Indigenous Nation and community who intervened with regards to the 2022 NPGS ROR and offered to have specific meetings and discussions to address their concerns, comments and recommendations. ROR-specific issues and concerns and addressed further in Appendix D.

Finally, as committed to under ToR arrangements between the CLFN, HFN, Historic Saugeen Metis, MSIFN, MNO, and SON, CNSC staff collaboratively drafted engagement updates with each Nation. For more information on ToR engagement completed in 2023 and each Nation's perspective on the engagement conducted by CNSC Licensees subject to this report during 2023, please see Appendix C and Section 3.3 below.

3.1.3. Issues and Concerns Tracking

In direct response to the Commission's action (RIB 26782) following the presentation of the 2021 RORs, CNSC staff have established issues and concerns tracking tables for each Indigenous Nation or Community who intervenes in CNSC regulatory processes, including RORs.

These tables capture the requests, concerns and comments included in the interventions in relation to each ROR, or other Commission proceedings as appropriate, from each Indigenous Nation and community. CNSC staff's responses and proposed actions are also included, as appropriate. The tracking tables are shared with each Indigenous Nation and community for validation and discussion in order to make progress on addressing their requests and concerns collaboratively.

CNSC staff have included Appendix D which provides an overview of issues, concerns and recommendations submitted via intervention by each Indigenous Nation and community. The information presented in Appendix D is derived from interventions submitted specifically for the 2022 ROR and these conversations carried forward into 2023.

In 2023, CNSC staff followed up with each Indigenous Nation and community who intervened with regards to the 2022 NPGS ROR and offered to have specific meetings and discussions to address their concerns, comments and recommendations. For Indigenous Nations and communities who have a ToR for long-term engagement with the CNSC, requests, concerns and comments raised in the ROR were further discussed in agreed-upon regular meetings and captured where appropriate in the engagement work plans with each Nation.

Overall, the issues and concerns were categorized into 12 different themes including CNSC consultation and engagement, environmental monitoring, improvements to ROR process and content, safety, security and more.

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

CNSC staff have formalized 10 ToRs for long-term engagement with interested Indigenous Nations and communities which have been collaboratively developed with each interested

Indigenous Nation or community. Existing ToRs with Indigenous Nations and communities with an interest in NPGS sites and activities include: CLFN, the MSIFN, the SON, the MNO and the Historic Saugeen Metis. In 2023, the CNSC developed and finalized a ToR for long-term engagement with the HFN.

A summary of the engagement activities that occurred in 2023 in relation to each of the existing ToRs for long-term engagement is included in Appendix E. These summaries were collaboratively drafted between CNSC staff and each respective Indigenous Nation or community.

CNSC staff are working on developing and finalizing a number of other ToRs in the coming years with interested Indigenous Nations and communities. CNSC staff remain open to developing ToRs for long-term engagement with other Indigenous Nations and communities interested in NPGS sites as appropriate.

3.1.5. Licensee Indigenous Engagement Activities

In 2023, CNSC staff continued to monitor the engagement work conducted by the NPGS licensees to ensure that there was active engagement and communication with Indigenous Nations and communities interested in their facilities, and that there were also activities in relation to relevant licensing and Commission hearing processes that occurred in 2023.

CNSC staff confirmed that the licensees have established and ongoing Indigenous engagement, communications and outreach programs. The CNSC encourages licensees to continue to develop relationships and engage with Indigenous Nations and communities who have expressed an interest in their activities and sites.

CNSC staff are satisfied with the level and quality of Indigenous engagement conducted by NPGS licensees with regards to their operations and proposed projects at its different Nuclear Power Generating Sites in 2023. CNSC staff encourage the licensees 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.

In previous ROR interventions, Indigenous Nations and communities raised concerns that their views on licensees' engagement was not reflected in the RORs. In response to this concern, CNSC staff have sought feedback from interested Indigenous Nations and communities with regards to their perspectives on the licensees engagement with them in 2023. Of the Indigenous Nations and communities that the CNSC requested feedback from, none responded. A summary of each Nation's feedback can be found within each section below.

3.1.5.1 Ontario Power Generation

Throughout 2023, OPG met and shared information with Indigenous Nations and communities on whose treaty or traditional territory OPG operates, as well as interested Indigenous Nations,

communities and organizations. Topics of discussion included the DWMF licence renewal, Cobalt-60 amendment, environmental monitoring activities, the licence to construct for the Darlington New Nuclear Project, OPG's application for Commission authorization to operate PNGS Units 5-8 to the end of 2026, OPG's application for a licence amendment for the PWMF, and changes to OPG's monitoring programs.

3.1.5.2 Bruce Power

Throughout 2023, both Bruce Power and OPG met and shared information with interested Indigenous communities and organizations, including the SON, the MNO and the HSM.

For Bruce Power, information and discussion topics included their normal operations at the Bruce site, the progress of their Major Component Replacement initiative, Bruce Power's application to amend their operating licence to consolidate Fitness for Service requirements under the same licence condition, Bruce Power's thermal risk assessment, the spring 2023 Gizzard Shad impingement event, environmental mitigation and remediation measures and studies, and potential new assessments or projects on-site. Bruce Power also provided funding to support the SON's Coastal Waters Monitoring Program, the results of which are shared with Bruce Power by the SON.

CNSC staff continue to be satisfied with Bruce Power's engagement efforts and activities in 2023 and encourage Bruce Power to involve Indigenous Nations and communities in the earliest stages possible when making decisions and plans about the site.

3.1.5.3 NB Power

In 2023, NB Power worked with several First Nation communities and organizations, including the WNNB, MTI, PRGI., Kopit Lodge, Sipekne'katik First Nation, the Union of New Brunswick Indian and Mawiw Council. NB Power maintains on-going dialogue with First Nations consultative bodies and representatives through scheduled monthly meetings and technical workshops.

Information and discussion topics included NB Power's operations at Point Lepreau, its application for a *Fisheries Act* authorization, waste management, SMRs, environmental monitoring, environmental and regulatory approval processes, education, cultural awareness and sensitivity.

First Nations field monitors from MTI, WNNB and PRGI take part in field related activities related to the radiological and conventional monitoring of the PLNGS site. Their role includes supporting the gathering and sharing of Indigenous Knowledge as well as establishing increased awareness and sensitivity among its workers and local communities. Members of New Brunswick First Nations communities are invited to lead medicine walks, participate in regular activities at the

site including collaborative environmental and safety monitoring and deliver presentations to NB Power leadership. NB Power works with Indigenous Nations and communities and members of the public in their host community, through regular community liaison committee meetings, open houses, regular newsletters, website updates and regular engagement activities with local fishing communities. NB Power's regular engagement activities are an effort to build capacity within their communities to better understand nuclear technology and its use in New Brunswick, waste management principles and procedures, new opportunities in nuclear development, and its role in New Brunswick's electricity mix.

3.1.5.4 Hydro-Québec

In 2023, Hydro-Québec continued its commitment to engage with Indigenous groups near the site or with an interest in its operations and met and shared information with interested First Nations communities and organizations, particularly the W8banaki Nation.

In December 2023, Hydro-Québec responded via letter to the W8banaki Nation's questions and concerns included in their intervention in the ROR meeting for NPGS: 2022, as was requested in the W8banaki Nation's intervention. In 2023, discussions focused primarily on decommissioning. Hydro-Québec linked the W8banaki Nation with the Société du parc industriel et portuaire de Bécancour to pursue archaeological work by the W8banaki Nation on land near the Gentilly-2 facilities.

CNSC continues to be satisfied with Hydro-Québec's efforts and engagement activities in 2023.

3.1.6. Licensee Disclosure of Reportable events to Indigenous Nations and Communities

Reportable events are communicated to Indigenous Nations and communities as well as the general public by licensees through a public information program. As per CNSC REGDOC-3.2.1 Public Information and Disclosure, licensees and licence applicants are required to develop and implement a Public Information Program that includes a disclosure protocol. Through these programs licensees and licence applicants should seek to gain an understanding of what information and reportable events Indigenous Nations and communities as well as the public wish to be informed of.

Licensees and licence applicants are required to have an established public disclosure protocol to address their target audiences' information interests in relation to the licensed activities. Licensees and licence applicants are required to consult with interested groups with a primary focus on the local community to determine what types of information would be of public interest. Each licensee or applicant makes their specific protocol available to the public and preferably, where practicable, shall be posted on the licensee's and licence applicant's Web site.

CNSC encourages licensees and licence applicants to discuss reportable events with Indigenous Nations and communities that have an interest in their NPGS sites and ensure that the information being disclosed is relevant to the specific areas of interest the Indigenous Nations and communities have expressed.

3.2 Public Consultation and Engagement

The NSCA 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.

In 2023, CNSC staff in the Directorate of Power Reactor Regulation (DPRR) engaged extensively in outreach efforts, participating in more than 80 activities aimed at fostering communication and understanding across diverse communities. A significant focus was on indigenous nations, with 34 activities dedicated to regular meetings and workshops aimed at enhancing understanding of CNSC operations and facilitating discussions on projects like Small Modular Reactors (SMRs). Additionally, 13 activities were conducted with host communities, covering topics ranging from SMRs to reactor refurbishment and distribution of Potassium Iodide (KI) pills. Further outreach efforts included 16 activities with unions and public safety organizations, promoting information exchange on various nuclear-related topics. Moreover, 8 activities were specifically tailored for students, providing insights into the nuclear industry and its latest developments, thereby nurturing future interest and expertise in this critical field.

CNSC staff have addressed and developed strategies to resolve specific requests, concerns, and feedback from Indigenous Nations, communities, and intervenors regarding the 2022 NPGS ROR. For further information, refer to Appendixes D and E in this report for detailed insights into these efforts.

CNSC staff plans to present their responses to the recommendations from CMD 23-M27.29, Nuclear Transparency Project Written Intervention in a separate CMD to the Commission later in 2024.

3.3 Participant Funding Program

The Canadian Nuclear Safety Commission (CNSC) established the Participant Funding Program (PFP) in 2011 to:

- enhance individual, not-for-profit organization and Indigenous Nations and Communities participation in the CNSC's environmental assessment (EA) and licensing processes for major nuclear facilities (e.g., uranium mines, nuclear power plants, nuclear substance processing, or nuclear waste facilities);

- assist individuals, not-for-profit organizations and Indigenous Nations and Communities to bring value-added information to the Commission through informed and topic-specific interventions related to EAs and licensing (i.e., new, distinctive and relevant information that contributes to a better understanding of the anticipated effects of a project).

Details on the PFP offerings specific to the activities of different NGSs can be found in their respective sub-sections in Section 3.

The CNSC also offered participant funding to review the 2023 NPGS ROR (this report). The details of this offering can be found online here.

3.4 NPGS ROR Virtual Engagement Session

The CNSC held an annual NPGS ROR virtual engagement session with Indigenous Nations and communities on September 22nd, 2023. The goal of the engagement session was to provide an overview of the ROR, CNSC staff's findings with regards to licensees performance in 2022 as well as discuss and address feedback, concerns, comments and recommendations submitted by interested Nations and communities in relation to the 2022 NPGS ROR. CNSC staff appreciated the feedback and discussions and worked to include and reflect a number of the recommendations in the 2023 NPGS ROR. CNSC staff plan to host another NPGS ROR engagement session for the 2023 ROR in September 2024.

3.5 Licensee Public Information and Engagement

- The CNSC requires licensees to maintain and implement Public Information and Disclosure Programs (PIDP), in accordance with CNSC's REGDOC-3.2.1, Public Information and Disclosure.
    - These programs are supported by disclosure protocols that outline the type of information to be shared with the public as well as details on how that information is to be disseminated by the licensee.
    - 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 in a meaningful, transparent, effective, and appropriate way.
- In 2023, CNSC staff determined that overall, the Public Information and Disclosure Programs for the Nuclear Power Plants (NPP) and Waste Management Facilities (WMF) complied with REGDOC-3.2.1.
    - All NPP and WMF operators delivered Public Information Programs which engaged and informed their stakeholders about activities at their nuclear

facilities. Many programs continue to be available both in-person and virtually, while continuing to respect post-pandemic health and safety guidelines.

  - As part of the ongoing compliance reviews conducted by CNSC staff, a fleet-wide desk top inspection of OPG's PIDP was conducted at OPG's Pickering Nuclear Generating Station (PNGS), Darlington NGS (DNGS), Pickering Waste Management Facility (PWMF), Darlington Waste Management Facility (DWMF), and Western Waste Management Facility (WWMF) in 2023. The inspection resulted in three notices of non-compliance (NNC) related to evaluation and improvement of the program, maintenance of records, and transparency and access to information regarding nuclear waste. CNSC staff were satisfied with OPG's corrective actions. As of April 2024, all NNCs were closed.

- CNSC staff encourage all licensees to review and update their PIDP annually. As per section 2.3.1 of REGDOC-3.2.1, licensees must send revisions of their public disclosure protocols to the CNSC, indicating the changes and the reasons for them. It remains good practice for licensees to provide this information to CNSC before any Commission proceedings.

4 Other matters of regulatory interest

4.1 Financial Guarantees

- CNSC staff reviewed the annual reports for licensees' financial guarantees (FGs).
  - CNSC staff were able to confirm that the FG cost estimates were valid and that the licensees had sufficient funds to meet decommissioning liabilities in 2023.
  - Note: The Bruce Power FG is covered under OPG's FG.
- OPG's next submission of the set of PDPs with the associated consolidated FG is expected in 2027.
- Hydro-Québec's next submission of its PDD, FG and storage under surveillance plan is expected in 2025.
- In 2023, NB Power continued their review of the three funding agreements which constitute its financial guarantee.
  - This review was performed to update the documents in line with the Financial Security and Access Agreement.
  - These actions are tracked as part of CNSC action item for NB Power.

UPDATE: CNSC staff have received and reviewed all three updated funding agreements and found that they were acceptable. A briefing note was provided to the Commission and was reviewed as part of the May 22, 2024 Commission meeting.

4.2 Independent Environmental Monitoring Program

CNSC staff continued to carry out its Independent Environmental Monitoring Program (IEMP) at planned sites in 2023. Each of the following sites have their own dedicated IEMP results page linked below:

- Darlington Nuclear Generating Site
- Pickering Nuclear Generating Site
- Bruce Nuclear Generating Station A and B
- Point Lepreau Nuclear Generating Site
- Gentilly-2 Nuclear Facilities

Learn more about the IEMP

4.3 Forum between the CNSC and Canadian Environmental Non-Governmental Organizations

Collaboratively drafted by CNSC staff and ENGO representatives

The CNSC and members of Environmental Non-Governmental Organizations (ENGOs) have an established forum to exchange information and ideas and consider substantive and procedural concerns relating to Canadian nuclear regulation – especially those of a more structural rather than project-specific nature. The Forum promotes constructive dialogue, discussion, and debate in a respectful, open and transparent setting, and is separate from formal regulatory proceedings and comment periods. It does not constitute ENGO endorsement of the CNSC or its processes.

