Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held on September 12, 2024

Minutes of the Canadian Nuclear Safety Commission (CNSC) meeting held virtually on Thursday, September 12, 2024 beginning at 9:05 am EDT. The meeting was webcast live via the CNSC website, and video archives are available on the CNSC website.

Present:

P. Tremblay, President
T. Berube
A. Hardie
J. Hopwood
M. Lacroix
V. Remenda

C. Salmon, Commission Registrar
L. Thiele, Senior General Counsel
C. Zou, Recording Secretary

CNSC staff advisors were: Alex Viktorov, Blair Carrol. Mike Rinker, C. Purvis, S. Faille and A. McAllister.

Other contributors were:

- Bruce Power: K. Thomson, D. Miller, A. Dykstra, A. Hanu
- Ontario Power Generation: S. Irvine, K. Aggarwal, L. Corkum, S. Sharma, K. Carew
- New Brunswick Power: N. Reicker
- Point Lepreau: J. Armstrong
- Metro Testing & Engineering Ltd.: H. Voelker
- Best Theratronics Ltd.: S. Muldoon

Constitution

1. With the notice of meeting Commission Member Document (CMD) 24-M29 been properly given and all Commission Members present, the meeting was properly constituted.

2. For the meeting, 24-M31 to 24-M35, and 24-M37 were distributed to Commission Members. These documents are further detailed in Appendix A of these minutes.

Adoption of the Agenda

3. The agenda, CMD 24-M30, was adopted as presented.

Chair and Registrar

4. President Tremblay chaired the meeting of the Commission, assisted by C. Salmon, Commission Registrar.

Minutes of the Commission Meetings Held May 22, 2024

5. The minutes of the Commission meeting held on May 22, 2024, were approved secretarially in advance of this meeting.

STATUS REPORT ON POWER REACTORS

6. With reference to CMD 24-M31 which included the status of the power reactor facilities as of August 21, 2024, CNSC staff presented the following updates:

   - Darlington Nuclear Generation Station (NGS) Unit 1, the removal of regulatory hold point[1] 2 – removing the guaranteed shutdown state and starting the reactor – was still in progress due to commissioning activities related to the primary heat transport system and the emergency coolant injection system, and under review by CNSC staff.
   - Pickering NGS Unit 1 was shut down on September 6, 2024 for a planned maintenance outage. The unit is expected to return to service by November 27, 2024.
   - OPG had reported an incident where an OPG employee accidentally discharged a firearm at the Bruce Power onsite shooting range during a security training exercise. No injuries

[1] Regulatory hold points are a series of mandatory checkpoints laid out in an operator's licence conditions that must be authorized by the CNSC prior to proceeding with reactor operations.

were reported and OPG's preliminary review identified the cause to be a mechanical failure of the firearm. OPG was conducting further investigation and would report updates to CNSC staff.
- Referencing the memorandum provided by CNSC staff regarding updates on Commission Action 32386,[2] CNSC staff recommended that the action be closed.

7. Regarding the Bruce Power Unit 3 refurbishment project, the Commission asked for more information on the following subjects:
   - the aging of the calandria vessel compared to that of pressure tubes
   - the expected lifetime of the calandria vessel
   - a progress update on the replacement of the steam generators
   - Bruce Power's waste management plan for the retired steam generators

8. Representatives from Bruce Power and OPG provided the following responses:
   - the aging degradation mechanism of the calandria vessel, which is primarily made of stainless steel, is different from that of the primary heat transport system.
   - the service life of the calandria vessel could be up to 100 years.
   - 4 out of the 16 steam generators had been removed from Unit 3 and would be replaced with new steam generators before the next set are removed.
   - the retired steam generators would be stored at OPG's Western Waste Management Facility, which is located on the Bruce Power site, and OPG was investigating the possibility of volume reduction.

9. The Commission enquired about the extended planned outage at the Point Lepreau NGS. A representative from New Brunswick (NB) Power detailed the scope of work involved in the outage and the reasons for the delayed completion. The NB Power representative explained that an unexpected generator phase-to-ground fault discovered during the return to service resulted in a series of additional repairs and replacements. The NB Power representative noted NB Power's continued focus on safety.

