Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

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Status Report on Power Reactors

Commission Meeting
August 22, 2018

This document summarizes the status of the Power Reactor facilities as of August 14, 2018.

Rapport d'étape sur les centrales nucléaires

Réunion de la Commission
Le 22 aout 2018

Ce rapport résume le rapport d'étape sur les centrales nucléaires en date du 14 aout 2018.

Signed on / Signé le
2018-08-14

Gerry Frappier, P.Eng.
Director General, Directorate of Power Reactor Regulation
Directeur général, Direction de la réglementation des centrales nucléaires

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1. Power Reactors Status as of August 14, 2018

1.1 Bruce A and B

Operational Status
Unit 1 is in Guaranteed Shutdown State
Unit 2 is at Full Power
Unit 3 is at Full Power
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 May 31, 2020. Part 2 of the relicensing Commission Hearing took place May 28-31, 2018.
Comments
Unit 1 is in Guaranteed Shutdown State since July 25th after a turbine trip occurred as a result of an issue with one of the phases of the Main Output Transformer. The investigation into the cause and a determination of the path forward is underway.
Event Notifications and Updates
None
Actions from previous Commission meetings
None

1.2 Darlington

Operational Status
Unit 1 is at Full Power
Unit 2 is Shutdown for Refurbishment
Unit 3 is at Full Power
Unit 4 is at 30% of Full Power
Licensing
Power Reactor Operating Licence expires on November 30, 2025.
Comments
Unit 2 Unit 2 Calandria tube install series is now the focus. Insertion is complete on 88 of 480 tubes. Installation of Calandria tubes is estimated to be completed October 16, 2018. On August 2, 2018, OPG transitioned out of mandatory respiratory protection use in the Unit 2 vault for Calandria tube installation. See attached briefing note (e-Doc 5608548) for update on the internal contamination event. On August 3, 2018 OPG informed CNSC staff that they had received a work refusal from a refurbishment contract worker. The concerns raised by the worker were related to recent changes to radiological respiratory protection requirements in the Unit 2 vault. The work refusal was reported to the Ministry of

Labour (MOL) and subsequently a field visit was conducted by an MOL inspector. The MOL inspector determined that the worker's concerns, which led to the work refusal, are unlikely to endanger workers. An option to wear respiratory protection (1/2 face mask) and use of a neck microphone to ease communication have been provided. The MOL investigation was concluded and the work refusal was terminated. Unit 4 On Saturday August 11 2018, Unit 4 experienced an unplanned shut down due to a computer power supply failure. All processes acted as expected, repairs were completed, and the unit is being returned to service.
Event Notifications and Updates
Update – Event Initial Report CMD 18-M14 – Darlington Refurbishment – Retube Waste Processing Building – Internal Contamination Event. Please refer to e-Doc 5608548 - Attached
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 83% of Full Power
Unit 5 is at Full Power
Unit 6 is at Full Power
Unit 7 is at 98.5% of Full Power
Unit 8 is at Full Power
Licensing
Commission Public Hearing Part 2 was held in Pickering on June 25-29, 2018. On August 7, 2017, Canadian Nuclear Safety Commission renewed the Power Reactor Operating Licence for the Pickering Nuclear Generating Station. The renewed licence is valid from September 1, 2018 until August 31, 2028.
Comments
Unit 4 is at 83% of Full Power following an unplanned outage. See Event Initial Report (CMD 18-M45.A.) Unit 7 is derated while maintenance is being performed on a shutdown system (SDS) component. Although this does not render the shutdown system unavailable, power reduction is required to prevent a spurious activation.
Event Notifications and Updates
Following a July 21 to July 22, 2018 algae run, Pickering Nuclear Generating Station (NGS) Units 5, 6, 7 and 8 went into unplanned outages. CNSC staff submitted an Event Initial Report (EIR) and this EIR will

be presented as CMD 18-M44. On August 4, 2018, Pickering NGS Unit 4 went into an unplanned outage due to increasing Condenser backpressure caused by clogged filter. CNSC staff submitted an Event Initial Report (EIR) and this EIR will be presented as CMD 18-M45.A.
Actions from previous Commission meetings
None.