The CNSC provides funding to support ENGO participation in the Forum through the CNSC's Indigenous and Stakeholder Capacity Fund. The Forum meets quarterly and is co-chaired by the CNSC's Regulatory Affairs Branch Vice-President and Chief Communications Officer, and the Nuclear Transparency Project Coordinator. There are currently five organizations that make up Forum membership:

- Canadian Environmental Law Association
- Northwatch
- Nuclear Transparency Project

- Ottawa Riverkeeper
- Saskatchewan Environmental Society

The Forum provides an opportunity for CNSC staff to better understand the potential challenges that ENGOs and other members of the public face when participating in CNSC's regulatory processes, including accessing information to inform interventions and comments about specific nuclear-related activities. At the same time, the Forum provides an opportunity for ENGOs to better understand the CNSC's regulatory role and approaches, and ongoing Commission modernization activities.

In 2023, Forum discussions focused on many procedural themes, including early engagement

and improving access to information and data related to Commission decisions and nuclear activities. ENGO Forum meeting agendas are available on the CNSC website. Notable discussions in 2023 were on the following substantive topics:

- March 23, 2023 – Independent Environmental Monitoring Program, Process to Manage Requests to Observe Specific Aspects of an Inspection, Possible Alternative Times Frames for Interventions.
- June 22, 2023– Small Modular Reactors – Licensing and Regulation Update, Canadian Standards Association Standards Enhanced Access Program, Indigenous and Stakeholder Capacity Fund and Timelines for Participant Funding Program.
- October 4, 2023 – CNSC's Approach to Inspections, Preparations for Canada's submission for the 8th Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.
- December 5, 2023 – CNSC's Regulatory Framework Plan.

In the summary of Forum activities co-drafted by CNSC and ENGO members for last year's ROR, ENGO members noted they felt strongly that meetings between CNSC staff and industry representatives and licensees should exhibit similar transparency to that demonstrated by the Forum, with meetings and their topics publicly reported for each calendar year. This year, ENGO members note no improvement has been made in this regard – while the Forum's meeting dates, topics, and Terms of Reference are made publicly available, there are no corresponding disclosures for members of industry relating to their meetings with CNSC staff. CNSC staff have acknowledged the request and note there remain logistical issues, such as the volume of its meetings with both industry and the public, which impede the proactive disclosure of the requested information. However, the CNSC continues to strive for transparency. As such, CNSC staff remain dedicated to finding opportunities to disclose meeting details, when feasible. CNSC staff continue to work with ENGOs and other members of the public to consider opportunities to share meaningful information.

Identified and agreed-upon commitments and issues are recorded and tracked to monitor whether, or to what extent, they are addressed over time. Over the last four years of maintaining this document, it has become clear to ENGO members that while CNSC staff provide

timely responses to specific requests for reports or information, very little progress has been made on procedural or structural issues raised by ENGOs at the Forum since 2020. For ENGO members, greater value in the Forum will ultimately only be possible when more progress is made on these outstanding items. CNSC staff acknowledge ENGO members' concern on the rate of progress on procedural issues raised.

Due to the ongoing dialogue, examples of improvements and progress on commitments made include extending certain funding program application timelines. The period between the announcement of funding and the submission deadline has now been extended from 60 days to 90-100 days, allowing ENGOs more time to review CMDs and RORs.

In response to more structural issues raised in ENGO forum meetings, CNSC staff have also put in place quarterly updates to ENGOs outlining upcoming timelines for public engagement and

participation opportunities for the public. These updates are provided to Forum members in writing ahead of each meeting to help keep funding recipients aware of potential delays for projects that could affect their deliverable due dates. Timeline updates are further provided and discussed within the quarterly meetings. CNSC staff will continue to work with ENGO members to identify updates of interest to Forum members.

In addition to following up on outstanding items, the Forum has agreed to prioritize key topics in 2024 including detailed updates on CNSC-led Environmental Reviews, focusing on projects under the Canadian Environmental Assessment Act 2012 (CEAA 2012), and CNSC Website Migration.

CNSC staff's intent is to continue to gain important insight and various perspectives from ENGOs and Civil Society Organizations on regulatory processes, practices and policies as the nuclear industry evolves. CNSC staff and ENGO forum members hope that their discussions can increase mutual understanding and the development of measures to address issues of shared importance.

5 Conclusions

- In 2023, CNSC staff continued to conduct regulatory oversight of NPPs and WMFs.
- CNSC staff concluded that the NPPs and associated WMFs on their respective sites operated safely and complied with the applicable requirements for all safety and control areas in 2023.
- This conclusion was based on detailed CNSC staff assessments of findings from compliance verification activities for each facility in the context of the 14 CNSC safety and control areas and supported by reported safety performance indicators and other observations.
- Important observations include the following:
    - NPP and WMF licensees took appropriate corrective actions for all events reported to the CNSC.
    - NPPs and WMFs operated within the bounds of their operating policies and principles.
    - There were no serious process failures at the NPPs. The number of unplanned transients and trips in the reactors was low and acceptable to CNSC staff. All unplanned transients in the reactors were properly controlled and adequately managed.
    - Radiation doses to the public and the workers were below the regulatory limits.
    - Releases to the environment were within safe limits
    - The frequency and severity of non-radiological injuries to workers were low.
    - Licensees met the applicable requirements related to Canada’s international obligations; safeguards inspection results were acceptable to the International Atomic Energy Agency.

6 References

1. **Company name.** *Report title.* XXXX.

2. **Author.** *Book title.* City : Publisher, Year.

3. *Journal article title.* **Author.** Issue, City : Publisher, Year, Vol. Volume.

7 Glossary

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

Appendix A: List of Inspections Reports at each NPP and WMF in 2023

A1 Darlington NGS

SCA	Report Number	Report Issue Date
Management Systems	DRPD-2023-17240 - Report - TII - DNRU3 Completion Assurance	June 22, 2023
	DRPD-2023-17290 REPORT Refurbishment Configuration Management	October 19, 2023
	DRPD-2023-10915 Report DTI Human Factors in Design	May 5, 2023
Human Performance Management	DRPD-2023-17226 and PRPD-2023-17258 - REPORT - Type II Fleetwide ANO Certified Training Program Inspection	December 20, 2023
	DRPD-2023-15631 - Report - DTI - Design, Development and Grading of Knowledge-based Certification Examinations	September 1, 2023
	DRPD-2023-14246 – Report – DTI - Design, Development and Grading of a Simulator-based Initial Certification Examination	June 30, 2023
Operating Performance	DRPD-2022-16417 Q3 Type II Inspection Report: Quarterly Inspection Report	May 23, 2023
	DRPD-2023-15879- Q4 Quarterly Inspection Report	July 14, 2023
	DRPD-2023-T2-17161-INSPECTION REPORT - Quarterly Inspection Report Q1	October 10, 2023
	DRPD-2023-T2-17998-INSPECTION REPORT-Quarterly Inspection Report Q2	January 10, 2024
Physical Design	DRPD-2023-16018 – Report - Commissioning of SSCs to Verify Technical Specifications	June 1, 2023
	DRPD-2023-17155 - PRRP Compliance Verification Report - General Verification of Pressure Boundary	July 19, 2023
Fitness for Service	DRPD-2023-17582 - Type II Inspection Report - Maintenance Planning and Scheduling	October 13, 2023

	DRPD-2023-T2-18035- INSPECTION REPORT - Type II System Inspection PHT	December 12, 2023
Radiation Protection	DRPD-2023-18198 REPORT - Type II Inspection Report - Radiation Protection During Re-Assembly of the Core Compliance Verification Report	December 19, 2023
	DRPD-2023-17470 DNRU4 RP Desktop – Report - Radiation Protection, Source Term, and ALARA Program in refurbishment	June 8, 2023
	DRPD-2023-15171 - Type II Inspection Report - Radiological Hazard Control	March 17, 2023
Security	DRPD-2023-15818 – Report – FI – Central Alarm Station and Protected Area	March 30, 2023
	PRPD-2023-14739, DRPD-2023-16793, OPG-PWMF-2023-01, OPG-DWMF-2023-01, OPG-WWMF-2023-04 - REPORT - DTI - (Fleet) Public Information and Disclosure Program at OPG	October 17, 2023

A2 Darlington WMF

SCA	Report Number	Report Issue Date
General	PRPD-2023-14739, DRPD-2023-16793, OPG-PWMF-2023-01, OPG-DWMF-2023-01, OPG-WWMF-2023-04 - REPORT - DTI - (Fleet) Public Information and Disclosure Program at OPG	July 20, 2023
	OPG-DWMF-2023-02 - Baseline Type II General Inspection	October 18, 2023
Emergency Management & Fire Protection	OPG-DWMF-2023-03 – Type II Emergency Management and Fire Protection	November 15, 2023

A3 Pickering NGS

SCA	Report Number	Report Issue Date
General	PRPD-2023-14739, DRPD-2023-16793, OPG-PWMF-2023-01, OPG-DWMF-2023-01, OPG-WWMF-2023-04 - REPORT - DTI - (Fleet) Public Information and Disclosure Program at OPG	July 20, 2023

Management System	Pickering NGS - CNSC Type II Inspection Report-PRPD-2023-14317 – Self Assessment	June 20, 2023
Human Performance Management	Compliance Verification Report - Type II Inspection of Certified Training Program PRPD-2023-15636	May 11, 2023
	DRPD-2023-17226 and PRPD-2023-17258 - REPORT - Type II Fleetwide ANO Certified Training Program Inspection	December 20, 2023
	PRPD-2023-16580 - DTI - REPORT - Design and development of a Pickering 1-4 and Pickering 5-8 Simulator-based Requalification Test	March 31, 2023
	PRPD-2023-17002- DTI - REPORT - Design, development and grading of a Pickering 1-4 ANO Written Requalification Test	May 16, 2023
Operating Performance	PRPD-2023-15536 - REPORT - TII - Quarterly Field Inspection Report Q3 2022-2023	May 2, 2023
	PRPD-2023-16283 - REPORT - TII - Quarterly Field Inspection Report Q4 2022-2023	July 18, 2023
	PRPD-2023-16015 - REPORT - TII - Outage Inspection - Unit 6 (GSS, HS, Start-up, Maintenance, HP-TII-SA) (P2361) at Pickering NGS	August 31, 2023
	CNSC Type II Inspection Report: PRPD-2023-17809 - P2341 Planned Maintenance Outage	October 5, 2023
	PRPD-2023-17366 - REPORT - TII - Quarterly Field Inspection Report Q1 2023-2024	October 13, 2023
	PRPD-2023-17991 - REPORT - TII - Quarterly Field Inspection Report Q2 2023-2024	January 22, 2024
	PRPD-2023-18016 Field Inspection Report Safe Operating Envelope Parameters or Performance	August 8, 2023
Fitness for Service	PRPD-2023-14864 - REPORT - TII - Periodic Inspection Program (P2291) at Pickering NGS	March 6, 2023
	PRRP Compliance Verification Report - PNGS Electrical Power System Type II Inspection PRPD-2023-15635	May 1, 2023
	PRPD-2023-14311 – Type II Inspection Report - Maintenance - SSC Monitoring	May 10, 2023
	PRPD-2023-14731 – Type II Inspection Report – Pressure Boundary	May 31, 2023

	PRPD-2023-16313 - Report - TII -Systems Inspection - Service Water Systems	June 5, 2023
	PRPD-2023-17992 - REPORT - TII - System Inspection - Emergency Coolant Injection at Pickering NGS	January 17, 2024
	PRPD-2023-17256 - REPORT - Type II Reliability Inspection	January 31, 2024
Radiation Protection	PRPD-2023-14732 - TII Inspection Report - Radiological Hazard Control	June 15, 2023
	PRPD-2022-14730 - Desktop Inspection Report - Application of ALARA	February 24, 2023
	PRPD-2023-14916 P2211 Unit 1 Planned Maintenance TII Outage Report	March 23, 2023
	PRPD-2024-18363 - REPORT - DTI - Pressure Boundary - Reactive at Pickering NGS	April 3, 2024
Environmental Protection	Pickering NGS - CNSC Type II Inspection Report: PRPD-2023-16169 - Hazardous Waste Management (March 2023)	June 21, 2023
Emergency Management & Fire Protection	Pickering NGS - CNSC Type II Inspection Report: PRPD-2023-17940 – Emergency Preparedness and Response	December 28, 2023
	PRPD-2023-17488 Stand Alone Field Inspection Report - Fire Protection	June 7, 2023
	DRPD-2023-18338 REACTIVE Public Address System Field Inspection Report	August 31, 2023
Security	PRPD-2023-12169 - Type II Inspection- Nuclear Security Program	March 23, 2023

A4 Pickering WMF

SCA	Report Number	Report Issue Date
General	PRPD-2023-14739, DRPD-2023-16793, OPG-PWMF-2023-01, OPG-DWMF-2023-01, OPG-WWMF-2023-04 - REPORT - DTI - (Fleet) Public Information and Disclosure Program at OPG	July 20, 2023
	OPG-PWMF-2023-02 - Baseline Type II General Inspection	October 18, 2023

A5 Bruce NGS

SCA	Report Number	Report Issue Date
Management System	BRPD-MCR6-2023-16049 - Report - T2 - Completion Assurance Inspection - Phase A	May 10, 2023
	BRPD-AB-2023-15896 - INSPECTION REPORT - DI - Problem Identification and Resolution - Event Investigation, Problem Resolution, Effectiveness Review and Trend Analysis	August 25, 2023
	BRPD-MCR6-2023-17609 - Report - T2 - Completion Assurance (Phase B)	August 2, 2023
	BRPD-MCR6-2023-18315 - Report - T2 - Completion Assurance (Phase C)	September 7, 2023
	BRPD-MCR6-2023-18504 - Report - T2 - Completion Assurance (Phase D)	September 21, 2023
	BRPD-MCR3-2023-18790 - Report - T2 - MCR3 Engineering Change Control Inspection	December 18, 2023
Human Performance Management	BRPD-MCR-16038 Type II - Evaluation of the refurbishment training programs	April 13, 2023
	BRPD-AB-2023-15648 - Report- Type II Compliance Inspection - Human Performance Program	May 15, 2023
	BRPD-A-2023-15945 - Inspection Report - DTI - Bruce A - Design, Development and Grading of Knowledge-based Certification Examinations and Requalification Tests	March 30, 2023
Operating Performance	BRPD-MCR3-2023-16686 - Report - TII - Major Component Replacement (MCR3) Core Defuel (INS-03-03)	May 12, 2023
	BRPD-AB-2023-16413 - INSPECTION REPORT - Bruce A and B Generating Stations Quarterly Field Inspection Summary Report for Q4 2022-23	June 26, 2023
	BRPD-AB-2023-17565 - Bruce Nuclear Generating Stations A and B CNSC Quarterly Field Inspection Summary Report – Q1 2023-24	October 13, 2023
	BRPD-AB-2023-18073 - INSPECTION REPORT - Bruce A and B Generating Stations Quarterly Field Inspection Summary Report for Q2 2023-24	January 3, 2024