10. The Commission asked for more information concerning the generator fault at the Point Lepreau NGS. In response, representatives from NB Power provided the following information:
    - the delay was not due to project management issues, as the outage scope did not encompass any work related to the generator

[2] CMD 24-M31, pages 7-8.

- while the root cause investigation was still in progress, preliminary findings suggested the cause to have been a mechanical failure associated with the soldering process on the stator bars
- NB Power had engaged the CANDU industry and its vendor partners throughout the investigation and shared information; similar faults have not occurred elsewhere
- as the outage had been extended, NB Power was looking into reducing corrective backlogs, implementing improvement initiatives, and advancing work items from upcoming outages.

ACTION by December 2025

The Commission expects NB Power to provide an update on the root cause of the generator fault at a future Commission meeting.

11. Referencing the update provided by CNSC staff regarding Bruce Power and OPG's progress in hydrogen equivalent concentration[3] ([Heq]) research and development (R&D) commitments,[4] the Commission asked for information on:
    - any findings to date, especially any unanticipated findings
    - whether there were concerns about the R&D schedule due to delays in completing certain experiments

12. CNSC staff and a representative from OPG provided the following responses:
    - The industry has been providing updates to CNSC staff every 6 months, and there have been no unexpected findings to date
    - CNSC staff had no concerns about the schedule, as the delays would not impact the final deliverable.

13. Referencing the employee injury reported by Bruce Power,[5] the Commission asked about immediate actions taken as well as corrective actions to prevent reoccurrence. A representative from Bruce Power responded that the Ontario Ministry of Labour had investigated the injury and determined that Bruce Power's corrective actions were appropriate.

14. In response to Commission questions regarding the firearm discharge incident reported by OPG, a representative from OPG stated that OPG had taken immediate action in accordance with the *Nuclear Security Regulations*[6]. The OPG representative noted that an armourer was conducting extent of condition assessments on the firearms.

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[3] Hydrogen equivalent (Heq) concentration ([Heq]) is the concentration of hydrogen by weight that would be present in a pressure tube if the deuterium atoms were replaced by hydrogen atoms [Heq] is expressed in parts per million (ppm) by weight.
[4] CMD 24-M31, pages 4-6.
[5] CMD 24-M31, page 2.
[6] SOR/2000-209.

15. With respect to Commission Action 32386, the Commission is satisfied with the information provided by CNSC staff in CMD 24-M31. The action is closed. **ACTION** #32386 Closed

EVENT INITIAL REPORTS

Ontario Power Generation and Bruce Power: Potential neutron exposure of workers

16. In its submission CMD 24-M35, CNSC staff provided the Commission with an Event Initial Report (EIR) on findings from an International Atomic Energy Agency (IAEA) safeguards inspector regarding low-level but detectable neutron radiation counts at the Retube Waste Storage Building (RWSB) located at OPG's Darlington Waste Management Facility (DWMF). The EIR includes information on the following:
    - OPG's initial actions to locate the neutron source
    - OPG's immediate actions to ensure safety
    - extent of condition assessments conducted by OPG and NB Power on their waste containers
    - further investigations and analysis being performed and a plan to provide a joint statement from OPG, Bruce Power and NB Power to the CNSC by September 10, 2024
    - a plan to provide formal updates to CNSC staff by January 31, 2025

    CNSC staff noted that no members of the public were affected by this event, and that the addition of the unaccounted neutron exposures is not expected to cause any worker to exceed the regulatory dose limits.[7]

17. Representatives from OPG, Bruce Power and NB Power presented a joint statement on this matter, including information on the following:
    - investigations and findings to date, including the likely source of neutron radiation[8] and risk assessment results
    - corrective actions taken
    - industry collaboration throughout the investigations and a plan to share operating experience (OPEX) for continuous improvement

18. The Commission asked questions on the following topics:

[7] All workers involved in handling of the relevant waste were Nuclear Energy Workers (NEWs). The *Radiation Protection Regulations* prescribe dose limits for NEWs, which, pursuant to subsection 13(1), are 50 millisieverts (mSv) per one-year dosimetry period and 100 mSv per five-year dosimetry period.
[8] The likely source was identified as the spontaneous fission of californium-252 (Cf-252), which has formed over time as a result of the prolonged irradiation of natural uranium impurities in the original base metal of the pressure and calandria tubes.

