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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 October 18, 2024.

Ce rapport résume le rapport d'étape sur les centrales nucléaires en date du 18 octobre 2024.

Signed on / Signé le
2024-10-30

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Canada

1. Power Reactors Status as of October 18, 2024

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
Unit 3 Major Component Replacement (MCR) started in March 2023. • Refurbishment project is on schedule • Bruce Power is expected to submit the formal request to release the regulatory hold point to allow fuel load in December 2025
Event Notifications and Updates
None
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 1.5 of this report.

1.2 Darlington

Operational Status
Unit 1 is Shut Down for Refurbishment
Unit 2 is Shut Down for a Forced Outage
Unit 3 is at Full Power
Unit 4 is Shut Down for Refurbishment
Licensing
Power Reactor Operating Licence expires on November 30, 2025
Comments
Unit 1 refurbishment started in February 2022. • Refurbishment project is on schedule. • RHP-3 was released on October 10, 2024. • RHP-4 is forecasted for November 3, 2024.

Unit 2 was shut down on October 10, 2024, for a Forced Outage due to a turbine trip from loss of excitation. Unit 4 refurbishment started in July 2023. • Refurbishment project is on schedule • Critical path is bellows inspection • OPG is expected to submit the formal request to release the regulatory hold point to allow new fuel load (RHP-1) on August 20, 2025
Event Notifications and Updates
None
Actions from previous Commission meetings
None

1.3 Pickering

Operational Status
Unit 1 is shut down for Safe Storage
Unit 2 is in a Safe Storage State
Unit 3 is in a Safe Storage State
Unit 4 is at Full Power
Unit 5 is shut down for a Planned Outage
Unit 6 is at Full Power
Unit 7 is at Full Power
Unit 8 is at Full Power
Licensing
The Commission issued a Summary Record of Decision and amended 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.
Comments
Unit 1 was shut down on October 01, 2024, and is transitioning to safe storage. The projected end stating for Unit 1 safe storage is June 13, 2026. Unit 5 was shut down on September 06, 2024, for a planned maintenance outage. The projected synchronization date is set for November 27, 2024.
Event Notifications and Updates
None
Actions from previous Commission meetings
None

1.4 Point Lepreau

Operational Status
The Unit is Shut Down for Planned Outage
Licensing
Power Reactor Operating Licence expires on June 30, 2032
Comments
The unit was shutdown on April 06, 2024, for a planned maintenance outage. The maintenance outage was planned to last 100 days. During start-up, a ground fault was identified on the generator and NB Power is taking steps to address this issue. The outage is expected to last until mid-December.
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 can be found in CMD 22-M37.1 and in CMD 22-M37.3, respectively.

Since the last update provided to the Commission in CMD 24-M31, CNSC staff have received the fourth semi-annual update provided by industry. 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 24-M31 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 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
Develop finite element software to simulate inlet rolled joint Heq evolution	Fall 2023	Software has been developed. Verification and validation activities are underway
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	Progressing as planned
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	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
development of final comprehensive model		
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.