	BRPD-A-2023-17441 - Inspection Report - TII - Unit 4 (A2341) Planned Maintenance Outage	January 23, 2024
Physical Design	BRPD-MCR6-2023-18316 - Report - T2 - Commissioning Inspection (Phase C)	September 7, 2023
	BRPD-MCR6-2023-18505 - Report - T2 - Commissioning Inspection (Phase D)	September 21, 2023
	BRPD-MCR6-2023-17346 - Report - T2 - Commissioning Inspection - Phase A	May 11, 2023
	BRPD-MCR6-2023-17610 - Report - T2 - Commissioning Inspection (Phase B)	August 2, 2023
Fitness for Service	BRPD-AB-2023-15807- REPORT - TII - Periodic Inspection Program REPORT	April 28, 2023
	BRPD-B-2023-15737 – Inspection Report - TII - System Inspection – Bruce B Annulus Gas System	May 4, 2023
	BRPD-A-2023-17135 - Inspection Report - TII - Annulus Gas System Inspection	May 16, 2023
	BRPD-AB-2023-14971 REPORT - TII - Aging Management	May 19, 2023
	BRPD-AB-2023-18225 - Inspection Report - TII - Maintenance Planning and Scheduling	January 15, 2024
	BRPD-MCR-2023-16318 – Inspection Report - TII - Major Component Replacement Radiation Protection	February 23, 2023
	BRPD-A-2023-19095 – FIELD INSPECTION REPORT - Unit 4 PHT Leak Summary Report	November 9, 2023
Conventional Health and Safety	BRPD-MCR3-2023-17426- Report - TII - Major Component Replacement (MCR3) Conventional Health and Safety (INS-08-01)	October 4, 2023
Environmental Protection	BRPD-MCR-2023-16319 - Report - T2 - MCR Environnement Inspection	March 23, 2023
Security	BRPD-AB-2023-15665 - Inspection Report - TI - Cyber Security	March 29, 2023

A6 WWMF & RWOS-1

SCA	Report Number	Report Issue Date
General	PRPD-2023-14739, DRPD-2023-16793, OPG-PWMF-2023-01, OPG-DWMF-2023-01, OPG-WWMF-2023-04 - REPORT - DTI - (Fleet) Public Information and Disclosure Program at OPG	July 20, 2023
	OPG-WWMF-2023-01 - Type II Compliance Inspection – General – Western Waste Management Facility	May 10, 2023
	OPG-WWMF-2023-05 - Type II Facility General Inspection	February 1, 2024
Operating Performance	OPG-WWMF-2023-06 - Type II Operating Performance Inspection	February 1, 2024
Emergency Management & Fire Protection	OPG-WWMF-2023-03 – Type II Fire Protection Inspection	June 2, 2023

A7 Point Lepreau NGS

SCA	Report Number	Report Issue Date
Human Performance Management	GPLRPD-2023-15625 - Inspection Report - DTI - Human Factors in Design	April 20, 2023
	GPLRPD-2023-16671 - Inspection Report - DTI - Electrical Safety Training	May 12, 2023
	GPLRPD-2023-16300 - Inspection Report - DTI - Design and Development of Simulator Examinations and Requalification Tests	May 17, 2023
Operating Performance	PLRPD-2023-16298 - Inspection Report - TII - Quarterly Field Inspection Report - Q4 - FY22/23	June 28, 2023
	PLRPD-2023-17236 - Inspection Report - TII - Outage 2023	August 18, 2023
	PLRPD-2023-17235 - Inspection Report - TII - Quarterly Field Inspection Report - Q1 - FY23-24	September 21, 2023
	PLRPD-2023-18151 - Inspection Report - TII - Quarterly Field Inspection Report - Q2 - FY23-24	December 18, 2023

Physical Design	PLRPD-2023-16279 - Inspection Report - TII - Preservation of Seismic Design Basis	May 23, 2023
Fitness for Service	GPLRPD-2023-15621 - Inspection Report - TII - Aging Management	March 31, 2023
	PLRPD-2023-17820 - Inspection Report - TII - System Inspection – Boiler Feedwater (BFW)	October 27, 2023
	PLRPD-2023-17930 - Inspection Report - TII - System Inspection - Electrical Power Systems	November 20, 2023
Radiation Protection	PLRPD-2023-17284 - Inspection Report - TII - Radiological Hazard Control	August 10, 2023
Environmental Protection	GPLRPD-2023-15745 - Inspection Report - TII - Effluent Monitoring and Control	March 8, 2023
	PLRPD-2023-17799 - Inspection Report - TII - Environmental Monitoring	August 31, 2023
Emergency Management & Fire Protection	GPLRPD-2023-16382 - Inspection Report - DTI - Accident Management	June 19, 2023
Waste Management	PLRPD-2023-18076 - Signed Inspection Report - TII - Solid Radioactive Waste Management Facility (SRWMF)	November 23, 2023

A8 Gentilly-2 Facilities

SCA	Report Number	Report Issue Date
General	HQ-G2-2023-02 - Inspection Générale de Type II	July 7, 2023
Management System	HQ-G2-2023-03 - Inspection de conformité de Type II Système de Gestion	September 14, 2023
Radiation Protection	HQ-G2-2022-01 - Inspection de conformité de Type II radioprotection	October 27, 2023
Environmental Protection	HQ-G2-2023-01 - Inspection de conformité de Type II en environement	July 7, 2023
Emergency Management & Fire Protection	HQ-G2-2021-02 - Exercise Incendie	October 27, 2023

Waste Management	HQ-G2-2021-02 - Installations de gestion des déchets radioactifs	October 27, 2023

Appendix B: Significant changes to the Licence Condition(s)

The following table lists the licence conditions handbook (LCH) for each facility covered by the regulatory oversight report and indicates the changes made to the LCHs in 2023.

Table 25: Details of LCHs that were revised in 2023

Facility	LCH #	Revision # as of December 31, 2023	Revision date
DWMF	LCH-W4-355.00/2033	R000	August 4, 2023
PNGS	LCH-PR-48.01/2028	R005	February 24, 2023
BNGS	LCH-PR-18.03/2028	R004	November 3, 2023

B1: Darlington Waste Management Facility

Table 26: Summary of changes made during revision 0

Condition	Description of change
G.3	Removed CSA standard N294-09 from Licensing Basis Publications and added 1) implemented CNSC guidance document G-206, 2) transition period for implementation of CNSC REGDOC 3.3.1 (supersedes G-206). Removed CNSC guidance documents G-219 and G-206 from Guidance Publications.
G.4	Removed CNSC regulatory and guidance document RD/GD-99.3 from Licensing Basis Publications and updated effective date of CNSC REGDOC 3.2.1 (supersedes RD/GD-99.3) to reflect implemented status.
1.1	Added CSA standard N286.0.1 to Guidance Publications.
2.1	Removed CNSC guidance documents G-276 and G-278 from Guidance Publications and added CNSC REGDOC 2.5.1 which supersedes them.
3.2	Removed CNSC regulatory and guidance document RD/GD-99.3 from Licensing Basis Publications and updated effective date for CNSC REGDOC 3.2.1 (supersedes RD/GD-99.3) to reflect implemented status.
4.1	Under Licensing Basis Publications, added CNSC REGDOC 2.4.4 with an implementing footnote on OPG's commitment to submit a gap analysis and implementation plan.

5.1	Under Licensing Basis Publications, added the following documents with implementing footnotes on OPG's commitment to submit respective gap analyses and implementation plans: • CSA Standard N393 version 2022 • National Building Code of Canada version 2020 • National Fire Code of Canada 2020 Removed CNSC guidance documents G-276 and G-278 from Guidance Publications and added CNSC REGDOC 2.5.1 which supersedes them.
7.1	Added 7.4 x 10^3 Bq (200 nCi) Cs-137 equivalent under contamination control action levels. Removed CNSC guidance documents G-129 and G-228 from Guidance Publications and added CNSC REGDOCs 2.7.1 and 2.7.2 which supersede them.
8.1	Added CNSC REGDOC 2.8.1 under Guidance Publications.
9.1	Added CSA standards N288.0 and N288.8 with their forecasted implementation dates; removed tabulated Derived Release Limits & Environmental Action Levels and added reference to OPG documentation where they are published. Removed CNSC guidance document G-228 from Guidance Publications, updated the version of CNSC REGDOC 2.9.1, and added CSA standard N288.1-2020.
11.1	Under Licensing Basis Publications, added CNSC REGDOC 2.11.1 with a footnote indicating near-complete implementation as a single clause is pending the implementation of a separate REGDOC (2.11.2), and added CSA standard N292.8 with a footnote on OPG's commitment to submit a gap analysis and implementation plan.
11.2	Added a condition under Licensee Documents that Require Notification of Change to indicate that 00044-PLAN-00960-00001, *Preliminary Decommissioning Plan - Darlington Waste Management Facility*, requires CNSC acceptance of change. Under Licensing Basis Publications, added CNSC guidance document G-219, and added CNSC REGDOC 2.11.2 (supersedes G-219) with text on its transition period for implementation. Removed CNSC guidance documents G-219 and G-206 from Guidance Publications.
12.1	Under Licensing Basis Publications, removed CNSC regulatory document RD-363 and added CNSC REGDOC 2.12.1 Volume I with a footnote indicating ongoing discussion between CNSC and OPG on its implementation.

12.2	Added CNSC positions of delegated authority responsible for authorization operations to begin at newly constructed structures.
14.1	Added CNSC REGDOC 2.14.1 to Guidance Publications.
15.1	Rephrased the licence condition to improve clarity and to add the requirements of 1) submission of a preliminary safety analysis report, and 2) written approval from the Commission or a person authorized by the Commission, prior to carrying out construction activities referred to in paragraph (iv) of Part IV of the licence. Under Licensing Basis Publications, added CNSC REGDOC 2.9.1. Added text on the process of CNSC review of construction-related documents and authorization to begin construction activities, as well as those CNSC positions of delegated authority responsible for providing authorization. Added CNSC REGDOC 2.4.4 to Guidance Publications.

B2: Pickering NGS LCH

On February 24, 2023, CNSC staff made a number of clarification changes in various sections, and updated referenced CNSC regulatory documents, CSA Group standards, and licensee documents. The table below summarizes the changes made in revision R005:

Table 27: The table below summarizes the changes made in revision R005

Condition	Description of change
Section G.5	Update CVC to reflect OPG implementation strategy for REGDOC-2.11.2 and REGDOC-3.3.1
Section 2.1	Added new OPG governance for complying with REGDOC-2.2.3 Vol II, version 3; updated implementation information for REGDOC-2.2.3, Vol II, version 3
Section 2.2	Updated min shift complement table to reflect changes to roles in MSC
Section 2.4	Removed outdated CVC re. implementation strategy for REGDOC-2.3.3 Vol III
Section 3.1	Updated CVC to reflect OPG implementation commitment for REGDOC-2.3.2 version 2
Section 4.1	Updated CVC to reflect OPG's updated REGDOC-2.4.1 implementation plan for 2022-2024; updated CVC to reflect status of REGDOC-2.4.2 implementation
Section 5.1	Updated LB publications table to reflect implementation of CSA N290.14-15
Section 6.1	Updated CVC related to N285.4 clause 12, N285.8-15 clause 5.4.3.1 (g), N285.8-15 clause 7.4.3.2, CVC for probabilistic fracture protection assessments, N285,4 clause 14, transition from N287.7-08 to N287.7-17

Section 7.1	Revised Administrative Dose Limits table to reflect latest iteration of N-PROC-RA-0019 R008
Section 7.1	Corrections made to Action Level for Surface Contamination Levels table to be fully aligned with text in N-REP-03420-10001
Section 9.1	Removed outdated CVC regarding implementation of N288.7-15 since December 31, 2020
Section 9.1	Update CVC to reflect OPG commitment to implement N288.8-17 Environmental Action Levels (EALs), by December 31, 2023; added new WN documents for groundwater protection and monitoring program and predictive effects assessment report
Section 10.1	Revised CVC to remove duplicated REGDOC-2.10.1 Version 2 requirements and to better align with other NPP LCH text.
Section 10.2	Update CVC to reflect implementation date for N293-12(R2017); removed CNSC-imposed requirement for a third party audit of Industrial Fire Brigade every 2 years
Section 11.1	Update Preamble text to reflect recently published REGDOC-2.11, which supersedes CNSC Policy P-290
Section 11.2	Updated Preamble; updated CVC to reflect latest submitted PDP, removed N294-09 version from LB publication table (N294-19 already in table)
Section 11.2	Updated CVC with implementation strategy for REGDOC-2.11.2
Section 12.1	Added new WN documents to be consistent with Darlington LCH; added CVC regarding Commission decision to temporarily exempt high security site licensees from the requirements of subsection 36(2) of the NSR for 12 to 24 months due to COVID-19 pandemic (CMD 21-H101)
Section 12.1	Removed CVC text relating to implementation plans for REGDOC-2.12.1 High Security Sites, Volume I: Nuclear Response Force, Version 2, as implementation was completed in December 2020
Section 15.1	Correction to publication date for REGDOC-2.3.3
Section 15.1, 15.4	Updated CVC with Commission decision from CMD 22-H107, Commission approval to extend deadline to submit PSR2 reassessment and application for ECO extension from December 31, 2022 to June 30, 2023.
Various	Updated WN document tables/CVC text to reflect number or/and title change to OPG document where appropriate
Various	Updated Guidance Publications tables to include recently published REGDOCs CSA standards and remove superseded guidance regulatory documents where appropriate

B3: Bruce NGS A and B LCH

On November 3, 2023, CNSC staff made a number of changes to clarify recommendations, guidance, and the compliance verification criteria in various sections to include a new or revised CNSC regulatory documents and CSA Group standards (these developments are described in this report and are aligned with the Commission decisions) and licensee documents.

