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Safety Commission

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de sûreté nucléaire

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STATUS REPORT ON POWER REACTORS

RAPPORT D'ÉTAPE SUR LES CENTRALES NUCLÉAIRES

This document summarized the status of
the Power Reactor Facilities as of January
7, 2025.

Ce rapport résume le rapport d'étape sur
les centrales nucléaires en date du 7
janvier 2025.

Signed on / Signé le

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1. Power Reactors Status as of January 7, 2025

1.1 Bruce A and B

Operational Status
Unit 1 is at Full Power
Unit 2 is at Full Power
Unit 3 is Shut Down for Major Component Replacement (MCR)
Unit 4 is at Full Power
Unit 5 is at Full Power
Unit 6 is at Full Power
Unit 7 is at Full Power
Unit 8 is at Full Power
Licensing
Power Reactor Operating Licence expires on September 30, 2028.
Comments
<p>Unit 3 Major Component Replacement (MCR) started in March 2023.</p> <ul style="list-style-type: none"> • Refurbishment project is on schedule. • Bruce Power has completed Calandria Tube Sheet Bore (CTSB) inspection and are now preparing for installation of Calandria Tubes and Calandria Tube Inserts. • Steam Generator Replacement lifts are in progress. <p>Bruce Power is expected to submit the formal request to release the regulatory hold point to allow fuel load in December 2025</p> <p>Unit 4 Major Component Replacement is scheduled to begin on February 1, 2025.</p> <ul style="list-style-type: none"> • Initial work will include defueling the reactor, performing a chemical decontamination of the primary heat transport (PHT) system to reduce radiation exposure to workers, draining and drying the PHT and moderator systems, and installing bulkheads to isolate Unit 4 from containment.
Event Notifications and Updates
<p>CNSC staff are monitoring OPG and Bruce Power’s progress in regards to the neutron exposure event and expect an update to staff’s GNSCR 12(2) request by January 31, 2025. CNSC staff will provide an update to the Commission during the next status update, following review of OPG and Bruce Power’s submission.</p>
Actions from previous Commission meetings
<ol style="list-style-type: none"> 1. The Commission directed CNSC staff to track on-going work on hydrogen equivalent concentration (Heq) research and development (R&D) in a Record of Decision (DEC 23-H103) issued on October 13, 2023. The progress update is provided in Section 1.5 of this report.

2. As part of the November 7, 2024 Commission Meeting, under agenda item *Updates on items from previous Commission meetings*, CNSC staff and Bruce Power provided responses, in CMD 24-M41 and CMD 24-M41.1, respectively, to the recommendations from Nuclear Transparency Project’s Written Intervention. During the question period for this item, an action came from the Commission to confirm the timing for Bruce Power’s implementation of REGDOC-3.1.1, Version 3, and the expectation for effluent and emissions data to be available in machine-readable format. In a letter to CNSC staff dated October 31, 2024, Bruce Power indicated that they would implement REGDOC-3.1.1, Version 3, by January 1, 2025. REGDOC-3.1.1, Version 3 requires licensees to submit their effluent data in a machine-readable format as part of quarterly safety performance indicator (SPI) reports. Bruce Power confirmed that they have now implemented REGDOC-3.1.1, Version 3.

1.2 Darlington

Operational Status
Unit 1 is at Full Power
Unit 2 is at Full Power
Unit 3 is at Full Power
Unit 4 is Shut Down for Refurbishment
Licensing
Power Reactor Operating Licence expires on November 30, 2025 <ul style="list-style-type: none"> • OPG submitted a licence renewal application on May 31, 2024 • Commission hearing (Part 1) will be March 26, 2025 with the public hearing (Part 2) taking place June 24-26
Comments
Unit 1 returned to commercial operations on November 27, 2024
Unit 4 refurbishment started in July 2023. <ul style="list-style-type: none"> • Calandria tube installation is in progress. • Regulatory Hold Point 1 (approval to load fuel) is anticipated for August 23, 2025.
Event Notifications and Updates
As reported on November 7, 2024 as part of CMD 24-M40, Unit 1 experienced a Shutdown System 1 and 2 trip due to low boiler level on October 24 2024. CNSC staff were satisfied with the corrective actions taken so far by OPG. CNSC staff are monitoring the event response and will review the detailed event report when it is submitted on February 28, 2025.
On January 1, 2025 CNSC staff was notified of a leak of approximately 11,000 L of lube oil into Lake Ontario. On January 2, CNSC staff accompanied Environment and Climate Change Canada (ECCC) on a field walkdown to collect samples of the oil that was discharged. OPG are assessing repair options and performing an extent of condition assessment, which will be

<p>submitted along with the detailed event report within 60 days of the event being reported. CNSC staff continue to monitor the situation and will interface with ECCC as necessary.</p> <p>CNSC staff are monitoring OPG and Bruce Power’s progress in regards to the neutron exposure event and expect an update to staff’s GNSCR 12(2) request by January 31, 2025. CNSC staff will provide an update to the Commission during the next status update, following review of OPG and Bruce Power’s submission.</p>
<p>Actions from previous Commission meetings</p>
<p>None</p>

