



Canadian Nuclear
Safety Commission

Commission canadienne
de sûreté nucléaire

Canada

Darlington Nuclear Generating Station 2025 Licence Renewal



CNSC Staff
Presentation

Commission Hearing
March 26, 2025
CMD 25-H2.A

e-Doc 7453399 EN (pptx)
e-Doc 7484025 EN (pdf)
e-Doc 7483942 FR (pptx)
e-Doc 7484076 FR (pdf)



Acknowledgement

The CNSC acknowledges that the Darlington Nuclear Generating Station is located within the lands and waters of the **Michi Saagiig Anishinaabeg**, the **Gunshot Treaty (1787-88)**, the **Williams Treaties (1923)**, and the **Williams Treaties Settlement Agreement (2018)**.

CNSC staff continue to conduct Indigenous engagement with details to be presented during Part 2 of the hearing.



- Purpose
- Review of licence application
- Regulatory oversight
- Performance assessment
- Other matters of regulatory interest
- Proposed Licence and draft Licence Conditions Handbook
- Conclusions and recommendations
- Annex A - Errata



To present to the Commission an overview of CNSC staff's review process that led to the conclusion that:

- OPG is qualified to carry on the activity authorized by the licence
- OPG, in carrying out those activities, will make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures to implement international obligations to which Canada has agreed

Based on these conclusions, staff have made a recommendation to the Commission regarding the licence renewal application



**Current power reactor
operating licence period:**

January 1, 2016 – November 30, 2025

—

**If renewed by the Commission,
the new licence would commence on:**

December 1, 2025

—

**The proposed licence would include a
new licence condition:**

G.7 Indigenous Engagement



Darlington Nuclear Generating Station. *Source: OPG*



CNSC staff confirmed that the application:

- Satisfied the regulatory requirements and expectations outlined in the *Nuclear Safety and Control Act*, the *General Nuclear Safety and Control Regulations* and the *Class I Nuclear Facilities Regulations*
- Was complete and contained sufficient supporting information
- Established an adequate technical basis for continued operation

CNSC staff note that:

- OPG request does not encompass any changes from current licensed activities
- OPG applied for a licence term of 30 years
- OPG completed a Periodic Safety Review with results summed up in this presentation
- An Integrated Implementation Plan has been produced

OPG's application meets regulatory requirements and contained sufficient information



REVIEW OF LICENCE APPLICATION

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Review of Application

In accordance with the Act and applicable regulations, CNSC staff conducted a **completeness check** of OPG's application to verify that programs and topic areas applicable to all Safety and Control Areas had sufficient supporting information.

CNSC staff conducted a **sufficiency review** to ensure enough information was provided to conduct a technical review of the application.

Following additional information provided by OPG, CNSC staff determined that the application contained sufficient information.

CNSC staff technical experts conducted an **adequacy review** of OPG's application and determined the information provided was adequate to substantiate CNSC staff's recommendation.

OPG's application was determined by CNSC staff to be **complete, sufficient, and adequate**.



CNSC staff's review of the licence application concluded that OPG demonstrated the ability to operate safely over the proposed licence period.

In addition, CNSC licence renewal recommendation is based on 3 points:

1. OPG is a licensee with a **history of safe operation**
2. OPG has conducted a **Periodic Safety Review** that assessed their compliance with modern standards and regulations and where there are gaps, have committed to improvement initiatives
3. Indigenous Nations and communities and the public have **opportunities to engage** with the Commission on a regular basis

CNSC staff
support
OPGs
licence
renewal



REGULATORY OVERSIGHT

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CNSC conduct regular regulatory oversight through:

- Multiple inspection types (Type I, Type II, field, compliance assessments)
- Continuous surveillance and monitoring
- Scheduled and unscheduled reporting
- Performance Indicators

CNSC staff promote compliance through graduated methods:

- Notices of non-compliance, warning letters, administrative monetary penalties, etc.
- Non-compliances are tracked to completion

CNSC staff conduct regular regulatory oversight



During the current licence period, CNSC staff:

