Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held on January 25, 2023

January 25, 2023

Minutes of the Canadian Nuclear Safety Commission (CNSC) meeting held Wednesday, January 25, 2023, starting at 1:00 p.m. EST. The public portion of the meeting was held virtually and webcast live via the CNSC website, and video archives are available on the CNSC's website.

Present:

R. Velshi, President
T. Berube
S. Demeter
R. Kahgee
M. Lacroix
I. Maharaj
V. Remenda

D. Saumure, Registrar
Lisa Thiele, Senior General Counsel
M. McMillan, Recording Secretary

CNSC staff advisors were: A. Viktorov, W. Chung, K. Heppell-Masys, D. Moroz, B. Prieur and M. Kent

Other contributors were:

- NB Power: J. Nouwens
- Ontario Power Generation (OPG): K. Carew, S. Irvine and D. Rogers
- Bruce Power: M. Burton
- Cameco: R. Peters
- BWXT: C. Davidson

Constitution

1. With the notice of meeting Commission member document (CMD) 23-M1 having been properly given and all Commission members being present, the meeting was declared to be properly constituted.

2. For the meeting, documents CMD 23-M3 to CMD 23-M7, were distributed to members. These documents are further detailed in Appendix A of these minutes.

Adoption of the Agenda

3. The revised agenda, CMD 23-M2.B, was adopted as presented.

Chair and Registrar

4. The President chaired the meeting of the Commission, assisted by D. Saumure, Commission Registrar.

Minutes of the CNSC Meeting Held December 15 and 16, 2022

5. The Commission noted that the minutes of the December 15-16, 2022 Commission meeting would be presented to the Commission for approval at a later date.

STATUS REPORT ON POWER REACTORS

6. With reference to CMD 23-M4, CNSC staff presented the following updates:

   - Pickering Nuclear Generating Station (NGS) Unit 1 was at 96% full power following a planned maintenance outage
   - Pickering NGS Unit 6 was shutdown for a planned maintenance outage
   - Point Lepreau NGS had returned to full power following an unplanned outage

7. Noting that OPG had informed CNSC staff that the Power Workers' Union (PWU) was in a legal strike position at the Darlington NGS and Pickering NGS, the Commission asked how a strike would affect the two stations. An OPG representative said that approximately 1500-2000 workers would be impacted across the two stations, including operations, maintenance, radiation protection, chemistry, and security staff. The OPG representative explained that as needed, the PWU would work with OPG to safely shut down the operating units in advance of the strike and that minimum staff complement would be maintained to ensure the ongoing safety and security of the stations. CNSC staff confirmed that its regulatory oversight activities would not be impacted

8. Regarding the potential impact of a PWU strike on the Darlington refurbishment project, an OPG representative explained that OPG has contingency plans in place and that much of the refurbishment project is managed by vendor partners who are not members of the PWU.

EVENT INITIAL REPORT (EIR)

NB Power – Partial Loss of Class IV Power and Heavy Water Leak at the Point Lepreau Nuclear Generating Station

9. In CMD 23-M7, CNSC staff informed the Commission of the partial loss of Class IV power and heavy water leak which occurred at the Point Lepreau NGS on December 14, 2022. According to CNSC staff's submission, the partial loss of Class IV power occurred due to an electrical fault on a cable from the Unit Service Transformer (UST). As a result, two of the four primary heat transport pumps tripped and shutdown systems 1 and 2 both actuated as designed to safely shut down the reactor. Regarding the heavy water leak, CNSC staff informed the Commission that, following the shut down of the reactor, New Brunswick Power (NB Power) identified a heavy water leak on a 3/8" instrumentation line connected to the primary heat transport system. NB Power actuated the deuterium oxide[1] (D_2O) recovery system to collect and return the heavy water inventory to the primary heat transport system, and then cut and capped the leaking instrumentation line.

10. CNSC staff's submission indicated that the fundamental safety functions of control, cool, and contain were maintained throughout the event. CNSC staff reported that a small quantity of tritium was released through normal monitored pathways, and that the releases were below action levels and the derived release limits. CNSC staff confirmed that no workers were injured during the event or received a dose that exceeded regulatory dose limits.