- if OPG was prepared for IAEA inspections and what the potential consequences may have been without this particular IAEA inspection
- whether there were any root-cause findings around contributing factors (e.g., fuel failures, the type of ore)
- whether there were any findings around the extent of conditions, including worldwide benchmarking of spontaneous fission of Californium-252 (Cf-252) – identified as the likely root cause; any impacts of the presence of Cf-252 in a shut-down reactor; and any other potential hazards
- details around dose calculations including the number of years for which the dose calculation should be applied retroactively, and specifics around dose rate estimation and radioisotope identification
- any concerns from the workers
- next steps from the CNSC staff standpoint

19. CNSC staff and representatives from OPG, Bruce Power and NB Power provided the following in their responses:
    - the IAEA frequently inspects OPG facilities, either announced or unannounced. For this event, the IAEA inspector had used a highly sensitive meter intended for fuel detection. While the radiation protection instruments being used by the industry remain accurate, in response to this event, the licensees were considering procuring other types of instruments and updating their dosimetry programs.
    - exposure of in-core components to high radiation fields, especially prolonged exposure, was suspected to have caused the neutron source and OPG plans to measure all in-core components during refurbishment.
    - based on investigations to date, spontaneous fission of Cf-252 had not been observed elsewhere in the world and the presence of Cf-252 in a shut-down reactor would not trigger a chain reaction. The industry was actively looking into both technical and programmatic causes to develop corrective actions for the proactive identification of unexpected radiological hazards.
    - the licensee representatives provided detailed explanations with respect to the dose rate estimates and how the Cf-252 radioisotope was identified. Although the dose calculations were still being finalized, no significant impacts to the administrative limits were anticipated and specific details around dose calculations would be submitted as part of the formal updates to CNSC staff by January 2025.
    - the cause of the event and the dose implications were communicated to workers and well received.
    - CNSC staff was satisfied with industry's response to-date and would assess the corrective actions and plan for the next steps upon receiving the updates.

20. The Commission is satisfied with the information provided by CNSC staff and licensees regarding this EIR.

Ontario Power Generation: Pickering Nuclear Generating Station Unit 4 Loss of Class IV Electrical Power

21. In its submission CMD 24-M33, CNSC staff provided the Commission with an EIR on the loss of Class IV power that occurred at Pickering NGS Unit 4, along with information on the following:
    - the actions immediately taken by OPG
    - impacts and risks assessment results
    - the postulated root cause of the event – spurious failure and design deficiency of the Hydro One[9] switchyard protection breaker relays
    - OPG's plan to submit a root cause investigation report, a corrective action plan and a detailed event report to CNSC staff by November 15, 2024

    CNSC staff submitted that this event did not pose a risk to the environment or to the health, safety and security of persons.

22. CNSC staff also provided verbal remarks reflecting its satisfaction with OPG's corrective actions to date. A representative from OPG provided verbal remarks that the reactor unit had responded as expected per OPG's procedures.

23. The Commission asked for more information on the following:
    - if OPEX sharing with industry peers was a standard practice
    - if there were any impacts to the probabilistic risk assessments (PRA) for Pickering NGS Units 1-4 due to the occurrence of this event
    - when the steam was released and what the impacts to the environment were
    - the duration that the standby generators were in use
    - the nature of the Hydro One relay failure
    - OPG's ability to address grid disturbances
    - any technical confirmation that the plant operated as designed
    - any lessons learned regarding performance of the control room team during the event
    - any discussions with Hydro One regarding its maintenance program

[9] Hydro One is Ontario's largest electricity transmission and distribution service provider.

