



Canadian Nuclear
Safety Commission

Commission canadienne
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 August 21,
2024.

Ce rapport résume le rapport d'étape sur les
centrales nucléaires en date du 21 août
2024.

Signed on / Signé le
2024-08-30

Alexandre Viktorov, Ph. D.
Director General, Directorate of Power Reactor Regulation
Directeur général, Direction de la réglementation des centrales nucléaires

1. Power Reactors Status as of May 02, 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
<p>Unit 3 Major Component Replacement (MCR) started in March 2023.</p> <ul style="list-style-type: none"> • Refurbishment project is on schedule. • Calandria tube removal is complete; inspections of reactor components and calandria vessel, and preparation for the installation of new calandria tubes have commenced. • 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>On August 21, 2024, a Bruce Power employee suffered an injury, a broken bone in their arm, while performing waste handling activities at Bruce A. A second employee manually moved some storage bins, causing the first employee’s arm to get caught between two of the bins. The employee received medical attention and returned to work later in the day with the arm in a cast. Bruce Power met with the Ministry of Labour on this event, and are developing corrective actions to prevent recurrence. A preliminary event report will be submitted to the CNSC as per REGDOC-3.1.1.</p>
Event Notifications and Updates
<p>On June 12, 2024, Bruce Power and OPG submitted <i>CNSC Event Report: Neutron Dose Measured From Retube Waste Container</i>. A detailed update of this event is included in an Event Initial Report (EIR) prepared by CNSC staff, a separate agenda item at this Commission Meeting.</p>
Actions from previous Commission meetings
<p>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.</p>

1.2 Darlington

Operational Status
Unit 1 is Shut Down for Refurbishment
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
Comments
<p>Unit 1 refurbishment started in February 2022.</p> <ul style="list-style-type: none"> • Refurbishment project is on schedule. • RHP-1 (authorisation for new fuel load) was on April 29, 2024. • RHP-2 (authorisation to approach to critical) is currently expected to be on September 08, 2024. <p>Unit 4 refurbishment started in July 2023.</p> <ul style="list-style-type: none"> • Refurbishment project is on schedule. • Critical path is Pressure Tube/Calandria Tube removal. • OPG is expected to submit the formal request to release the regulatory hold point to allow new fuel load (RHP-1) in June 2025.
Event Notifications and Updates
Update provided in Bruce A and B section and a detailed update of this event is included in an industry-wide Event Initial Report (EIR) prepared by CNSC staff, a separate agenda item at this Commission Meeting.
Actions from previous Commission meetings
None

1.3 Pickering

Operational Status
Unit 1 is at Full Power
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 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 August 31, 2028. OPG requires Commission approval to operate PNGS beyond December 31, 2024. A public hearing to consider OPG’s request to operate Units 5-8 to December 2026 was held in June 2024.
Comments
None
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-November.
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-M15](#), CNSC staff have completed a detailed review of the second and third semi-annual updates provided by industry. Overall, CNSC staff are satisfied with progress being made. CNSC staff confirm that progress against the original completion dates provided in the R&D plans summarized in [CMD 24-M15](#) and reproduced in the table below continues to be acceptable.

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	Summer 2023	Work has been completed

R&D Activity	Planned Completion Date (from CMD 22-M37.1 and 22-M37.3)	Updated Status of R&D Activities
model		
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
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 September 2024.



MEMORANDUM

NOTE DE SERVICE

To
A Canadian Nuclear Safety Commission Registry

Security Classification - Classification de sécurité

UNCLASSIFIED

Our File – Notre référence :

e-Doc #7342032

Fully releasable ATIP - Entièrement publiable AIPRP :

Yes/Oui

2024-08-26

From
De X A. Viktorov

Alexandre Viktorov

Director General, DPRR

Signed by: Viktorov, Alexandre

Subject
Objet CNSC Update on Commission Action 32386 On-Site Presence of CNSC Staff at Nuclear Power Plant “NPP” Sites

ISSUE

During the February 21, 2024 presentation of Version 3 of REGDOC-3.1.1 for Commission approval, Acting President Berube asked industry representatives for their perspective on potential burden from the new version of REGDOC-3.1.1 reporting. Industry representatives indicated there were no significant concerns with the revised reporting requirements; however, there were apprehensions that Canadian Nuclear Safety Commission (CNSC) staff may in the future rely more on reports rather than information collected in site visits. Bruce Power representative referred to a discussion held between industry and CNSC senior management the week prior to the meeting, in which CNSC management took an action to look into CNSC staff presence on NPP sites.

Commission Action 32386 was placed on CNSC staff to provide the Commission with an update on any recommendations that may arise from discussions with the licensees regarding an increase in on-site presence of CNSC staff. This memorandum serves as the update on this matter.

DISCUSSION

CNSC staff would like to assure the Commission that scheduled reporting is not intended to replace or reduce site presence, be it inspectors or specialists. The information gathered from scheduled and unscheduled reporting in accordance with



REGDOC-3.1.1 is one of several inputs used to inform CNSC compliance verification activities. Reported data is not to be used to reduce on-site presence of CNSC staff, but to risk-inform the compliance activities.

Following the February 2024 Commission meeting, CNSC staff met with representatives from power reactor licensees and confirmed that their comments were related not to the number of inspections or inspectors’ presence on sites but rather to specialist site visits and in-person interactions with licensees’ counterparts.

During the COVID-19 pandemic, presence of Directorate of Power Reactor Regulation (DPRR) inspectors on site was paused for a brief period of approximately 6 weeks in spring 2020. Once adequate COVID-19 protective measures were put in place, CNSC inspections were resumed with inspectors physically present at sites while supported remotely by specialists. Lately, regulatory oversight mostly returned to in-person participation of specialists, at the same time benefitting from remote connectivity where appropriate. As all CNSC staff, site inspectors also take advantage of the hybrid work model, and work remotely when this provides efficiency in accomplishing their tasks (for example, documenting outcomes of their inspections in reports and databases).

DPRR management is aligned with industry that there is significant value in maintaining CNSC staff familiarity with NPP design and their operation, as well as building working relationships with the licensees’ personnel. This is particularly true for the new regulatory staff who may have had limited previous familiarity with the nuclear facilities. These visits provide a more in-depth understanding of the operation of sites, of the conditions at site, and activities and capabilities and of licensees’ staff. This contributes to clarity, efficiency and effectiveness of regulatory activities.

CONCLUSION AND RECOMMENDATION

CNSC management will maintain staff physical presence at sites as required for efficient delivery of the regulatory mandate. Oversight activities will continue to include provisions for technical specialist visits to sites and in-person engagement with the licensees’ personnel.

Acknowledgement of concurrence with Director General decision:

I approve

I do not approve

8/26/2024

X Ramzi Jammal

X

Ramzi Jammal
Executive Vice-President and CROO
Signed by: Jammal, Ramzi

Ramzi Jammal
Executive Vice-President and CROO

Prepared by: Kimberly Hazelton, Director, PRLCID