1.4 Point Lepreau

Operational Status
Unit is at Full Power
Licensing
Power Reactor Operating Licence expires on June 30, 2022.
Comments
None
Event Notifications and Updates
None
Actions from previous Commission meetings
None

1.5 Other

Government of Canada / Gouvernement du Canada

MEMORANDUM NOTE DE SERVICE

To / À Marc Leblanc
Commission Secretary

CC Ramzi Jammal

From / De Gerry Frappier
Director General
Directorate of Power Reactor Regulation

Security Classification - Classification	
Non-classified	
Our File – Notre référence e-Doc 5608548	
Your File - Votre référence RIB/BIR 14051	
Date 2018/08/15	Tel. No. - N° de

Subject Update RIB/BIR Action 14051 – Event Initial Report CMD 18-M14 - Darlington Refurbishment –
Objet Retube Waste Processing Building – Internal Contamination Event

This memo is to provide an update to the Secretariat on the Retube Waste Processing Building (RWPB) internal contamination event that occurred on February 6, 2018, and CNSC follow-up compliance activities. The event was presented to the Commission on March 15, 2018 as an Event Initial Report (EIR) in CMD 18-M14.

Background

On February 6, 2018, contamination was detected on two (2) Canatom workers. The two (2) workers were performing lidding operations on Darlington Storage Over-packs in the Waste Tooling System hardware station of the Retube Waste Processing Building (RWPB). At the time of the event, the Waste Tooling Station was classified as an Alpha Level I[1] contamination control area. The workers were wearing protective coveralls, double gloves and booties. No respiratory protection was in use.

Contamination surveys of the work area were performed following the event, which confirmed that the alpha classification at the time of the event was not representative of the alpha hazards. OPG subsequently re-classified the area as Alpha Level III[2], and respiratory protection was then required. Follow-up bioassay samples for the affected workers confirmed that the workers received intakes of alpha contamination.

OPG submitted a preliminary event report on February 21, 2018, D-2018-04257 - *Internal Uptake from Personnel Contamination Event*. The event was reported to the Commission on March 15, 2018 as an Event Initial Report (EIR) in CMD 18-M14.

Processing of reactor components in the RWPB for Unit 2 is now complete.

1. Alpha I classification is used when the relative abundance of alpha contamination compared with beta-gamma contamination is minimal. In the unlikely case of an inhalation uptake, the internal dose from alpha emitters is not likely to exceed 10% of the total internal dose.

2. Alpha III classification is used when the relative abundance of alpha contamination compared with beta-gamma contamination is elevated. In the unlikely case of an inhalation uptake, the internal dose from alpha emitters is likely to exceed 90% of the total internal dose.

Update

Dose Assessment

As later reported to the Commission in CMD 18-M33 on June 25, 2018, a dose assessment was carried out by OPG and submitted to CNSC on March 12, 2018. OPG reported that the two (2) workers received a committed effective dose of 0.28 and 0.31 mSv well below the regulatory dose limit and the licensee's action level. CNSC specialist staff reviewed and concurred with OPG's dose assessment.

CNSC Reactive Inspection

CNSC staff conducted a reactive inspection in response to the event in the RWPB. The objective of the inspection was to verify that OPG was compliant with its Radiation Protection (RP) program requirements for alpha monitoring and control for work in the RWPB. The on-site portion of the inspection was conducted during the weeks of March 6 to 9 and March 19 to 23, 2018.

As a result of the inspection, enforcement actions were placed on OPG to address deficiencies in the implementation of its RP program. Areas of non-compliances were observed related to:

- Documenting and performing classification of alpha hazards in the RWPB
- Maintaining records of the survey results for work conducted in the RWPB
- Consistently performing reviews and verification of radiation survey results for the RWPB
- Implementing adequate radiological monitoring.

CNSC findings were communicated to OPG on April 12, 2018 and the final inspection report was issued on June 7, 2018. OPG is currently developing a corrective action plan to address CNSC staff's enforcement actions; which OPG will be submitting by September 4, 2018.

OPG Investigation

On April 23, 2018, OPG submitted to the CNSC its Detailed Event Report for D-2018-04257 – *Other Events of Regulatory Interest: Internal Uptake from Personnel Contamination Event*. CNSC staff reviewed OPG's Detailed Event Report and found that additional information was required to substantiate the identified causes and to provide assurance that OPG's corrective actions would prevent recurrence of a similar event.

In response to CNSC comments, OPG provided the results of a common cause analysis to address deficiencies identified during work on the Darlington Unit 2 Refurbishment Project. This analysis identified three (3) common factors that contributed to the RWPB event:

[1] Production focus diverting OPG's RP staff from their primary focus of providing radiation protection safety oversight
[2] RP Coordinator weakness in RP fundamentals due to lack of knowledge and experience
[3] Inadequate focus on basic contamination control and hygiene by workers.