Table 28: The table below summarizes the changes made in revision R004

Condition	Description of change
LC 5.1, Compliance Verification Criteria Appendix D – List of Licensee Documents Requiring Written Notification	Addition of BP-PROC-01081, Engineering Change Control.
LC 9.1, Environmental Protection, Appendix B, Table B.1	Removed N288.1, 2008, Update No. 1 (2011) from Section 9.1 of LCH as N288.1, 2014, Update 3 was implemented on Dec. 31, 2021. Changed text to reflect that N288.1 is fully implemented. Note that Bruce Power plans to implement N288.1-2020 by January 31, 2024. This was added to the licensing basis publications table, along with text for implementation strategy.
LC 9.1, Environmental Protection	Removed N288.8 (2017) implementation plan text as Bruce Power is now in full compliance with the standard.
LC 15.1, Lease Agreement	Added new lease agreement under LC 15.1.
LC 6.1, Fitness for Service Program	Updated CVC text on the implementation plan for CSA N285.7 based on latest correspondence (March 2022).
LC 6.1, Fitness for Service Program	Updated CVC text on the implementation of N285.5-18 based on latest correspondence (March and May 2022).
3.1, Operations Program	Added CVC text related to approval of rod-based guaranteed shutdown state (RBGSS) at Bruce Power as fourth approved GSS.
10.2, Fire Protection Program	Added guidance text related to CSA N293-12(R2017) transition plan.
9.1, Environmental Protection Program	Removed BP-PROC-00171, Radiological Emissions as it has been superseded by BP-STND-00049, Radiological Emissions and Effluent Monitoring.

15.10, Cobalt-60 and Lutetium-177	The Regulatory Hold Point (RHP) related to Lu-177 production has now been removed in October 2022. Therefore, the CVC text associated with RHP, including the conditions for removal, has been removed.
15.3, Pressure Tube Fracture Toughness 6.2, Fitness for Service Program for Fuel Channels in Extended Operation	Bruce Power has requested to remove LC 15.3 related to HEQ in pressure tubes. CNSC staff recommended the Commission to remove 15.3 but has added a new LC 6.2 (see CMD 23-H103). This recommendation is based on the results of CNSC staff assessments of findings of elevated Heq in some pressure tubes in extended operation. The Commission has accepted this change in the Record of Decision on October 13, 2023.
6.1, Fitness for Service Program	Updated CVC text in LC 6.1. LC 15.3 (PT fracture toughness) has been replaced by LC 6.2 – some of the text is outdated. See Item #20.
2.1, Human Performance Program	Added CVC text related to alcohol and drug testing based on new letter from CNSC to Bruce Power. However, this decision has been stayed by the court. Added additional sentence regarding the court order issued on October 27, 2023.
3.1, Operating Performance 10.1, Emergency Preparedness Program	Updated CVC table in LC 3.1. REGDOC-2.3.2 version 2 was issued by CNSC. Bruce Power stated in July 2023 (BP-CORR-00531-04256) that they fully comply with this latest edition. CNSC staff approved this change.
5.2, Pressure Boundary Program	Updated CVC text in LC 5.2. CNSC staff agreed with Bruce Power to expand the exemption criteria to include Factory Mutual (FM) approved per accreditation by the Standards Council of Canada.
4.1, Safety Analysis Program	Updated CVC text in LC 4.1. Bruce Power requested a proposed revision to Section 4.1 (Safety Analysis Program) of the LCH. REGDOC-2.4.1 was written to be technologically neutral, so full compliance may not be practicable for existing stations such as those at the Bruce site. CNSC staff agreed with Bruce Power's proposal. Also, the safety report improvement project (SRI) has been completed. Therefore, the associated text has been deleted.

6.1, Fitness for Service Program	Updated CVC text in LC 6.1. Updated text on CSA N285.8 implementation plan. The PFP acceptance criterion was previously conditionally accepted. CNSC staff are now satisfied with Bruce Power's updated work.

Appendix C: Indigenous Nations, Communities and organizations that have traditional and/or Treaty Territories and/or interests within proximity to the licensed facilities

Facility	Indigenous Nations, Communities and/or Organizations

Darlington/Pickering	• Williams Treaties First Nations, which include:
	  ○ Alderville First Nation
	  ○ Curve Lake First Nation
	  ○ Hiawatha First Nation
	  ○ the Mississaugas of Scugog Island First Nation
	  ○ the Chippewas of Beausoleil First Nation
	  ○ the Chippewas of Georgina Island First Nation
	  ○ the Chippewas of Rama First Nation
	• Métis Nation of Ontario (Region 8)
	• Mohawks of the Bay of Quinte
	• Six Nation of the Grand River
	• Mississaugas of the Credit First Nation

Bruce	• Saugeen Ojibway Nation • Métis Nation of Ontario • Historic Saugeen Métis • Chippewas of Kettle and Stony Point First Nation
Point Lepreau	• Wolastoqey Nation of New Brunswick (representing 6 Wolastoqey communities in New Brunswick) • Mi'gmawe'l Tplu'taqnn Incorporated (representing 8 Mi'gmaq communities) • Kopit Lodge (representing Elsipogtog First Nation) • Passamaquoddy Recognition Group Inc. (representing the Peskotomuhkati Nation)

Gentilly-2	• Nation W8banaki
	  ○ Abénakis of Wôlinak
	  ○ Abénakis of Odanak
	• Nation huronne-wendat

Appendix D: Status of issues, concerns and requests from intervenors

D1 Indigenous Nations and Communities Interventions

This appendix provides an overview of the issues raised in the interventions in relation to the previous year's ROR (i.e. the 2022 NPGS ROR), and the proposed path forward to address them. Table 29 provides an overview of the key thematic categories raised by all Indigenous Nations and communities 2022 NPGS ROR intervenors and the total number of times each theme or topic was raised across the interventions. Tracking this thematic information will help CNSC staff to focus their efforts on areas that generate the most concerns.

The following Indigenous Nations and communities submitted interventions in relation to the 2022 NPGS ROR:

- Passamaquoddy Recognition Group Inc.
- Hiawatha First Nation
- Nation W8banaki
- Mississaugas of Scugog Island First Nation

It is noted that the intervention submitted by the MSIFN was solely focused on the Pickering Mid-Term update (which was part of the same Commission meeting in December 2023), not the NPGS ROR, and so the issues and concerns are not included in Table below.

Table 29: Interventions by Thematic Category

Issues and concerns thematic category	Number of times the topic was raised	Number of Indigenous Nations and communities who raised the topic in their interventions
CNSC Consultation and Engagement (e.g., suggestions for improvements to the approach to consultation and engagement and request for meaningful responses to issues raised)	14	3
ROR Process & Content (e.g., requests related to improving accessibility, providing additional information or clarification in specific sections of the report, and improving the format of the report)	12	3

Environmental Monitoring (e.g., comments on the inclusion of potential pathways and biological effects of radionuclides, concerns regarding the cumulative impacts of NPGS activities)	5	2
Safety (e.g., requests for more information regarding recent events and concerns regarding safety assessment ratings)	6	1
UNDRIP (e.g., requests to review licensee activity with respect to the UNDRIP action plan, concerns regarding free, prior, and informed consent)	4	1
Waste (e.g., concern about impacts from waste)	2	1
Emergency Management (e.g., concerns about lack of detail and request for information about the process for notification in an emergency)	2	1
NPGS Operations & Compliance (e.g., requests for more information regarding compliance verification activities, definition of operational terms)	2	1
Archeology (e.g., requests for archeological surveys, concerns regarding the lack of surveys)	2	1
Proponent Engagement (e.g., concerns about the availability of information from the proponent or discrepancy of information released by the proponent)	2	1
Decommissioning (e.g., concerns raised regarding the adequacy of financial guarantees for decommissioning)	1	1
Security (e.g., requests for more information on security exercises)	1	1

D2 Public Interventions

CMD 23-M36.B - Supplementary submission from CNSC Staff - 2022 Regulatory oversight report for Canadian nuclear power generating sites, discussed most of the key themes raised by interveners and attempted to address them.

The following table provides an overview of the key thematic categories raised in the public interventions in relation to the 2022 NPGS ROR and the number of times each theme or topic was raised in total across all interventions. The categories included in Table 30 have been ordered from most frequently raised to least.

Table 30: Interventions by topic category

Topic of concern, request, comment	Number of times the topic was raised	Action(s) taken by CNSC
Supporting licensee performance	7	No action required
Supporting CNSC staff conclusions	4	No action required
Indigenous Engagement and Reconciliation	3	Actions described in Section 3 and Appendix D1 above
Pickering Station's exclusion zone	2	Outside of the ROR scope
Environmental Monitoring	2	Addressed in CMD 23-M36.B
Availability of Data	2	Addressed in CMD 23-M36.B
Fuel Channel fitness for service	2	Ongoing work between the licensee and CNSC staff
Employees assistance programs	1	No action required
Equity programs	1	No action required
Participant funding program	1	To be addressed by the Commission
Measures to prevent long term effects of radiation	1	Addressed by CNSC staff during the Commission meeting and captured in the Minutes of December 13-14, 2023 meeting
Modeling the effects of climate changes	1	Addressed in CMD 23-M36.B
Employment trends at Pickering nuclear power plant	1	Addressed during the Commission meeting proceedings
Removal of defects from core bundles	1	Ongoing

Addressing the pre-fire plan inconsistencies at Pickering	1	Addressed in CMD 23-M36.B
Expansion of the delivery of KI pills	1	Addressed in CMD 23-M36.B
Details on Fisheries Act Authorizations	1	Addressed in CMD 23-M36.B

D3 Conclusions

CNSC staff take the issues and concerns raised by intervenors seriously and continues to work with Indigenous Nations and communities who have intervened in the NPGS ROR Commission meeting on identifying approaches to addressing the different topics areas, requests and comments raised, as appropriate. Furthermore, the CNSC is committed to improving the quality of data included in RORs and the ROR reporting process. CNSC staff acknowledge that the two main themes of issues raised in the 2022 NPGS ROR were “CNSC Consultation and Engagement” and “ROR Process & Content” and has made it a priority to further discuss and address these issues where feasible. The inclusion of this Appendix in the ROR is part of this commitment and CNSC staff are working towards the efficient reporting to the Commission on issues tracking and engagement efforts.

The CNSC is open to having dialogue and working towards improving understanding around key issues within the CNSC’s mandate and authority.

Appendix E: Summary of engagement in relation to CNSC's Terms of Reference for Long-term Engagement and Associated Workplans in 2023

E1: Curve Lake First Nation - CNSC Long-term Engagement Terms of Reference

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

In February 2021, CNSC staff and Curve Lake First Nation signed a ToR for long-term engagement, providing a formalized structure for ongoing dialogue on CNSC-regulated facilities and activities of interest in Curve Lake First Nation's traditional and treaty territories. As part of the ToR, a yearly work plan is developed between the CNSC and Curve Lake First Nation that provides information on the scope of work, detailed activities, and timelines associated with work items for collaboration and engagement. In 2023, the work plan included activities that CNSC staff and Curve Lake First Nation collaborated on to implement throughout 2023 and beyond, including:

- Participation in the CNSC's Independent Environmental Monitoring Program (IEMP)
- Updates and discussions on specific projects and ongoing operations of existing nuclear facilities of interest
- Information, communication, and other topics (i.e. REGDOC updates, feedback on CNSC reporting and processes, funding opportunities, radiation monitoring and cumulative effects)
- Developing a plan for a Curve Lake First Nation Indigenous Knowledge Study

In 2023, due to capacity constraints and other priorities, Curve Lake First Nation and CNSC were not able to initiate discussions on developing a plan for an Indigenous Knowledge study. However, Curve Lake First Nation and CNSC are committed to developing a plan for a Curve Lake First Nation IK Study in 2024. Due to capacity constraints, despite best efforts by Curve Lake First Nation, and funding opportunities made available by CNSC, there are topics and issues that have not been adequately discussed and addressed. Both Curve Lake First Nation and CNSC are committed to an ongoing effort to close such gaps

In 2023, Curve Lake First Nation and CNSC staff continued to meet monthly and work collaboratively to make progress on the agreed upon initiatives in the work plan. Through monthly meetings and interactions, Curve Lake First Nation and CNSC have developed a good working relationship; one that has been conducive to open and direct communications.

Topics of discussion related to Nuclear Power Generating sites in Curve Lake First Nation's territory included ongoing environmental monitoring activities, fish impingement and entrainment at the DNGS and PNGS, OPG's application to authorize operations until 2026 for the PNGS and OPG's application for a licence to construct the Darlington New Nuclear Project including information about the selected technology, applicability of the Environmental Assessment and regulatory review process. Curve Lake First Nation participated in the IEMP sampling for the Darlington site. During the IEMP sampling campaign, Curve Lake First Nation representatives requested that CNSC staff test manoomin (wild rice) harvested from Chemong Lake east of Curve Lake First Nation and shared the cultural importance of manoomin to their communities. Having Curve Lake First Nation representatives participate in the sampling promotes a better understanding of sampling methods and improves input into future sampling in terms of Curve Lake First Nation species of interest, valued components, and potential sampling locations.

In 2023, CNSC staff attended Curve Lake First Nation community events, including the Alternative Routes Career fair in January 2023 and Harvesters Symposium in September 2023. CNSC staff look forward to continuing to enhance information sharing and communication with Curve Lake First Nation community members and leadership.

In December 2023, CNSC staff had an in-person meeting with Curve Lake First Nation representatives, in their community. CNSC staff provided updates on and an overview of all nuclear facilities and activities in their Treaty and traditional territories.

In 2023, Curve Lake First Nation provided feedback through their intervention on the 2022 RORs and continue to do so through ongoing discussions. CNSC staff have made a number of improvements to CNSC staff reports and documentation based on the feedback, updating the language used throughout CNSC reports and having discussions on how to better incorporate Indigenous Knowledge and perspectives in CNSC's regulatory processes (including Environmental Protection Review Reports). In 2023, CNSC staff and Curve Lake First Nation had focused discussions on the key themes raised in their interventions to the Commission and are working together to discuss and address the issues, concerns and recommendations raised in Curve Lake First Nation's interventions.

CNSC staff and Curve Lake First Nation continue to be committed to strengthening the relationship through on-going respectful dialogue to share knowledge, information on culture, history, Rights and interests and perspectives that help CNSC staff and Curve Lake First Nation learn from each other and improve collaboration and communications. CNSC staff are

committed to continuing to have discussions regarding areas of interest and issues or concerns related to existing and proposed CNSC-regulated nuclear activities of interest to Curve Lake First Nation.