1.3 Pickering

<p>Operational Status</p>
<p>Unit 1 is shut down for Safe Storage</p>
<p>Unit 2 is in a Safe Storage State</p>
<p>Unit 3 is in a Safe Storage State</p>
<p>Unit 4 is shut down for Safe Storage</p>
<p>Unit 5 is at Full Power</p>
<p>Unit 6 is at Full Power</p>
<p>Unit 7 is at Full Power</p>
<p>Unit 8 is at Full Power</p>
<p>Licensing</p>
<p>On December 17, 2024, the Commission issued a Detailed Record of Decision to amend the Power Reactor Operating Licence (PROL) to authorize OPG to continue to operate Units 5-8 until December 31, 2026, up to a maximum of 305,000 equivalent full power hours. The amended PROL expires on August 31, 2028.</p>
<p>Comments</p>
<p>Unit 1 was shut down on October 01, 2024, and is transitioning to safe storage. Defueling is expected to be completed by February 2025.</p> <p>Unit 4 was shut down on December 31, 2024, and is transitioning to safe storage. Defueling is expected to be completed by May 2025.</p>
<p>Event Notifications and Updates</p>
<p>None</p>
<p>Actions from previous Commission meetings</p>
<p>None</p>

1.4 Point Lepreau

<p>Operational Status</p>
<p>The reactor has returned to service following an extended outage to fix the generator stator and is now at Full Power.</p>

Licensing
Power Reactor Operating Licence expires on June 30, 2032
Comments
New CNSC Regulatory Program Director for PLNGS has been appointed.
Event Notifications and Updates
None
Actions from previous Commission meetings
None

1.5 Other

CNSC staff assessment of progress on hydrogen equivalent concentration (Heq) research and development (R&D) program commitments by Bruce Power and OPG

In [DEC 23-H103](#), the Commission directed “CNSC staff to provide updates on Bruce Power’s progress in its research and development (R&D) activities through the regular Status Report on Power Reactors, which is presented at each public Commission Meeting. CNSC staff shall develop a consolidated table to track and communicate the ongoing work to the Commission through the aforementioned Status Report on Power Reactors”.

Although the Commission’s direction was to report specifically on Bruce Power’s progress on its R&D activities, CNSC staff note that the Heq-related R&D program is conducted jointly between Bruce Power and OPG.

R&D plans from OPG and Bruce Power were presented to the Commission during a [Meeting](#) held on November 1-3, 2022 ([CMD 22-M37.1](#) and in [CMD 22-M37.3](#), respectively).

CNSC staff’s review of the fourth semi-annual update provided by industry is ongoing, and the results of this review will be presented to the Commission at a future status update.

Progress against the original completion dates provided in the R&D plans summarized in [CMD 24-M40](#), presented during a Commission Meeting held on November 7, 2024 and reproduced in the table below, continues to be acceptable. Delays from originally planned completion dates are due to scope increases and scheduling adjustments. CNSC staff are satisfied that these delays do not impact the current safety case for reactor operation and are not likely to impact the overall project deliverable.

R&D Activity	Planned Completion Date (from CMD 22-M37.1 and 22-M37.3)	Updated Status of R&D Activities
Update finite element software to simulate outlet rolled joint Heq evolution	Fall 2023	Software has been updated. Verification and validation activities are underway with a TCD of Fall 2025

R&D Activity	Planned Completion Date (from CMD 22-M37.1 and 22-M37.3)	Updated Status of R&D Activities
Develop finite element software to simulate inlet rolled joint Heq evolution	Fall 2023	Software has been developed. Verification and validation activities are underway with a TCD of Fall 2025
Perform evaluation to assess the potential impact of the high levels of Heq on flaws at the inside surface of pressure tubes near the inlet region of interest	Fall 2023	Preliminary work was completed. Sensitivity studies for key input parameters are underway
Improve characterization of 'blip' and expected evolution of the inlet region of elevated Heq with continued operation	Spring 2024	Original work scope has been completed and additional work added with TCD of Fall 2024 (on schedule)
Confirm the potential roles of hydrogen isotope ingress and redistribution on the development of the inlet regions of elevated Heq	Summer 2023	Original work scope has been completed. Sensitivity studies are underway
Improve characterization of solubility behaviour of hydrogen isotopes in tubes with elevated Heq	Winter 2024	Work has been completed
Enhance modeling of temperature distributions near the outlet rolled joint region of pressure tubes	Summer 2023	Work has been completed
Define input parameters required for interim updates to the Heq model	Summer 2023	Work has been completed
Develop interim Heq model	Fall 2024	Progressing as planned
Validation activities for the interim Heq model to support development of final comprehensive model	Fall 2025	Progressing as planned

R&D Activity	Planned Completion Date (from CMD 22-M37.1 and 22-M37.3)	Updated Status of R&D Activities
Define input parameters required for the final comprehensive Heq model	Summer 2025	Progressing as planned
Define the relative importance of variables influential to Heq evolution	Fall 2025	Progressing as planned
Develop the final comprehensive Heq model	Winter 2026	Progressing as planned
Complete hydride related crack initiation experiments for unirradiated material at Heq of 220 ppm or higher	Fall 2024	Bruce Power and OPG have revised the completion date to Spring 2025
Complete fatigue crack initiation experiments for unirradiated material at Heq of 220 ppm or higher	Fall 2024	Bruce Power and OPG have revised the completion date to Spring 2025
Complete crack initiation experiments for irradiated material with elevated Heq without flaws present	Fall 2024	Bruce Power and OPG have revised the completion date to Spring 2025
Complete crack initiation and crack growth experiments for irradiated material with elevated Heq with flaws present	Fall 2024	Bruce Power and OPG have increased the scope of this activity. Completion date has been revised to Spring 2025

The next semi-annual R&D update is expected from Bruce Power and OPG in March 2025.