- Assessed OPG’s programs and processes
- Conducted compliance assessments and inspections of the Darlington NGS
- Spent an average of 3663 person days of effort performing regulatory oversight every year

Compliance Activities	2016	2017	2018	2019	2020	2021	2022	2023	2024 ¹
Field ² Inspections	N/A	N/A	N/A	78	49	66	79	74	37
Type II Inspections	29	29	18	17	23	19	18	13	6
Annual Effort (person days)	3483	3596	3535	4403	3497	3641	3690	3459	2650

1. Completed at time of data collection
 2. SCA focused field inspections were instituted in 2019

Additional details can be found in the Regulatory Oversight Reports posted on the [CNSC website](#)



PERFORMANCE ASSESSMENT

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Safety and Control Area (SCA) Performance

Safety and Control Areas	2016	2017	2018	2019	2020	2021	2022	2023
Management Systems	SA	SA	SA	SA	SA	SA	SA	SA
Human Performance Management	SA	SA	SA	SA	SA	SA	SA	SA
Operating Performance	FS	FS	FS	SA	SA	SA	SA	SA
Safety Analysis	FS	FS	FS	SA	SA	SA	SA	SA
Physical Design	SA	SA	SA	SA	SA	SA	SA	SA
Fitness for Service	SA	SA	SA	SA	SA	SA	SA	SA
Radiation Protection	FS	SA	SA	SA	SA	SA	SA	SA
Conventional Health and Safety	FS	FS	FS	SA	SA	SA	SA	SA
Environmental Protection	SA	SA	SA	SA	SA	SA	SA	SA
Emergency Management and Fire Protection	SA	SA	SA	SA	SA	SA	SA	SA
Waste Management	FS	FS	SA	SA	SA	SA	SA	SA
Security	SA	SA	SA	SA	SA	BE	BE	SA
Safeguards and Non-Proliferation	SA	SA	SA	SA	SA	SA	SA	SA
Packaging and Transport	SA	SA	SA	SA	SA	SA	SA	SA

FS = Fully Satisfactory
(no longer applicable as of 2019)

SA = Satisfactory

BE = Below Expectations

UA = Unacceptable

OPG's history of safe operation provides rationale for licence renewal



Review of the application found that OPG:

- Maintains operating performance processes
- Maintains a safe operating envelope in accordance with **CSA N290.15**, *Requirements for the safe operating envelope for nuclear power plants*
- Executed planned maintenance outages safely in accordance with approved processes
- Reported events as per **REGDOC-3.1.1**, *Reporting Requirements for Nuclear Power Plants*
- Completed a periodic safety review as per **REGDOC-2.3.3**, *Periodic Safety Reviews*
- Complies with **REGDOC-2.3.2**, *Accident Management, Version 2*

OPG has a clearly defined safe operating envelope



Purpose of a Periodic Safety Review (PSR):

- Comprehensive evaluation of the design, condition and operation of an NPP
- Determine reasonable and practicable improvements to enhance safety until the next PSR
- Repeated on a 10-year cycle

CNSC staff accepted the licensee's PSR and Integrated Implementation Plan (IIP).

CNSC staff report on the implementation of the IIP to the Commission during the Regulatory Oversight Report.

Four phases of conducting a PSR:



PSR is a comprehensive assessment to determine plant improvements



Examples of Integrated Implementation Plan Improvements

- Inspect the Tritium Removal Facility structures per the updated Periodic Inspection Plans
- Prepare transition plan for full implementation of CSA N285.7 at Darlington NGS
- Submission of a transition plan for Darlington NGS compliance with N285.7-21 to the CNSC
- Revise the Periodic Inspection Plans for CSA N287.7-17 compliance
- Update leakage rate documents per SCA N287.7-17
- Update post tensioning inspection specification
- Perform gap assessment for potential CCA components that are unmapped to existing commodity groups

11 of 17 IIP actions are complete



Review of the application found that OPG:

- Maintains programs to verify fitness for service of structures, systems and components important to safe operation
- Implements an integrated management program and lifecycle management plans as per **REGDOC-2.6.3, *Aging Management***
- Implements a reliability program as per **REGDOC-2.6.1, *Reliability Programs for Nuclear Power Plants***
- Implements a maintenance program as per **REGDOC-2.6.2, *Maintenance Programs for Nuclear Power Plants***
- Inspected reactor and containment structures and components in accordance with **CSA N285.4, N285.5 and N287.7 *Periodic inspection standards***

OPG satisfies fitness for service requirements



Review of the application found that OPG:

- Maintains a radiation protection program that is effective in protecting workers
- Did not exceed the regulatory dose limits

Dose Statistic (mSv)	2015	2016	2017	2018	2019	2020	2021	2022	2023
Average effective dose	1.18	1.42	3.24	2.67	1.93	1.25	3.67	2.98	2.80
Maximum effective dose	9.78	9.13	18.94	18.47	12.37	9.59	19.95	19.43	20.20

OPG implements a radiation protection program to keep radiation exposures below regulatory limits



Review of the application found that OPG:

- Maintains an environmental protection program
- Submitted an addendum to their 2020 site-wide environmental risk assessment
 - CNSC staff are currently reviewing an addendum to the 2020 ERA that provides updated data
 - Next periodic review in 2026
- Maintains an effluent and emissions monitoring program and effectively controls releases to the environment
- Minimizes potential risks from radiological and hazardous releases to the environment

CNSC staff produced an environmental protection review report:

- CNSC staff concluded that OPG meets regulatory requirements

OPG performs continuous monitoring activities related to hazardous releases to the environment



Review of the application found that OPG:

- Maintains an emergency management program as per **REGDOC-2.10.1**, Nuclear Emergency Preparedness and Response
- Maintains appropriate equipment for emergency and fire response
- Maintains an emergency and fire response plan
- Conducts drills and exercises including full scale exercises
 - Exercise Unified Control 2017
 - Exercise Unified Command 2022
- Public Address system is being modernized with work continuing into the next licence period

OPG has made adequate preparations to respond to an emergency



Review of the application found that OPG:

- Minimizes, segregates and characterizes radioactive wastes
 - This includes waste from normal operations, refurbishment and medical isotope production
- No significant changes to the management of radioactive waste is proposed for the next licensing period
- The current preliminary decommissioning plan was submitted in 2022. The next revisions is expected in 2026.

OPG maintains a waste management program



Review of the application found that OPG:

- Continues to implement corrective action plans and changes to their security program to address non-compliances that led to Below Expectations ratings in 2021 and 2022 and the findings from the Type I Reactive Inspection
 - CNSC staff continue enhanced regulatory oversight in this area
- Updated their cyber security program to comply with **CSA N290.7-14**, *Cyber security for nuclear power plants and small reactor facilities* and have provided an implementation plan to update to **N290.7-21**
- Conduct drills and exercises, including full-scale force on force exercises

OPG continues to implement corrective actions to improve their security program



CNSC staff concluded that:

- OPG demonstrated stable safety performance during the current licensing period
- OPG maintained a sufficient number of qualified staff
- Radiation doses and radiological releases are well below regulatory limits
- Safety analyses were updated and considered aging effects, as well as the impacts and hazards from the Darlington New Nuclear Project
- Major components, structures and systems remain fit for service
- OPG completed a PSR and prepared an IIP
- OPG maintains an effective emergency management program
- OPG safeguards program conforms to measures required by the CNSC to meet Canada's international obligations

OPG implements and maintains effective programs and processes which adequately provide for safe conduct of licensed activities



OTHER MATTERS OF REGULATORY INTEREST

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CNSC staff recommendation for a 30-year licence period is based on the following conclusions:

- OPG programs and processes assure safe conduct of licensed activities
- OPG demonstrated stable safety performance during the previous licensing period
- PSR will be conducted every 10 years and OPG will be required to make identified, practicable safety improvements
- OPG is required to implement the safety enhancements arising from PSR
- Refurbishment, which will be completed in 2026, and ageing management programs provide confidence in station structures, systems, and components fitness for service`

