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Safety Commission

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## **STATUS REPORT ON POWER REACTORS**

## **RAPPORT D'ÉTAPE SUR LES CENTRALES NUCLÉAIRES**

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This document summarized the status of  
the Power Reactor Facilities as of  
September 9, 2025.

Ce rapport résume le rapport d'étape sur  
les centrales nucléaires en date du 9  
septembre 2025.

Signed on / Signé le  
**19-Sep-2025**

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## 1. Power Reactors Status as of September 9, 2025

### 1.1 Bruce A and B

<b>Operational Status</b>
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 Shut Down for Major Component Replacement (MCR)
Unit 5 is Shut Down for a Forced Outage
Unit 6 is at Full Power
Unit 7 is at Full Power
Unit 8 is at Full Power
<b>Licensing</b>
Power Reactor Operating Licence expires on September 30, 2028.
<b>Comments</b>
<p>The Unit 3 MCR Project started in March 2023 and remains on schedule.</p> <ul style="list-style-type: none"> <li>Fuel channel installation is complete.</li> <li>The Moderator system refill is in progress.</li> <li>The reactor bridge re-installation is in progress to facilitate lower feeder installation.</li> <li>Fuel load is scheduled for January 2026.</li> <li>CNSC staff are performing verification activities to confirm adequate completion of pre-requisites for releasing regulatory hold points established by the Commission.</li> </ul> <p>The Unit 4 MCR Project started in February 2025 and remains on schedule.</p> <ul style="list-style-type: none"> <li>Bulkheads have been installed to isolate Unit 4 from containment.</li> <li>The primary heat transport system drain and dry is complete.</li> <li>The moderator system drain and dry is in progress.</li> <li>Feeder removal is in progress.</li> </ul>
<b>Event Notifications and Updates</b>
<p>Bruce Power encountered several worker injuries during MCR4:</p> <ul style="list-style-type: none"> <li>A worker's fingers were caught on rotating equipment when moving a fan</li> <li>A worker's fingers were crushed when they reached out to stop an airlock door from closing</li> <li>A worker tripped on an air hose in the vault and pinched their fingers between a removed section of a feeder tube and the waste bin</li> </ul> <p>As a result of these concerns, CNSC staff issued a warning letter to Bruce Power to require that effective corrective actions are implemented to improve worker safety.</p> <p>On June 27, 2025, Unit 1 experienced a turbine trip and automatic reactor stepback and setback due to a degraded relay on the generator excitation system. Bruce Power replaced</p>

the relay and is performing an extent of condition at both Bruce A and Bruce B units. Unit 1 was returned to service on July 3, 2025.

On July 9, 2025, Unit 8 was taken offline to repair an open feeder cabinet insulation panel which was causing a localized, elevated temperature level in the vault. Bruce Power repaired the feeder cabinet insulation panel, restored a normal vault temperature and returned the unit to service on July 11, 2025.

On July 25, 2025, Unit 7 was taken offline due to indications of acetylene in the Main Output Transformer (MOT) red phase. Bruce Power is currently conducting an investigation to determine the cause of the increase in acetylene. The MOT was replaced with a spare and the unit was returned to service on August 5, 2025.

On September 7, 2025, Unit 5 was taken offline to repair an increasing instrument line leak on the heat transport system. Bruce Power performed a leak search followed by repairs to stop the leak. The unit was returned to service on September 12, 2025.

CNSC staff maintained regulatory oversight throughout the outages as part of routine surveillance and monitoring activities, including reviewing the REGDOC 3.1.1 reports.

#### Actions from previous Commission meetings

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 1.6 of this report.

## 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"> <li>OPG submitted a licence renewal application on May 31, 2024</li> <li>Commission hearing (Part 1) was held on March 26, 2025, while (Part 2) took place on June 24-26, 2025. Awaiting Commission's Record of Decision.</li> </ul>
Comments
Unit 4 refurbishment started in July 2023.
<ul style="list-style-type: none"> <li>Re-tube tooling platform bridge removal is underway</li> <li>Shield plug installation is complete</li> <li>Fuel load is complete</li> <li>Regulatory Hold Point 1 has been removed on August 28</li> </ul>

<ul style="list-style-type: none"> <li>Regulatory Hold Point 2 (approval to remove GSS) is anticipated for December 10, 2025.</li> </ul>
<b>Event Notifications and Updates</b>
<p>On July 29, 2025, OPG notified the CNSC Duty Officer of three misplaced fission detectors that were used for refurbishment start-up activities. These detectors are essential for neutronic monitoring when the reactor operates at very low power levels, and standard monitoring is unavailable due to off-scale low indications. The detectors were misplaced following the completion of U1 refurbishment activities. OPG implemented search efforts within the Darlington Nuclear Generating Station (DNGS) as well as associated waste facilities. On August 11, 2025, the fission detectors were located at the Western Clean Energy Sorting &amp; Recycling Facility in Tiverton, Ontario. The missing fission detectors were shipped back to DNGS on August 14, 2025 to ensure that they're being properly tracked through the waste streams. CNSC staff followed up with OPG for additional information and conducted on-site field activities as part of the event review. Once OPG completes its root cause investigation, CNSC staff will review the corrective actions to ensure appropriate measures are implemented to prevent future reoccurrence.</p>
<b>Actions from previous Commission meetings</b>
None

### 1.3 Pickering

<b>Operational Status</b>
Unit 1 is shut down and transitioning to Safe Storage
Unit 2 is in a Safe Storage State
Unit 3 is in a Safe Storage State
Unit 4 is shut down and transitioning to Safe Storage
Unit 5 is at Full Power
Unit 6 is at Full Power
Unit 7 is at Full Power
Unit 8 is at Full Power
<b>Licensing</b>
<p>Power Reactor Operating Licence expires on August 31, 2028. OPG is authorized to operate Units 5-8 until December 31, 2026, up to a maximum of 305,000 equivalent full power hours.</p> <p>On June 27, 2025, OPG submitted a licence renewal application to authorize the refurbishment of Units 5-8 and renew the Power Reactor Operating Licence and Pickering Waste Management Facility Operating Licence for a 10-year term. As part of its application, OPG is seeking to consolidate the licensed activities of the separate licences into a single Pickering Power Reactor Operating Licence.</p>
<b>Comments</b>
Units 1 and 4 are defueled with dewatering activities in progress.