24. A representative from OPG provided the following responses:
    - industry experience at any power station is typically shared across the fleet as well as across the industry
    - there were no changes to the PRA predictions for Pickering NGS Units 1-4 for the loss of Class IV power, as this type of event is already included
    - the steam was released immediately after the reactor tripped, and there were no radiological risks or any other adverse impacts associated with this release
    - the standby generators started immediately in response to the loss of Class IV power and remained in service until Class IV power was restored, approximately 7 hours later.
    - the cause of the event was identified as Hydro One protection breaker relays in OPG's switchyard, which operated spuriously and intermittently for 10 milliseconds.
    - OPG's nuclear facilities are capable of responding to grid disturbances, which were planned in their design bases. OPG was working closely with Hydro One to ensure reliable output power to the grid.
    - OPG completed a thorough post-event analysis, along with simulations to validate the failure mode and the event cause.
    - behavioral lessons learned were identified, leading to corrective actions being incorporated into the procedures and the response protocol.
    - the OPG representative shared discussion outcomes including the operational background, extent of condition and aging management program for the relay in concern and responded that OPG was not aware of Hydro One's plan to phase out the relay prior to this event.

25. The Commission was satisfied with the information provided by CNSC staff and OPG regarding this EIR.

Metro Testing & Engineering Ltd.: Exposure of a person in excess or potential for excess of the applicable radiation dose limits prescribed by the *Radiation Protection Regulations*

26. In its submission CMD 24-M32, CNSC staff provided the Commission with an EIR on Metro Testing & Engineering Ltd. regarding the exceedance of the dose rate limit of 2.5 microsieverts per hour (µSv/h) for occupied space around its primary storage location in Burnaby, British Columbia. As a result of the dose rate exceedance, it was determined that 6 laboratory technicians, who were not nuclear energy workers (NEWs), likely exceeded the 1 millisievert (mSv)/year effective dose limit prescribed in the

Radiation Protection Regulations[10] for 2021, 2022 and 2023.[11] The EIR includes information on the following:

- the licensee's immediate actions
- impacts and risks assessment results
- root cause
- CNSC staff's plan to conduct an inspection in July 2024

CNSC staff noted that there were no adverse health and safety consequences, or appreciable increased risks, associated with the estimated doses. CNSC staff added that the doses were well below the effective dose limits for NEWs, and roughly within the range of annual background radiation levels across Canada.

27. CNSC staff provided verbal remarks on this event including a summary of the event review and observations from its follow-up inspection in July 2024. CNSC staff noted that the inspection results were satisfactory. A licensee representative provided verbal remarks on additional dose readings taken as part of its continuous improvement strategy, with the highest dose rate now being 0.7 µSv/h.

28. The Commission asked whether there were any plans to develop procedures to prevent future overexposures. A representative from Metro Testing & Engineering Ltd. responded that changes to the radiation protection manual in response to this event would be included in the next revision of the manual.

29. In response to a question from the Commission, CNSC staff confirmed that the workers who had received the doses were non-NEWs and that the risk to those workers as a result of the dose limit exceedance was low.

30. The Commission asked CNSC staff about the most recent in-person inspection conducted. CNSC staff described its inspection protocol for the licensee's various locations, and responded that the last inspection was conducted in July 2024.

31. The Commission is satisfied with the information provided by CNSC staff and the licensee regarding this EIR. The Commission recognized the licensee's prompt and effective action taken in response to the discovery of the event.

[10] SOR/2000-203.
[11] CNSC staff reported that the annual doses received were estimated at 4.73 mSv/y, 3.46 mSv/y, 2.47 mSv/y, 1.64 mSv/y, 1.23 mSv/y, and 1.03 mSv/y.

INFORMATION ITEM

CNSC Response to Member of Parliament's Concerns Regarding Best Theratronics Ltd.