OPG committed to undertake a number of actions to address the identified causes, including:

- Hiring staff to support oversight in RP program and field execution
- Issuing an instruction clarifying stop work authority when backout conditions are met
- Additional training to enhance RP Coordinator specific knowledge and skills
- Delivering to both OPG and contractor staff a communication campaign on the workers' accountability with respect to prevention of personnel contamination and internal uptakes.

At the time of preparing this update, CNSC staff were reviewing OPG's common cause analysis and the proposed corrective actions resulting from OPG's investigation.

Request Pursuant to Subsection 12(2) of the *General Nuclear Safety and Control Regulations*

During a meeting held on June 26, 2018, OPG informed CNSC staff that, based on their assessments of expected radiation hazards, steps were being taken to conduct some upcoming installation activities (i.e., Calandria Tubes, Fuel Channels, Lower Feeders, Feeder Cabinet) without the use of respiratory protection. In consideration of the open regulatory issues (i.e. in progress resolution of CNSC comments on the Detailed Event Report and findings from the 2018 March reactive inspection), on June 29, 2018, CNSC staff issued a formal request pursuant to subsection 12(2) of the *General Nuclear Safety and Control Regulations* [hereafter referred to as the 12(2) request] for additional information to provide adequate assurance that current and future work in the RWPB and in the Darlington NGS Unit 2 vault would proceed safely and would sufficiently take into account the lessons learned from the February 6, 2018 event in the RWPB.

In response to the 12(2) request, OPG provided:

- An ALARA analysis for the installation activities planned on the Unit 2 Re-tube Tooling Platform,
- A description of workplace controls to protect workers from intakes of alpha contaminants, and
- Provisions for enhanced RP oversight and alpha monitoring to provide timely detection of changing hazard levels.

The submissions also included a commitment that hazard planning assumptions and the suitability of controls and protective measures would be validated and reviewed by OPG technical specialists and management prior to OPG's decision to conduct installation work without respiratory protection.

On July 31, 2018, OPG provided the CNSC with a memorandum from the Responsible Health Physicist summarizing the results of OPG's validation process for the Calandria Tube installation sequence.

OPG also confirmed that:

- Alpha contamination levels on the Unit 2 Re-tube Tooling Platform are very low and no airborne alpha contamination has been detected. Monitoring is in place to detect changing conditions.
- The installation work being performed on Unit 2 Re-tube Tooling Platform has been extensively reviewed to verify that airborne radiological hazards will not be generated. Specifically the work does not involve the application of destructive or abrasive energies, and that no contact contamination work will be performed.
- Physical barriers are in place to clearly segregate the respirator free area (Unit 2 Re-tube Tooling Platform) from other work locations within the reactor vault.
- Enhanced contamination monitoring, including, real-time air monitoring with alarming capabilities, passive airborne monitors, surveys, personnel contamination monitoring, are in place and functional.
- Personal air sampling (PAS) will be issued to monitor the breathing zone of each worker not wearing a respirator to confirm inhalation intakes are not occurring.
- OPG will review and perform additional validation surveys to confirm conditions and assumption have not changed between different installation series. This will include but not be limited to a review of the tooling operation at the mock-up facility to validate assumptions, determination of additional validation survey locations, and modifications of survey locations and frequencies as appropriate.

On August 2, 2018, OPG made the decision to transition away from use of respiratory protection by workers on the Unit 2 Re-tube Tooling Platform for Calandria Tube installation.

During OPG's validation process and transition, CNSC inspectors have undertaken enhanced regulatory surveillance to verify that the controls and protective measures specified by OPG were being implemented.

CNSC Actions in Progress

CNSC staff are currently reviewing OPG's response to the 12(2) request and OPG's common cause analysis.

CNSC staff will review OPG's corrective action plan for the reactive inspection once submitted by OPG.

CNSC inspectors conduct frequent walk downs and field inspections of the Unit 2 vault and will continue to verify that the controls and measures identified by OPG are in place and remain effective.

Conclusion

OPG remains accountable for implementing all the necessary measures to protect workers from all hazards in the workplace.

CNSC staff have enhanced their oversight of the installation work in the U2 vault to verify that OPG continues to effectively implement and maintain the radiation protection measures they have committed to.