E2: Hiawatha First Nation - CNSC Long-term Engagement Terms of Reference

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

In May 2023, CNSC staff and Hiawatha First Nation signed a ToR for long-term engagement, providing a formalized structure for ongoing dialogue on CNSC-regulated facilities and activities of interest in Hiawatha First Nation's traditional and treaty territories. As part of the ToR, a yearly work plan is developed between the CNSC and Hiawatha First Nation that provides information on the scope of work, detailed activities, and timelines associated with work items for collaboration and engagement. In 2023, the work plan included activities that CNSC staff and Hiawatha First Nation collaborated on implementing throughout 2023 and beyond, including:

- Participation in the CNSC's Independent Environmental Monitoring Program (IEMP)
- Updates and discussions on specific projects and ongoing operations of existing nuclear facilities of interest
- Information, communication, and other topics (i.e. REGDOC updates, feedback on CNSC reporting and processes, funding opportunities, radiation monitoring and cumulative effects)
- Developing a plan for a Hiawatha First Nation Indigenous Knowledge Study

Hiawatha First Nation and CNSC were not able to initiate discussions on developing a plan for an Indigenous Knowledge (IK) study. However, Hiawatha First Nation and CNSC are committed to developing a plan for a Hiawatha First Nation IK Study in 2024.

In 2023, Hiawatha First Nation and CNSC staff continued to meet monthly and work collaboratively to make progress on the agreed upon initiatives in the work plan. Through monthly meetings and interactions, Hiawatha First Nation and CNSC are progressing their working relationship.

Topics of discussion related to Nuclear Power Generating sites in Hiawatha First Nation's territory included ongoing environmental monitoring activities, fish impingement and entrainment at the Darlington Nuclear Generating Station and Pickering Nuclear Generating Station, OPG's Pickering Nuclear Generating Station application to authorize operations until

2026 and OPG's application for a licence to construct the Darlington New Nuclear Project including information about the selected technology, applicability of the Environmental Assessment and regulatory review process. In addition, Hiawatha First Nation participated in the IEMP sampling for the Darlington site. Having Hiawatha First Nation representatives participate in the sampling activities promotes a better understanding of sampling methods and improves input into future IEMP activities including the inclusion of Hiawatha First Nation species of interest, valued components, and potential sampling locations.

In December 2023, CNSC staff had an in-person meeting with Hiawatha First Nation leadership, in their community. CNSC staff provided updates regarding an overview of all nuclear facilities and activities in their traditional and treaty territory. CNSC staff and Hiawatha First Nation also discussed concerns and priorities for 2024 and beyond.

In 2023, Hiawatha First Nation provided feedback through their intervention on the 2022 Regulatory Oversight Reports and continue to do so through ongoing discussions with CNSC staff. CNSC staff have made a number of improvements to CNSC staff reports and documentation based on the feedback, such as updating language used throughout CNSC documentation and having discussions on how to better incorporate Indigenous Knowledge and perspectives in CNSC's regulatory processes (including Environmental Protection Review Reports). In 2023, CNSC staff and Hiawatha First Nation had focused discussions on the key themes raised in their interventions to the Commission and are working together to discuss and address the issues, concerns and recommendations raised in Hiawatha First Nation's interventions.

CNSC staff and Hiawatha First Nation 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 Hiawatha First Nation learn from each other and improve collaboration and communication. CNSC staff are committed to continuing to have discussions regarding areas of interest and issues or concerns related to existing and proposed CNSC-regulated nuclear activities of interest to Hiawatha First Nation. Hiawatha First Nation would like to see real change in the CNSC's regulatory and consultation processes. This includes the implementation of the 2018 Williams Treaties Settlement Agreement, which would in effect uphold the Inherent and Treaty rights of the First Nation. The Williams Treaties Settlement Agreement was signed in 2018 and recognized the pre-existing treaty harvesting rights for the First Nations members and included both federal and provincial apologies for the negative impacts of the Williams Treaties on the First Nations. CNSC staff and Hiawatha First Nation are committed to working together to ensure Hiawatha First Nation's rights and interests are protected and reflected in the CNSC's regulatory process and documents.

E3: Historic Saugeen Métis – CNSC 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 BNGS in 2018, a Terms of Reference 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 the Bruce Nuclear Generating Station (Major Component Replacement and operational activities including updates on pressure tubes), OPG's Western Waste Management Facility, CNL's Douglas Point decommissioning project and NWMO's Adaptive Phase Management project.

CNSC staff and HSM representatives collaborated on the IEMP sampling campaign that took place around BNGS in 2022. CNSC staff appreciated HSM's involvement in the Independent Environmental Monitoring Program, through selection of samples and participating in sample collection. Their contributions have helped to strengthen the IEMP monitoring program. In 2023, CNSC staff shared the results of the 2022 IEMP sampling campaign and discussed the results with HSM.

HSM provided a walk in MacGregor Park in June 2023 to share some of the history of the land and HSM's cultural connections to the area. CNSC staff learned more about the area around the Bruce site, including traditional uses and importance of various plant species. CNSC staff also attended the annual HSM Rendezvous in August 2023 to share information about radiation and the CNSC's regulatory oversight of the nuclear industry in Canada.

In 2023, Bruce Power announced their intent to pursue an Integrated Impact Assessment for up to 4,800 MW of new nuclear generating capacity at the Bruce site. The CNSC established a Memorandum of Understanding with the Impact Assessment Agency of Canada (IAAC) in 2019 to conduct Integrated Impact Assessments for projects that are implicated by both the Impact Assessment Act, 2019 and the NSCA. CNSC staff have been collaborating with IAAC to conduct early engagement on the Integrated Impact Assessment process, including presentations to HSM's staff and Council. CNSC staff and IAAC have been proactively engaging with the HSM on the integrated assessment process for this potential project, as well as providing participant and capacity funding to support HSM. IAAC staff are frequently invited to the regular bi-annual meetings with HSM established under the HSM-CNSC ToR, as well as to ad-hoc meetings held on topics of interest to HSM in order to maintain regular communication and lessen the demand on the SON's time and resources.

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 Terms of Reference.

Optional HSM Comments on CNSC engagement:

The Historic Saugeen Métis continues to value the strong relationship with CNSC staff. HSM and CNSC conduct semi-annual meetings to discuss a broad range of nuclear industry topics, oversight activities and regulatory matters. Additionally, staff provide regular communications with updates and follow-up regarding action items, reportable events, regulatory commenting opportunities and new information. CNSC staff and HSM are always exploring new ways to share traditional knowledge and culture by organizing walks and lectures to better understand the connections with land and water.

E4: Mississaugas of Scugog Island First Nation – CNSC Long-term Engagement Terms of Reference

As committed to with the Mississaugas of Scugog Island First Nation (MSIFN) as part of the Terms of Reference (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 the MSIFN to establish a formal long-term relationship with the community, and a ToR was signed between the MSIFN and the CNSC in March 2022. As part of the ToR, a yearly work plan is developed between the CNSC and the MSIFN, which provides information on the scope of work, detailed activities, and timelines associated with work items for collaboration and engagement. CNSC also provides funding and capacity support to the MSIFN through its Indigenous and Stakeholder Capacity Fund to support the meetings, engagement and collaboration work as per the ToR and engagement work plan.

In 2023, the work plan included:

- Participation in the CNSC's Independent Environmental Monitoring Program (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 the MSIFN
- Emergency management and preparedness

In 2023, 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. CNSC staff and MSIFN continued to track, collaboratively verify, and provide responses to key concerns and issues raised by the MSIFN throughout 2023.

Topics of discussion related to Nuclear Power Generating sites in the MSIFN territory included updates and discussions about the Darlington Nuclear Generating Station (DNGS) and MSIFN's intervention and participation in the 2023 Darlington Waste Management Facility (DWMF) license renewal hearing, Pickering Nuclear Generating Station (PNGS), and Pickering Waste Management Facility (PWMF) including OPG's request to change the licensing basis of the PWMF. CNSC staff and the MSIFN met monthly, including an in-person meeting with MSIFN leadership in November 2023, to continue discussions on the Darlington New Nuclear Project (DNNP), DWMF licence renewal, OPG's intent to extend existing operations at the Picking Nuclear Generating Station, as well as concerns regarding the volume of work related to CNSC-regulated activities and facilities within MSIFN's territory given that the MSIFN is the closest First Nation community to PNGS, DNGS, DWMF, and PWMF, and hosts several other CNSC regulated facilities in its treaty areas.

The MSIFN requested that the CNSC ensure OPG provides all essential information on both the DNNP and the proposed PNGS life extension and planned refurbishment, enabling the MSIFN to thoroughly evaluate the impacts of these projects. The MSIFN also participated in the 2023 CNSC IEMP sampling campaign for the DNGS. In 2023, CNSC staff and the MSIFN began working on a community-specific Potassium Iodide Pill fact sheet, to be finalized in 2024. The MSIFN community is located within the 50km Ingestion Planning Zone (IPZ) for two CNSC regulated facilities: DNGS and PNGS. KI pills have been pre-distributed to the community in preparation for a potential nuclear emergency. CNSC staff are continuing to collaborate with MSIFN to develop related communication materials for leadership and community members in 2024.

The MSIFN has raised concerns regarding the future Darlington New Nuclear Project, including the requirement for consent from impacted First Nations, the lack of plans for Species at Risk habitat compensation, decommissioning, and nuclear waste management, and the fact that the project is proceeding with an outdated environmental assessment that does not meet current standards. The MSIFN continues to assert that the DNNP project will have impacts on Rights. CNSC is moving forward with drafting a Rights Impact Assessment regarding MSIFN's rights around the DNNP project, prior to its license to construct hearing in late 2024. The MSIFN has expressed concerns that the short timeline provided to complete the RIA will result in a limited understanding of MSIFN's rights in relation to the project, and collaboration is lacking as the CNSC independently prepares the draft RIA without MSIFN's input into designing the study. CNSC staff are working with the MSIFN to address these concerns. MSIFN's perspectives including these concerns will be reported to the Commission through the regulatory process for the DNNP Licence to Construct application.

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

E5: Métis Nation of Ontario - CNSC Long-term Engagement Terms of Reference

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

Following the licence renewal hearing for the Bruce Nuclear Generating Station 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 ToR was also signed in December 2019 with MNO Region 7.

In 2023, the engagement plans included:

- Participation in the CNSC's IEMP
- Sharing information on NWMO's Adaptive Phase Management initiative
- Sharing information on the NPD project
- Sharing information on SMRs, and GFP's MMR project
- CNSC to support MNO capacity building through new Indigenous and Stakeholder Capacity Fund (ISCF), including the hiring of a community liaison to work with CNSC directly
- Communication with MNO citizens

The following facilities covered in this ROR are of interest: Bruce Nuclear Generating Station, Western Waste Management Facility, and NWMO's Adaptive Phase Management initiative.

As per the engagement plan, in 2023, CNSC staff continued to meet with MNO Region 7 representatives semi-annually to discuss topics such as the Douglas Point decommissioning licence application, 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.

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.

E6: Saugeen Ojibway Nation- CNSC Long-term Engagement Terms of Reference

As committed to with the Saugeen Ojibway Nation (SON) as part of the Terms of Reference (ToR) for long-term engagement with the CNSC, CNSC staff prepared the following summary and offered to co-author and validate the text with the SON, who informed CNSC staff that rather than co-author this summary, they would communicate to the Commission directly through an intervention.

A ToR was 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 the SON, which provides information on the scope of work, detailed activities, and timelines associated with work items for collaboration and engagement.

In 2023, the work plan included:

- Joint review and analysis of licensee submissions, particularly around Environmental Protection
- Following-up on the CNSC's 2022 IEMP sampling to share and discuss the results
- Inclusion on the design and review of Bruce Power's study of available mitigation measures for environmental impacts
- CNSC staff outreach in the SON communities
- 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, NWMO's Adaptive Phase Management initiative, OPG's Darlington New Nuclear Project, and Bruce Power's existing and anticipated projects.

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 the Bruce Nuclear Generating Station existing and anticipated projects, Western Waste Management Facility, Douglas Point, and NWMO's Adaptive Phase Management initiative OPG's Darlington New Nuclear Project.

CNSC staff understand that the SON continue to have concerns regarding the environmental impacts resulting from the nuclear activities at the BNGS, which were presented in their intervention in Bruce Power's licence renewal hearing on March 14, 2018. The focus of the activities in the work plan is to ensure SON oversight, inclusion, and a means to obtain additional information that will provide clarity, transparency and assurances for the communities and the SON leadership regarding the interactions between the BNGS facility and the environment.

In 2023, CNSC staff and the SON continued to meet and work collaboratively to complete a number of the 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. Due to the pandemic and inability to meet with community members in person, this work has been delayed, however, the SON have informed CNSC staff that data collection is complete, and the report is expected to be complete in 2024.

After completing collaborative work on Bruce Power's mitigation measures study, the SON and CNSC staff have further collaborated on environmental monitoring, mitigation measures, and updates to the CNSC's regulatory framework. In 2023, CNSC staff met with the SON and Bruce Power on mitigation measures used at the Bruce site and emerging technologies to discuss how best to continue to have dialogue on potential options that could be considered in future reviews. As a result, CNSC staff and Bruce Power invited the SON to attend quarterly environment update meetings with ECCC and DFO to facilitate communication on this topic and better involve the SON in regulatory oversight of the Bruce site.

CNSC staff and members from the SON community participated in the Independent Environmental Monitoring Program sampling campaign for 2022. The 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 some outreach activities as well to explain the program as well as health impacts due to radiation. In 2023, when the IEMP sampling results from 2022 were published, CNSC staff met with the SON to share and discuss the results.

CNSC staff participated in a number of outreach activities with SON. CNSC staff attended the SON's Mothers' Day market, both as an opportunity for the CNSC to learn about and better understand the SON communities, and to interact with SON members to ask questions and learn more about how nuclear energy and radiation is regulated in Canada.

In addition, the SON completed another year of the Coastal Waters Monitoring Program (CWMP), which is an initiative funded in part by Bruce Power, but designed, led, and implemented by the SON to monitor environmental conditions in the nearshore areas of the Saugeen Peninsula. In 2023, the CNSC's Indigenous Capacity Support Fund opportunity opened for the first time, and the SON applied for additional funding to support the administration of their CWMP. SON plans to share with CNSC the 2023 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. 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 DGR sited in SON Territory to ensure that their voices are heard and considered in decision making processes.