32. In its submission CMD 24-M37, CNSC staff provided the Commission its response to address concerns raised by a federal Member of Parliament (MP), about the safety of continuing operations at a Class IB nuclear substance processing facility operated by Best Theratronics Ltd. (BTL) while the facility's unionized employees were on strike.

33. Asked about the reason for the MP raising concerns, the representative from BTL was unaware of the specific reason.

34. The Commission thanked CNSC staff for its prompt action on this matter.

UPDATE ON AN ITEM FROM A PREVIOUS COMMISSION PROCEEDING

Vancouver General Hospital: Update on the discovery of inaccuracies between paper records and screening test for thyroid monitoring

35. In its submission CMD 24-M34, CNSC staff provided an update to a 2023 EIR, presented to the Commission in December 2023, regarding the discovery of inaccuracies between the paper records and the screening tests for thyroid monitoring of staff at the Vancouver General Hospital (VGH). During the December 2023 meeting, the Commission directed that CNSC staff provide an update on this item. CNSC staff's update included information on the following:
    - risk assessment results
    - the CNSC's enforcement action[12] issued to the radiation safety officer with British Columbia's Provincial Health Services Authority for the falsification of records
    - corrective actions

36. The Commission asked for more information concerning the following:
    - the extent to which the radiation safety officer's workload and duties may have contributed to them falsifying records
    - the corrective action taken to educate the workforce on the importance of thyroid testing
    - the hospitals where corrective measures were implemented

[12] *Administrative monetary penalty issued to an individual*, February 2, 2024.

37. CNSC staff provided the following responses:
    - while the licensee's staff may face competing workload priorities, it is the licensee's responsibility to ensure sufficient staffing to complete the work required to maintain its licence
    - the licensee has communicated to its workers that, despite the low probability of unusual radioiodine thyroid uptakes, it is important to test to confirm
    - most corrective measures were specific to the VGH, with some implemented at other British Columbia's Provincial Health Services hospitals for a consistent approach.

38. The Commission was satisfied with the information provided by CNSC staff regarding this item. **ACTION** # 32383 Closed

Closure of the Public Meeting

39. The public portion of the Commission meeting closed at 11:15 am EDT on September 12, 2024. These minutes reflect both the public meeting itself and the Commission's considerations following the meeting.

Zou, HuiRu

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Recording Secretary _____ Date

Salmon, Candace

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Commission Registrar _____ Date

APPENDIX A – Commission Member Documents

CMD	Date	e-Docs No.
24-M29	2024-08-13	7338591
Notice of Meeting of the Commission on September 12, 2024		
24-M30	2024-09-03	7341761
Agenda of the Meeting of the Canadian Nuclear Safety Commission (CNSC) to be held on September 12, 2024		
24-M36	2024-06-28	7299560
Approval of the Minutes of Commission Meetings held on May 22, 2024		
24-M31	2024-08-30	7354778 – English 7356802 – French
Status Report Status Report on Power Reactors Written submission from staff		
24-M35	2024-08-27	7347237 – English 7347262 – French
Event Initial Report Ontario Power Generation and Bruce Power: Potential neutron exposure of workers Written submission from CNSC Staff		
24-M33	2024-09-05	7347222 – English 7347223– French
Event Initial Report Ontario Power Generation: Pickering Nuclear Generating Station Unit 4 Loss of Class IV Electrical Power Written submission from CNSC Staff		
24-M32	2024-06-19	7347149 – English 7347161 – French
Event Initial Report Metro Testing & Engineering Ltd.: Exposure of a person in excess or potential for excess of the applicable radiation dose limits prescribed by the *Radiation Protection Regulations* Written submission from CNSC Staff		
24-M37	2024-09-05	7358254 - English 7358235 - French
Information Item CNSC Response to Member of Parliament’s Concerns Regarding Best Theratronics Ltd. Written submission from CNSC Staff		

CMD	Date	e-Docs No.
24-M34	2024-08-08	7337980 – English 7347018 – French
Updates on items from previous Commission proceedings Vancouver General Hospital: Update on the Discovery of inaccuracies between paper records and screening test for thyroid monitoring Written submission from CNSC Staff		