Unit 6 will shut down for a planned maintenance outage on September 18, 2025.
<b>Event Notifications and Updates</b>
On July 19, while performing routine maintenance activities on Unit 6, OPG staff removed an incorrect fuse that removed power to the quadrant 2 boiler level controller causing the associated boiler control level valves to fail closed resulting in an automatic reactor trip. OPG's investigation revealed that contributing factors to the event included inadequate correct component verification as well as OPEX of similar events not being covered in the pre-job brief. Upon completion of OPG's investigation, Unit 6 was returned to service on July 23. CNSC staff initiated a reactive field inspection as a result of this event to verify the implementation of OPG's corrective actions to prevent recurrence. CNSC staff are satisfied with the implementation of the corrective actions taken.
<b>Actions from previous Commission meetings</b>
None

#### 1.4 Point Lepreau

<b>Operational Status</b>
The Unit is shut down for a Planned Outage
<b>Licensing</b>
Power Reactor Operating Licence expires on June 30, 2032
<b>Comments</b>
The unit was shutdown on July 14, 2025, for a planned maintenance outage. The targeted synchronization date is December 1, 2025.
<b>Event Notifications and Updates</b>
None
<b>Actions from previous Commission meetings</b>
None

#### 1.5 Darlington New Nuclear Project

<b>Construction Status – DNNP-1</b>
Major construction initiatives in progress: <ul style="list-style-type: none"> <li>• Excavation of vertical shaft for Condenser Cooling Water Intake tunnel</li> <li>• Preparation of the Tunnel Boring Machine (TBM) for tunnelling of the Condenser Cooling Water (CCW) system</li> <li>• Excavation for the Reactor Building</li> <li>• Installation of pile ("caisson") foundations for the Turbine, Radwaste, and Control Buildings</li> </ul>

Licensing
<p>Power Reactor Construction Licence issued on April 04, 2025, expires on March 31, 2035. OPG is authorized to construct a single BWRX-300 reactor and any supporting infrastructure for up to three (3) additional reactors. LCH revision 0 was issued on April 14, 2025.</p> <p>Summary status of the DNNP and OPG's progress toward each regulatory hold point:</p> <ul style="list-style-type: none"> <li>· RHP-1: Installation of the Reactor Building (RB) Foundation <ul style="list-style-type: none"> <li>Changes to RHP1 commitments: <ul style="list-style-type: none"> <li>• Commitment 5.2.5.1A "<i>OPG to provide updated information regarding the BWRX-300 Alternate Approach to the Means of Shutdown</i>" has been deferred to RHP-2. This has reduced the number of commitments associated with RHP-1 to 23, from the previously reported 24.</li> </ul> </li> <li>Status: 18 open, 6 closed, 23 total</li> </ul> </li> <li>· RHP-2: Installation of the Reactor Pressure Vessel (RPV) <ul style="list-style-type: none"> <li>Changes to RHP2 commitments: None</li> <li>Status: 23 open, 0 closed, 23 total</li> </ul> </li> <li>· RHP-3: Fuel-Out Commissioning <ul style="list-style-type: none"> <li>Changes to RHP3 commitments: None</li> <li>Status: 7 open, 0 closed, 7 total</li> </ul> </li> </ul>
Comments
None
Event Notifications and Updates
<p>Two separate incidents occurred at the DNNP site on July 14 and July 24, 2025, each involving a contractor worker who sustained injuries. The details of these incidents have been reported to the Commission in a separate CMD (25-M36).</p> <p>Work on the excavation of vertical shafts for the Condenser Cooling Water (CCW) and the Reactor Building has resumed, after the completion of investigations from the Ontario MLTSD and OPG contractor AECON following the worker injuries. OPG is preparing for the commencement of rock splitting in the Reactor Building excavation - starting on September 15, 2025.</p>
Actions from previous Commission meetings
None

## 1.6 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).

Since CNSC staff's last update to the Commission in [CMD 25-M23](#), industry has provided their fifth semi-annual update. CNSC staff's review of this latest update 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 25-M23](#), presented during a Commission Meeting held on June 3, 2025 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
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 with a TCD of Fall 2025
Improve characterization of 'blip' and expected evolution of the inlet region of elevated Heq with continued operation	Spring 2024	Work has been completed

<b>R&amp;D Activity</b>	<b>Planned Completion Date (from CMD 22-M37.1 and 22-M37.3)</b>	<b>Updated Status of R&amp;D Activities</b>
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 with a TCD of Summer 2025
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	Work has been completed
Validation activities for the interim Heq model to support development of final comprehensive model	Fall 2025	Progressing as planned
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



<b>R&amp;D Activity</b>	<b>Planned Completion Date (from CMD 22-M37.1 and 22-M37.3)</b>	<b>Updated Status of R&amp;D Activities</b>
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 final semi-annual R&D update is expected from Bruce Power and OPG in September 2025.