In 2023, Bruce Power announced their intent to pursue an Integrated Impact Assessment for up to 4,800 MW of new nuclear generating capacity at the Bruce site. The CNSC established a Memorandum of Understanding with the Impact Assessment Agency of Canada (IAAC) in 2019 to conduct Integrated Impact Assessments for projects that are implicated by both the Impact Assessment Act, 2019 and the NSCA. CNSC staff have been collaborating with IAAC to conduct early engagement on the Integrated Impact Assessment process, including presentations to SON's Nuclear Advisory Committee and Environment Office staff. CNSC staff and IAAC have been proactively engaging with the SON on the assessment process for this potential project, as well as providing participant and capacity funding to support the SON. IAAC staff are regularly invited to the monthly meetings established under the SON-CNSC ToR in order to maintain regular communication and lessen the demand on the SON's time and resources.

CNSC staff and the SON will continue to work collaboratively to address areas of concern, rights, and interests for the SON in relation to the Bruce site.

Appendix F: Data

F1: Unplanned Transients

All operating NPPs licensees are required to report serious process failures to the CNSC, in accordance with CNSC REGDOC-3.1.1, Reporting Requirements for Nuclear Power Plants. Among other performance indicators, REGDOC-3.1.1 requires operating NPP licensees to submit quarterly reports on the "Number of unplanned transients", which tracks unplanned transients (unexpected reactor power changes) for each reactor that is not in a guaranteed shutdown state. These unplanned transients indicate problems within a plant, and place strain on its systems.

Table summarizes the number of unplanned transients for the operating NPPs caused by step backs, setbacks, and reactor trips. Step backs and setbacks refer to intentional power reductions initiated by the reactor's regulating systems. These adjustments are made to proactively manage operational risks and ensure safe plant operation without the need for a rapid reactor shutdown. On the other hand, reactor trips are initiated automatically by the reactor's shutdown systems in response to conditions that pose an immediate risk to safety or in accordance with operational protocols. These trips are designed to quickly and safely shut down the reactor to prevent any potential hazards. Industry total provides the data for the operating Canadian NPPs. In 2023, all unplanned transients were properly controlled by the reactor control systems. CNSC staff also determined that no serious process failures occurred at any NPP.

Table 31: Number of unplanned transients in 2023

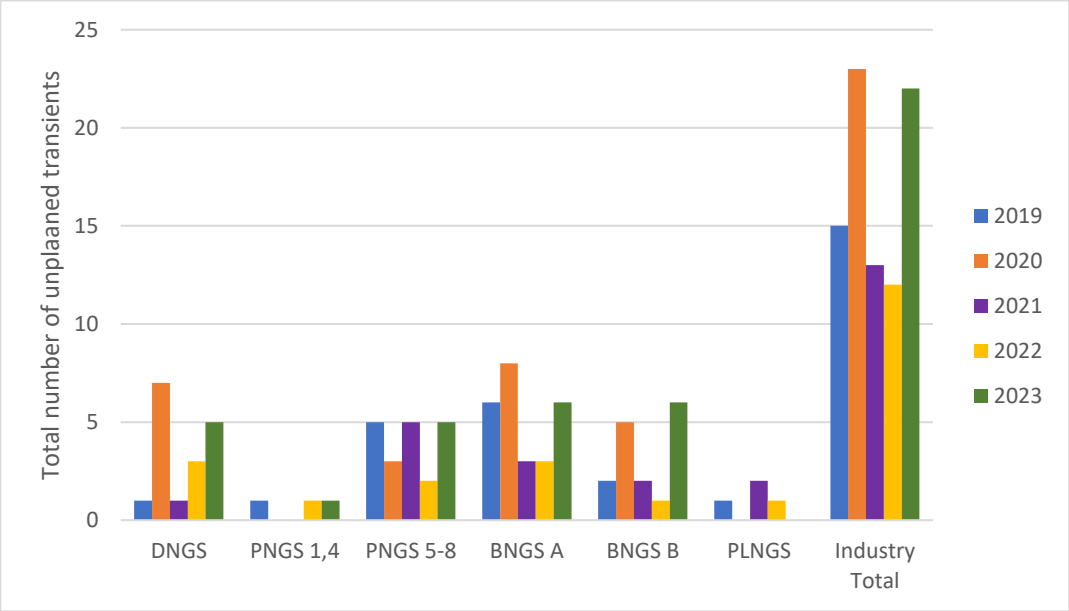
NPPs	Number of operating reactors[3]	Number of hours of operation	Un-planned reactor trips[1]	Step-backs	Set-backs	Total unplanned transients	Number of trips per 7,000 operating hours
DNGS	4	19885	2	0	3	5	0.35
PNGS 1, 4	2	15488.37	0	0	1	1	0.00
PNGS 5–8	4	28762.7	1	0	4	5	0.24
BNGS A	4	26517.88	0	2	4	6	0.00
BNGS B	4	26472.39	0	2	4	6	0.00
PLNGS	1	7429	0	0	0	0	0.00
Industry total	19	126171.3	2	4	15	22	0.11

Notes:

1 This includes automatic reactor trips only; it does not include manual reactor trips or trips during commissioning testing.

2 Step backs are not a design feature at PNGS Units 1 and 4.

3 DNGS Units 1 (for part of the year) and 3 were down for refurbishment in 2022.



Year	DNGS	PNGS 1,4	PNGS 5-8	BNGS A	BNGS B	PLNGS	Industry Total
2019	1	1	5	6	2	1	15
2020	7	0	3	8	5	0	23
2021	1	0	5	3	2	2	13
2022	3	1	2	3	1	1	12
2023	5	1	5	6	6	0	22

Figure 11 shows the total number of unplanned transients from 2019 to 2023 for the operating NPPs

F2: Unplanned reactor trips

Figure 12 compares the number of unplanned reactor trips for Canada's operating NPPs per 7,000 hours of operation, which is a measure used by the World Association of Nuclear Operators (WANO). This WANO indicator is defined as the number of unplanned automatic scrams (reactor shutdown system(s) actuations) that occur per 7,000 hours of critical operation (which is approximately 1 year of operation). WANO targets include the following:

- The target for each of the individual operational units for pressurized heavy water reactors (PHWR) is 1.5 trips per 7,000 hours critical. In 2023, all units in Canada met this target.
- The PHWR industry target, which is the equivalent industry total trips per 7,000 hours critical, is 1.0. Although the WANO target for PHWR is the appropriate benchmark for the CANDU reactors at Canadian NPPs, Figure superimposes a line at the more challenging target (0.5) for pressurized water reactors, which Canadian NPPs continue to use as the more conservative target.

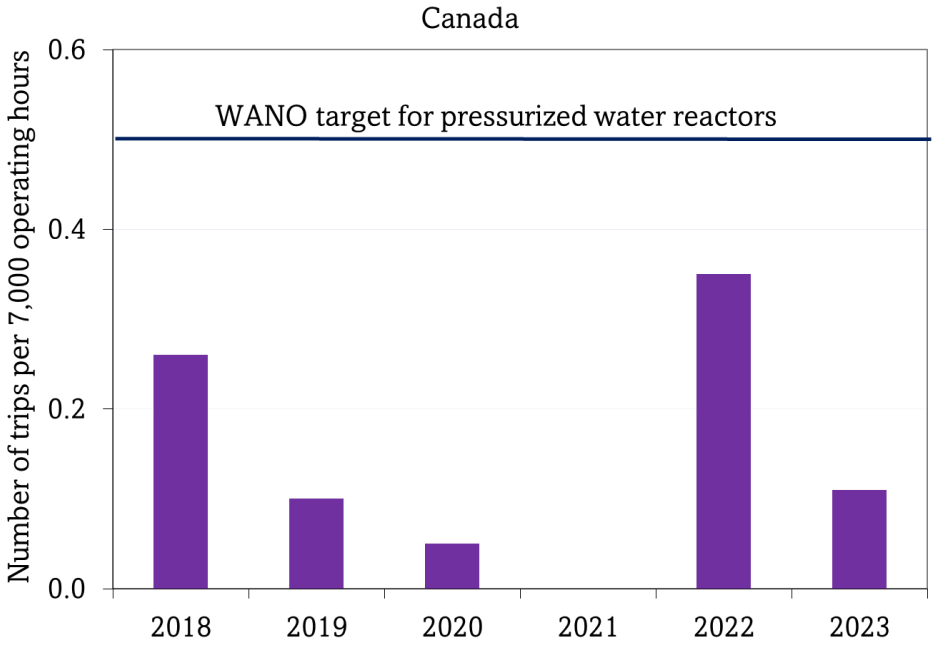


Figure 12: Trend of unplanned reactor trips per 7,000 operating hours

- CNSC staff informed the Commission of unplanned outages resulting from reactor trips and their outcomes via status reports on NPPs in 2023.
- CNSC staff confirmed that unplanned outages were managed safely and in accordance with the applicable regulatory requirements. During each unit's planned outage in 2023, CNSC staff conducted compliance verification activities and determined that regulatory requirements were met, and outages were executed safely.

F3: Safety System Test Performance

Overall, the special safety systems (SSSs) performed well in 2023 and met their unavailability targets.

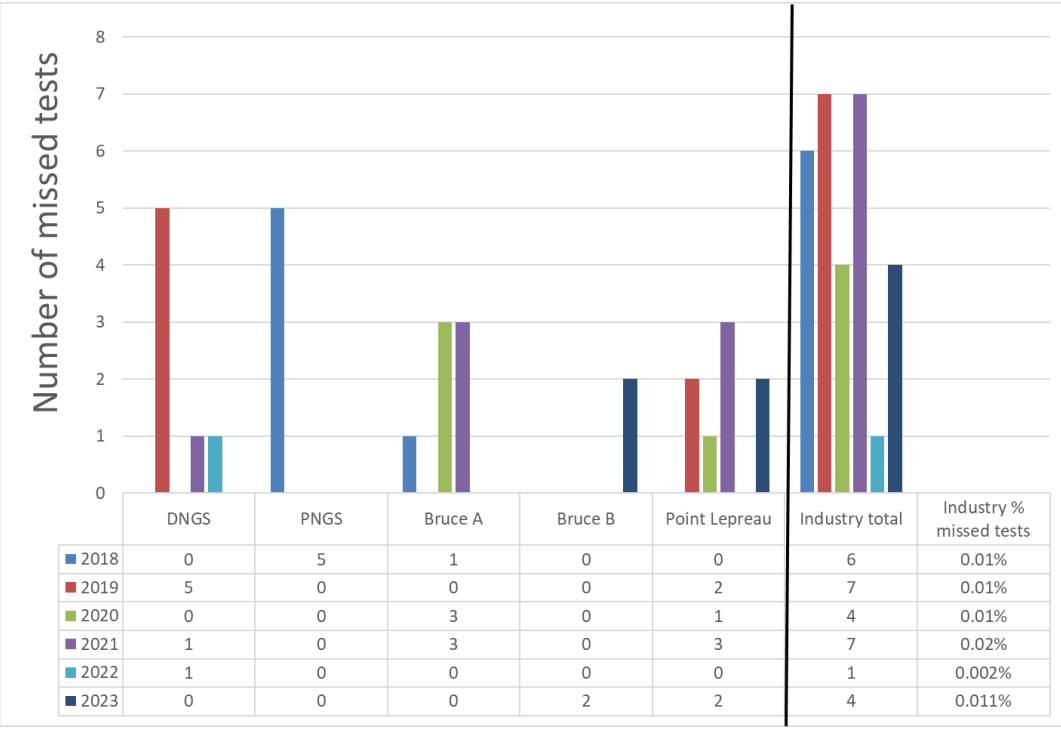
- The number of total missed safety system tests remained very low in 2023.

- In all, 34,884 tests were performed, and the percentage of missed tests was 0.009%.
- The impact of missing a single test is negligible because the NPP designs have sufficiently high redundancy to ensure continuous availability of the safety systems.

Table 32 provides the number of planned tests versus the number of tests not completed.

Table 32: Safety system test performance for 2023

Nuclear power plant	Number of annual planned tests	Not completed: Special safety systems	Not completed: Standby safety systems	Not completed: Safety relatec process systems	Not completed: Total	Percent not completed
DNGS	6,196	0	0	0	0	**0.00%**
PNGS	13,592	0	0	0	0	**0.00%**
BNGS A	4,585	0	0	0	0	**0.00%**
BNGS B	6,174	1	0	1	2	**0.05%**
PLNGS	4,282	2	0	0	2	**0.05%**
Industry total	**34,829**	**3**	**0**	**1**	**4**	**0.01%**



	DNGS	PNGS	Bruce A	Bruce B	Point Lepreau	Industry total	Industry % missed tests
2018	0	5	1	0	0	6	0.01%
2019	5	0	0	0	2	7	0.01%
2020	0	0	3	0	1	4	0.01%
2021	1	0	3	0	3	7	0.02%
2022	1	0	0	0	0	1	0.002%
2023	0	0	0	2	2	4	0.011%

Figure 13: Trend of safety system test performance for NPPs and industry

F4: Collective Dose

The safety performance indicator for the Application of ALARA is the “collective radiation exposure” also known as collective dose. In 2023, the total collective dose for monitored individuals at all Canadian NPPs and WMFs was 30.7 person-Sieverts (p-Sv), which is in line with the industry-wide collective dose reported for 2022 (30.0 p-Sv), and in slight contrast to the industry-wide collective dose reported for 2021 (35.5 p-Sv) and 2020 (27.2 p-Sv).

The collective doses for the individual NPPs are dominated by doses from outages (including refurbishment activities) rather than from routine operations. The magnitude of the doses received during refurbishment also changes depending upon the work being performed; a higher radiation exposure is experienced when a reactor core is dismantled compared to when it is being reconstructed. Table 33 shows the total collective dose for operating NPPs, as well as a breakdown of the collective dose into different work categories.