**OPG must seek Commission approval
for change to licensed activities or conditions**



CNSC staff recommendation for licence period is based on the following conclusions:

- Multiple opportunities for CNSC staff to provide updates to the Commission on emerging issues
- CNSC's mature and agile regulatory oversight that allows for effective compliance verification and enforcement regardless of licence period
- CNSC staff commitment to maintain ongoing engagement and consultation with Indigenous Nations and communities and the public
- Ability of Indigenous Nations and communities and the public to bring concerns to CNSC staff at any time

The CNSC welcomes concerns from interested parties at any time



The Commission can
**amend, suspend,
and/or revoke** a licence
at any time.

CNSC staff routinely report to the Commission through:

- Regulatory Oversight Reports for the Nuclear Power Generating Sites
- Status Reports on Power Reactors
- Event Initial Reports



OPG is required to maintain financial guarantees for decommissioning activities described in the preliminary decommissioning plan for Darlington NGS.

- OPG reports annually on the status of its financial guarantee
- At a minimum of every 5 years, OPG is required to revise the financial guarantee to ensure it remains adequate to meet the decommissioning needs according to the PDP
- CNSC staff assessed OPG's 2022 financial guarantee proposal for the 5-year review period and determined that it met the guidance in CNSC **REGDOC-3.3.1**, *Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities*
 - OPG's financial guarantee requirement was \$20.480 billion
 - OPG's financial guarantee had a market value of \$23.998 billion

The proposed FG is adequate for the future decommissioning of Darlington NGS



- The Public Information and Disclosure Program (PIDP) provides guidance on how information related to health, safety, security of persons and the environment is communicated to the public
- CNSC staff reviewed OPG's PIDP through compliance activities and confirmed that it meets the requirements of **REGDOC-3.2.1**, Public Information and Disclosure
 - It sets clear goals and objectives for information dissemination
 - It ensures public availability of information
 - It provides information on facility operations, health and safety, and environmental monitoring

OPG's Public Information and Disclosure Program
meets regulatory requirements



PROPOSED LICENCE AND DRAFT LCH

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Proposed Power Reactor Operating Licence (PROL):

- Describes the licensed activities
- Sets the licence conditions
- Contains standard licence conditions (LCs)
 - Several amended
- Contains one new licence condition
 - G.7 The licensee shall implement and maintain and Indigenous engagement program



Draft Licence Conditions Handbook (LCH):

- Describes compliance verification criteria (CVC) for each LC
- Identifies CNSC regulatory documents and standards
- Provides guidance
- Will be updated as needed
- New licence condition G.7: Introduces requirements on reporting engagement activities to the CNSC



CONCLUSIONS AND RECOMMENDATIONS

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With respect to subsection 24(4) of the NSCA, CNSC staff find that:



OPG is qualified to carry out the activities authorized by the licence.



OPG, in carrying out those activities, will make adequate provisions for protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.



CNSC staff recommend that the Commission:

- Exercise its authority under the NSCA to **renew the licence**, as provided in Part 2 of CMD 25-H2, to authorize OPG to continue to operate the Darlington NGS until November 30, 2055.
- **Delegate the authority** to CNSC staff for a “person authorized by the Commission” as indicated in three licence conditions:
 - Licence condition 3.2 - Restart after a serious process failure
 - Licence condition 15.4 – Removal of regulatory hold points



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- Various minor errors are listed in **Annex A** of this presentation
- Inaccuracies are administrative in nature and **do not impact** CNSC staff's conclusions on safety performance at the sites
- **This presentation reflects the corrected information**



- Page 20 – Section 2.8
 - Revoke or suspend a licence should be revoke or suspend
- Page 24 – Section 3.1.4
 - Safety culture self-assessments are required every 5 years, not every 3 years
- Page 63
 - CMD stated that there have been no lost-time injuries since 2018, however there was one in 2019.
- Page 68 – Section 3.9.4
 - OPG did report 13 ECA non-compliances during the 2016-2023 period



- Page 68 – Section 3.9.4
 - There were 7 ozone depleting substance releases, not 6