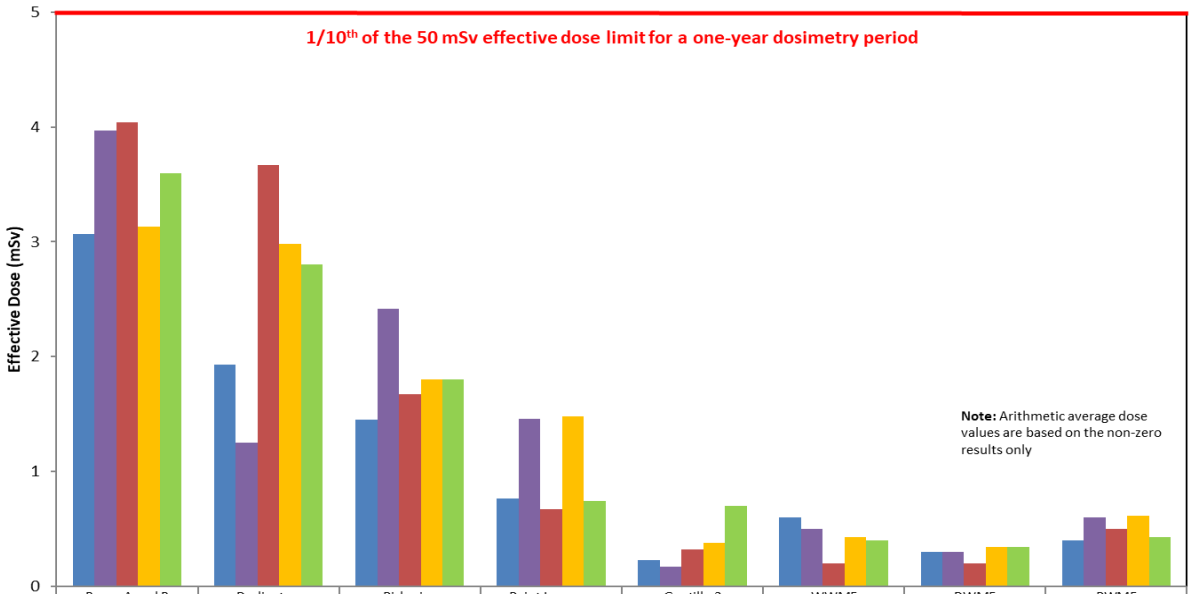
Table 33: Breakdown of collective dose for operating NPPs in 2023 (person-mSv)

NPP	Number of Units	Routine Operations	Outages	Refurbishment	Total
Pickering	6	939	3,018	0	3,957
Darlington*	4	312	24	9,742	10,078

Point Lepreau	1	258	167	0	425
BNGS A**	4	465	938	10,440	11,843
BNGS B***	4	419	2,607	1,351	4,377
*** Darlington Refurbishment Project; Unit 1 (entire year), Unit 3 (Q1 and Q2), Unit 4 (Q3 and Q4)** **** BNGS A Major Component Replacement Unit 3 (entire year)** ***** BNGS B Major Component Replacement Unit 6 (Q1-Q3)**					

F5: Effective Dose

The annual average effective dose in 2023 for all operating Canadian NPPs was 2.84 millisieverts (mSv). The trend of average effective doses of monitored persons is provided in Figure 14. In general, the fluctuations in average dose observed from year to year reflect the type and scope of work being performed at each facility. No negative trends were identified in 2023.

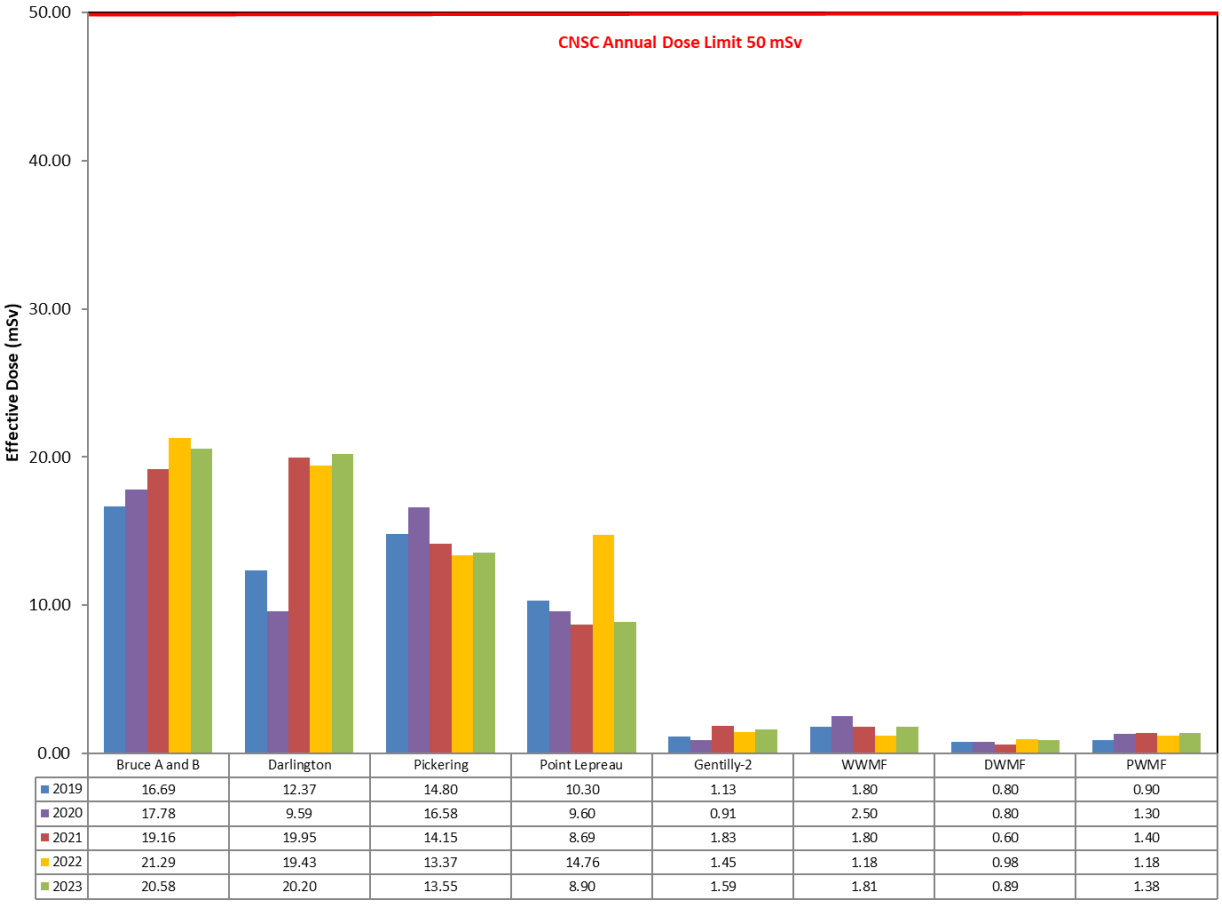


	Bruce A and B	Darlington	Pickering	Point Lepreau	Gentilly-2	WWMF	DWMF	PWMF
2019	3.07	1.93	1.45	0.76	0.23	0.60	0.30	0.40
2020	3.97	1.25	2.42	1.46	0.17	0.50	0.30	0.60
2021	4.04	3.67	1.67	0.67	0.32	0.20	0.20	0.50
2022	3.13	2.98	1.8	1.48	0.38	0.43	0.34	0.61
2023	3.6	2.8	1.8	0.74	0.70	0.40	0.34	0.43

Figure 14: Trend of average effective doses of monitored persons

The maximum annual individual effective doses, as reported by each NPP and WMF for 2019 to 2023, are presented in Figure 15. In 2023, the maximum individual effective dose received at a single site was 20.58 mSv, received by a worker at BNGS. In 2023, no radiation exposures

received by persons at any NPP or WMF exceeded the regulatory dose limit of 50 mSv/year for nuclear energy workers, as established in the Radiation Protection Regulations.

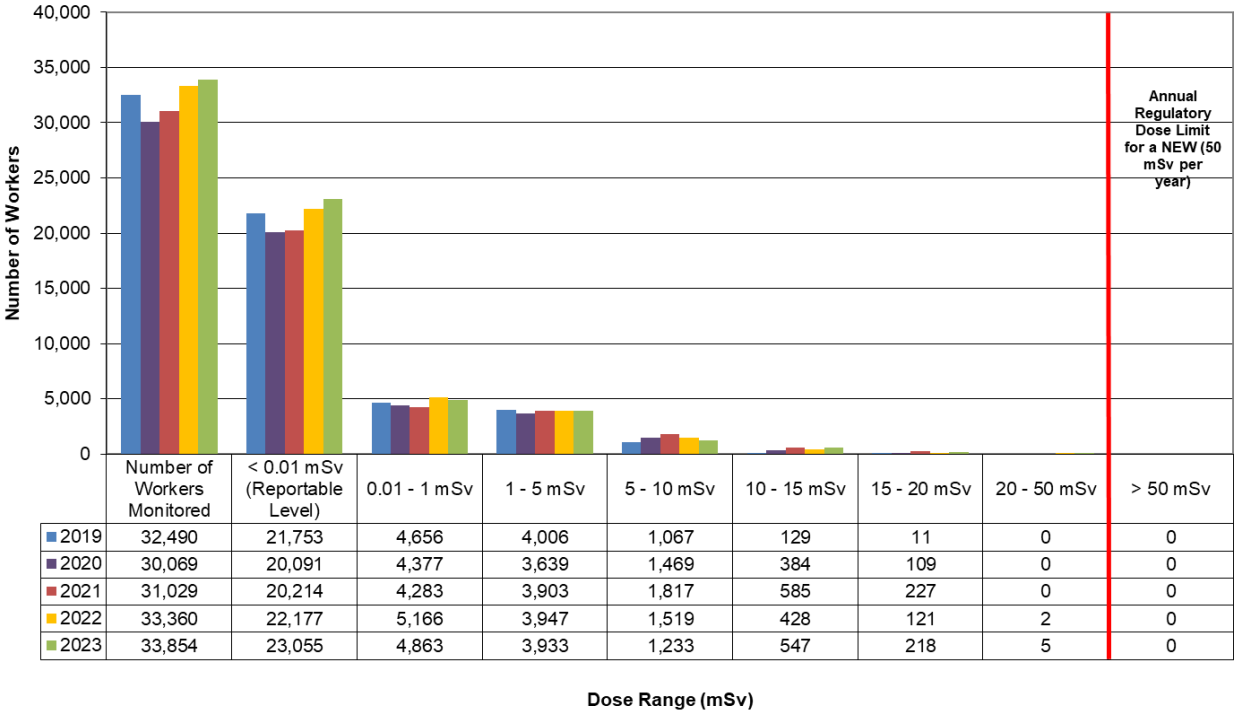


	Bruce A and B	Darlington	Pickering	Point Lepreau	Gentilly-2	WWMF	DWMF	PWMF
2019	16.69	12.37	14.80	10.30	1.13	1.80	0.80	0.90
2020	17.78	9.59	16.58	9.60	0.91	2.50	0.80	1.30
2021	19.16	19.95	14.15	8.69	1.83	1.80	0.60	1.40
2022	21.29	19.43	13.37	14.76	1.45	1.18	0.98	1.18
2023	20.58	20.20	13.55	8.90	1.59	1.81	0.89	1.38

Figure 15: Maximum annual individual effective doses, as reported by each NPP and WMF for 2019 to 2023

Figure 16 provides the distribution of annual effective doses to all monitored persons at all Canadian NPPs from 2019 to 2023. All doses reported over those years were below the annual regulatory dose limit of 50 mSv for nuclear energy workers.

Overall, CNSC staff were satisfied with the licensees' control of worker doses in 2023 and concluded that workers' radiation protection was appropriately planned and managed.



	Number of Workers Monitored	< 0.01 mSv (Reportable Level)	0.01 - 1 mSv	1 - 5 mSv	5 - 10 mSv	10 - 15 mSv	15 - 20 mSv	20 - 50 mSv	> 50 mSv
2019	32,490	21,753	4,656	4,006	1,067	129	11	0	0
2020	30,069	20,091	4,377	3,639	1,469	384	109	0	0
2021	31,029	20,214	4,283	3,903	1,817	585	227	0	0
2022	33,360	22,177	5,166	3,947	1,519	428	121	2	0
2023	33,854	23,055	4,863	3,933	1,233	547	218	5	0

Figure 16: Trend of distribution of annual effective doses received by all monitored persons at Canadian NPPs

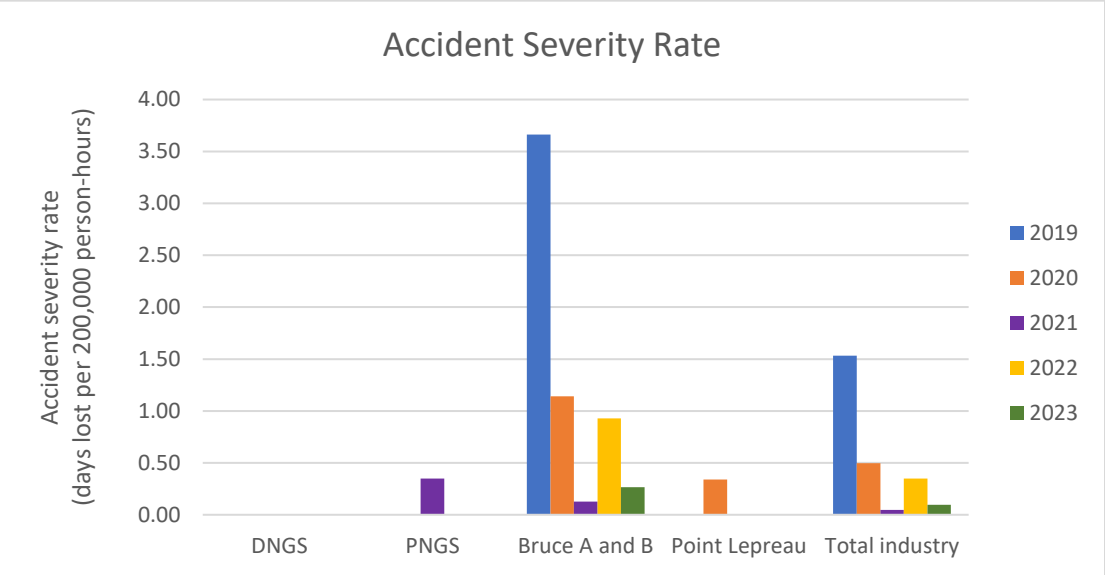
NPPs continued to employ performance metrics and perform self-assessments to monitor and control performance in all aspects of the RP program. Operating experience and benchmarking with industry was used to improve performance.

CNSC staff did not observe any failures of RP programs in 2023 and are satisfied with the industry's performance.

F6: Accident Severity Rate, Accident Frequency and Industrial Safety Accident Rate.

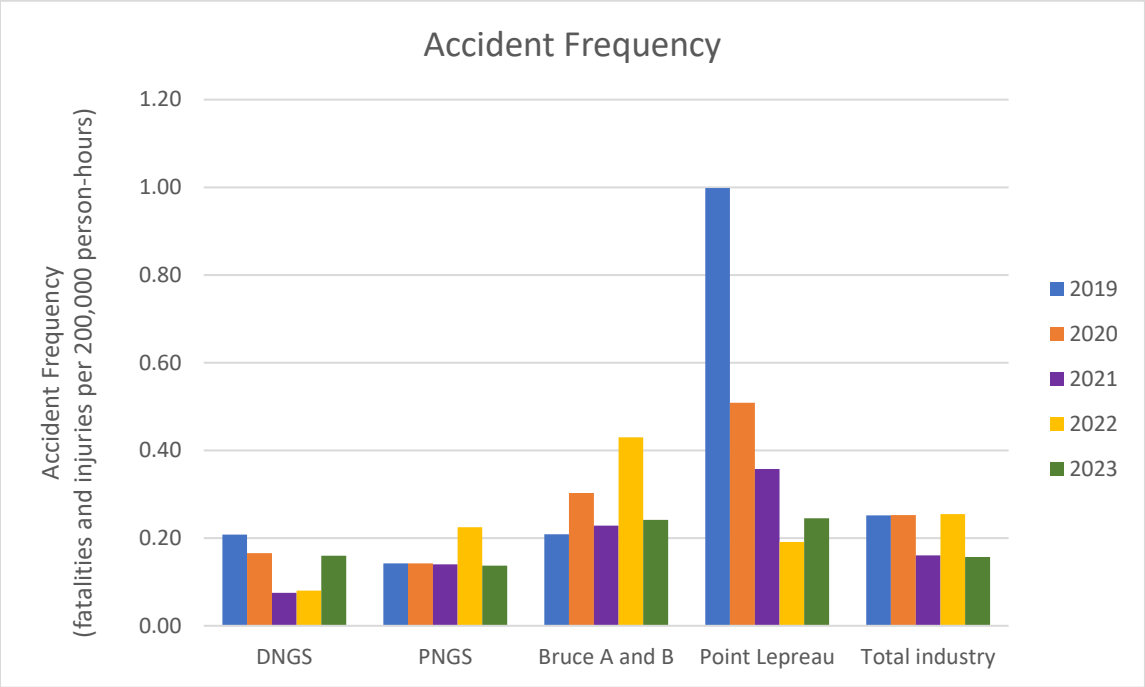
The Accident Severity Rate (ASR) measures the total number of days lost due to work-related injuries for every 200,000 person-hours (approximately 100 person-years) worked at an NPP. The Accident Frequency (AF) is a measure of the number of fatalities and injuries (lost-time and medically treated) due to accidents for every 200,000 person-hours worked at NPPs. The Industrial Safety Accident Rate (ISAR) is a measure of the number of lost-time injuries for every 200,000 hours worked by NPP personnel.

The ASR, AF and ISAR values for the NPPs and industry average are presented in figures 17, 18 and 19. The data in these figures indicate continuing low rates of accidents and lost time due to accidents.



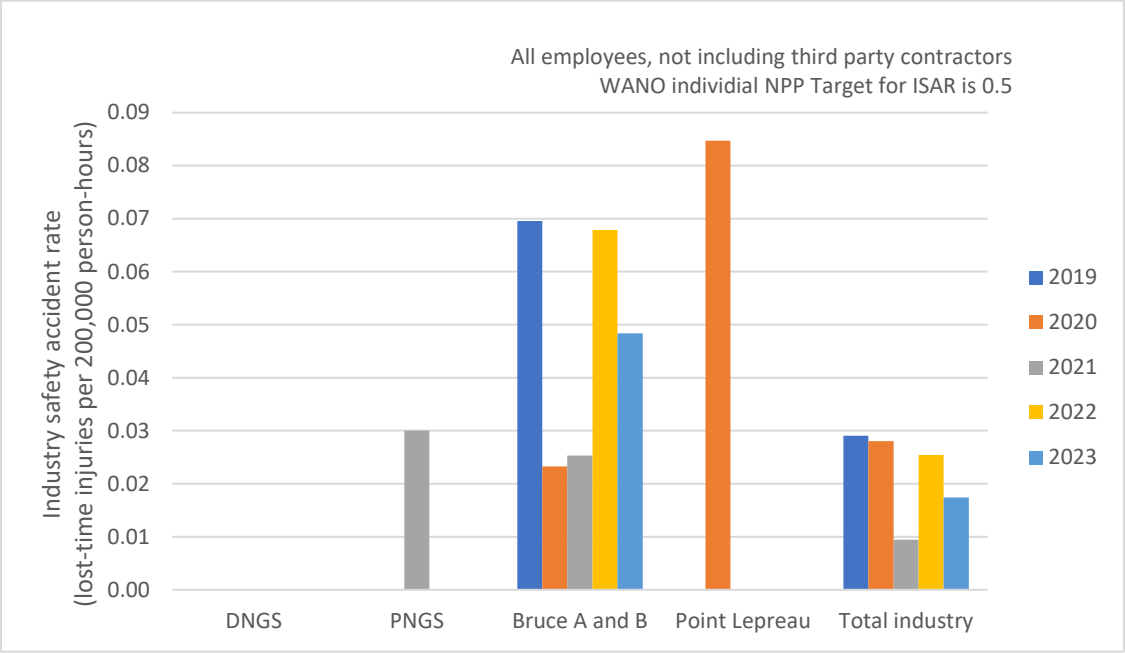
Year	DNGS	PNGS	BNGS A and B	Point Lepreau	Total industry
2019	0.00	0.00	3.66	0.00	1.53
2020	0.00	0.00	1.14	0.34	0.50
2021	0.00	0.35	0.13	0.00	0.05
2022	0.00	0.00	0.93	0.00	0.35
2023	0.00	0.00	0.27	0.00	0.10

Figure 17: Trend of accident severity rate for NPPs and Canadian industry (Covers all employees, not including third-party contractors)



Year	DNGS	PNGS	BNGS A and B	Point Lepreau	Total industry
2019	0.21	0.14	0.21	1.00	0.25
2020	0.17	0.14	0.30	0.51	0.25
2021	0.08	0.14	0.23	0.36	0.16
2022	0.08	0.22	0.43	0.19	0.25
2023	0.16	0.14	0.24	0.25	0.16

Figure 18: Trend of accident frequency for NPPs and Canadian industry (Covers all employees, not including third-party contractors)



Year	DNGS	PNGS	BNGS A and B	Point Lepreau	Total industry
2019	0.00	0.00	0.07	0.00	0.03
2020	0.00	0.00	0.02	0.08	0.03
2021	0.00	0.03	0.03	0.00	0.01
2022	0.00	0.00	0.07	0.00	0.03
2023	0.00	0.00	0.05	0.00	0.02

Figure 19: Trend of industrial safety accident rate for NPPs and Canadian Industry (covers all employees, not including third-party contractors)

In addition, the values for ASR and ISAR at OPG WMFs were zero in 2023 with no lost-time injuries. There was one lost-time injury reported at Gentilly-2 in 2023, which resulted in an ASR of 88.96 and an ISAR of 2.62, both of which are above industry average, and this can be attributed to significantly lower exposure hours at Gentilly-2 in its safe shutdown state compared to operating NPPs. CNSC staff observed that no work-related fatalities occurred at Canadian NPPs and WMFs in 2023.

All licensees continue to implement and maintain a safe Conventional Health and Safety program in accordance with provincial and federal regulatory requirements. In 2023, the licensees were compliant with the relevant requirements of the *Occupational Health and Safety Act of Ontario*, the *Labour Relations Act*, and OPG's Occupational Health and Safety Policy. Conventional Health and Safety conditions at all NPPs continued to achieve a high degree of personnel safety. Licensees adequately identified workplace hazards in 2023 and have appropriate procedures in place to ensure the protection of the environment and the health of persons against hazardous materials.

CNSC site inspectors maintain oversight of Conventional Health and Safety in the field during routine and planned field inspections and walkdowns, through daily monitoring and attendance at the licensee integrated station brief, following up on reported events, and frequent discussions with the staff.

F7: Safeguard activities

The CNSC and licensees continued to engage with the IAEA on a revised equipment-based approach (EBA) for the verification of spent fuel loadings and transfers at the CANDU sites as part of the IAEA's revised State-level approach for Canada.

During 2023, the IAEA identified several instances where some licensees provided late notifications of delays to or cancellations of spent fuel loadings or transfer activities. These delays in notification had an impact on the IAEA's unannounced inspections. The CNSC has reiterated to all licensees the need for the timely and accurate provision of information to support the IAEA's safeguards approach for these activities. The IAEA's future implementation of an EBA for spent fuel loadings and transfers should reduce these occurrences and their potential impact on safeguards implementation at these facilities. The numbers of activities conducted by the IAEA at each NPP and WMF in 2023 are provided in Table 34.

Table 34: IAEA safeguards activities for 2023

Activity	DNGS	DWMF	PNGS	PWMF	BNGS A	BNGS B	WWMF	PLNGS	G-2	Totals
Physical inventory verifications	1	1	1	1	1	1	1	1	1	9
Design information verifications	2	1	1	1	1	1	1	1	1	10
Short-notice random inspections	1	N/A	1	N/A	1	1	N/A	1	N/A	5
Unannounced inspections	4	4	6	3	5	4	5	7	0	40
Complementary accesses	0	0	1*	0*	0	0	0	0	0	1*

* This covers buildings at both PNGS and PWMF.

Appendix G: Heq Concentration Estimates

In response to the Commission's direction in RIB # 14757, for CNSC staff to inform the Commission on the maximum [Heq] of the pressure tubes, the following table is included. The work on developing new models for pressure tube fracture toughness and the hydrogen equivalent (Heq) content in pressure tubes at Bruce A and B is addressed in section 2.5.6 of this report.

Unit	Status as of January 1st 2024			Future situation			
	EFPH	Predicted maximum [H]eq, ppm[1]	Existing fracture toughness model valid?[2,3]	Key date	Anticipated Target EFPH	Predicted maximum [H]eq, ppm[1]	Existing fracture toughness model valid?[2,3]
DNGS Unit 1	Undergoing refurbishment			Undergoing refurbishment			
DNGS Unit 2	29,118	No measurements since refurbished		Unit has been refurbished	210,000[4]	No measurements since refurbished	
DNGS Unit 3	4,252	No measurements since refurbished		Unit has been refurbished	250,000[4]	No measurements since refurbished	
DNGS Unit 4	Undergoing refurbishment			Undergoing refurbishment			
PNGS Unit 1	177,943	96[5]	Yes	Sep 2024	185,000	991[5]	Yes
PNGS Unit 4	151,221	731[5]	Yes	Dec 2024	161,500	781[5]	Yes
PNGS Unit 5	271,159	1151[5]	Yes	Sep 2026[6]	297,500	1271[5]	Yes[7]
PNGS Unit 6	278,429	1081[5]	Yes	Sep 2026[6]	305,000	1191[5]	Yes[7]
PNGS Unit 7	272,484	1101[5]	Yes	Sep 2026[6]	298,000	1211[5]	Yes[7]
PNGS Unit 8	255,284	1021[5]	Yes	Sep 2026[6]	283,000	1121[5]	Yes[7]
BNGS Unit 1	79,822	53.8	Yes	2044 (End of Service)	234,000	89.3	Yes
BNGS Unit 2	79,304	53.9	Yes	2044 (End of Service)	234,000	90.4	Yes
BNGS Unit 3	242,326	N/A	Yes	Unit undergoing refurbishment		N/A	N/A
BNGS Unit 4	242,669	106.9	Yes	2025 (Refurbishment)	251,000	110.4	Yes
BNGS Unit 5	275,368	99.1	Yes	2026 (Refurbishment)	300,000	107.4	Yes
BNGS Unit 6	2,526	N/A	Yes	Unit has been refurbished		N/A	N/A

BNGS Unit 7	268,467	98.5	Yes	2028 (Refurbishment)	300,000	108.3	Yes
BNGS Unit 8	252,555	91.9	Yes	2030 (Refurbishment)	300,000	117.0	Yes
PLNGS	77, 750	64	Yes	Unit has been refurbished			Yes

Notes:

1. For reactor units in extended operation beyond 210,000 EFPH as of January 1, 2024, the [H]eq predictions do not apply to the regions of the tubes within 75 mm of the outlet rolled joint burnish mark and within 20 mm from the inlet burnish mark and are bounding for the remainder of the pressure tube between those locations.
2. For reactor units in extended operation beyond 210,000 EFPH as of January 1, 2024, the existing fracture toughness model is valid for the entire pressure tube except for the regions within 75 mm of the outlet rolled joint burnish mark and within 20 mm from the inlet burnish mark. The validity of the model for the regions near the burnish marks is under investigation. Continued operation of pressure tubes with the potential for elevated Heq near the outlet rolled joint is based on Records of Decision DEC 21-H113 [1] and DEC 22-H100 [2]. The incremental risk of continued operation of pressure tubes with the potential for elevated Heq near the inlet burnish has been assessed to be low until at least 2025 and remains under investigation [3]. This note is applied for both of the Rev. 1 or Rev. 2 models because outside the locations near the burnish marks the Heq is bounded by model predictions.
3. The current Rev. 2 Fracture Toughness model is valid to 140ppm.
4. Target operating life which is subject to change
5. Estimates of the Peak Heq concentrations at the burnish mark are as of January 1, 2024, and the September 2026 target operating life, using conservative assumptions and existing modeling capabilities (including application of hydrogen-deuterium tracking model).
6. Key dates for Pickering Units 5-8 of September 2026 are pending license extension approval
7. For pressure tubes operating beyond 210,000 EFPH, the Heq predictions are valid outside the defined Regions of Interest near the inlet and outlet burnish marks where elevated Heq has been observed. Research activities are underway to improve Heq modelling capabilities in these regions of the pressure tubes.

References:

1. Letter, “Record of Decision DEC 21-H113 - Request for Authorization to Restart Bruce Nuclear Generating Station A Unit 4 and Bruce NGS Units 5, 7 and 8 following future outages”, Bruce Power CD No. BP-CORR-00531-02629, February 28, 2022.
2. Letter, “Record of Decision DEC 22-H100 - Request for Authorization to Restart Bruce Nuclear Generating Station A Unit 3 following future outages”, March 9, 2022.
3. Letter, M. Hornof to M. Burton, “Bruce A and B: CNSC Risk Assessment of Elevated Heq at the Inlet Rolled Joint Burnish Mark of Pressure Tubes – New Action Item 2022-07-26737”, CNSC e-Doc 6936709, Bruce Power CD No. BP-CORR-00531-03681, December 16, 2022.