11. In CMD 23-M7.1, NB Power provided additional information on the event. NB Power reported that the failure of the UST cable was caused by a separation of the cable connector shield and that the failure of the instrumentation line was due to the condition of the line and worsening of an existing crack. NB Power clarified that the containment structure operated as per design and contained all the heavy water leakage within the reactor building. NB Power reported that it completed all necessary repairs and clean-up activities, and that the Point Lepreau NGS successfully returned to service on January 18, 2023. NB Power also provided further detail on its emergency response, and how it communicates events to the CNSC, the public, and Indigenous Nations and communities.

[1] Deuterium oxide (D_2O), also known as heavy water, is a form of water that is used as coolant in the primary heat transport system of CANDU reactors.

12. The Commission asked if the two failures – the partial loss of power and the leak – were related. An NB Power representative explained that, though not directly related, the loss of power tripped two pumps which caused vibrations in the primary heat transport system. The vibrations increased the severity of the existing crack in the instrumentation line and caused the line to fail.

13. The Commission asked NB Power what measures it was taking to prevent event reoccurrence. An NB Power representative said that NB Power had reviewed all instrumentation lines on the primary heat transport system and cut and capped three additional lines with a similar condition to the one that failed. The NB Power representative added that NB Power had tested all the cables on the UST and found no issues. The representative further stated that NB Power was completing a full root cause evaluation and would build lessons learned into its preventive maintenance program.

14. The Commission expressed that CNSC staff's EIR (CMD 23-M7) was lacking detail. Specifically, the Commission noted that the EIR did not include a maximum dose to workers or the volume of the leak. CNSC staff acknowledged its oversight in excluding the maximum worker dose from the EIR. The Commission emphasized that CNSC staff's EIRs should include more details - to the extent they are available.

15. Regarding the size of the leak, CNSC staff stated that the total amount of heavy water leaked from the primary heat transport system was approximately 15 tonnes. CNSC staff confirmed that the heavy water was collected and returned to the primary heat transport system by the D_2O recovery system.

16. Regarding tritium levels during the event, an NB Power representative said that the maximum measured tritium in the reactor building was 30 millisieverts per hour, and that all doses received by workers during the event were controlled and planned. The NB Power representative explained that NB Power measures tritium in the reactor building in terms of the potential dose to workers, rather than by concentration.

17. Further to its request at the December 16, 2022 Commission meeting, the Commission expects NB Power and CNSC staff to provide another update to the Commission regarding the Point Lepreau NGS event once the event investigation is complete. The Commission directs that this update detail any key findings and lessons learned, and that it be presented to the Commission at a future public meeting.

ACTION
by June 2023

UPDATES ON ITEMS FROM PREVIOUS COMMISSION PROCEEDINGS

Update from CNSC Staff on the Decision Regarding the Inclusion of Radionuclides as a Chemical of Mutual Concern Under the Great Lakes Water Quality Agreement

18. Regarding CMD 23-M6, the Commission noted that it is satisfied with the information provided by CNSC staff. The Commission anticipates CNSC staff's next update on this matter by the end of 2023.

Responses to the Questions from the External Advisory Committee on Pressure Tubes

19. The Commission noted that, at the November 3 2022 Commission meeting, the External Advisory Committee on Pressure Tubes (EAC) had submitted a list of questions for CNSC staff, OPG, and Bruce Power, as captured in CMD 22-M37.8. Following the November meeting, CNSC staff and the licensees provided responses to the EAC's questions to the Commission Registry (CMD 23-M3, CMD 23-M3.A, CMD 23-M3.1, and CMD 23-M3.2).

20. The Commission further noted that the EAC had submitted to the Commission Registry on January 23, 2023 an assessment of the responses (CMD 23-M3.3). The EAC's assessment included an additional question for CNSC staff and the licensees. The Commission directs CNSC staff, Bruce Power and OPG to file responses to CMD 23-M3.3 with the Commission Registry by February 24, 2023. **ACTION by February 24, 2023**

21. The Commission clarified that the long-term regulatory response to the discovery of elevated hydrogen equivalent concentrations in the pressure tubes of reactors in extended operation is not yet complete. The materials noted in this meeting will be added to the consideration of this important issue. The Commission also noted that later in 2023, likely summertime, the EAC is to submit a report to the Commission which will inform the Commission's consideration and determinations on this issue with the expertise of the EAC.

INFORMATION ITEM

Presentation from CNSC Staff on the Implementation of the International Atomic Energy Agency's Revised State Level Approach for Safeguards in Canada

22. CNSC staff presented a progress update on implementation of the International Atomic Energy Agency's (IAEA) revised state-level approach for safeguards in Canada (CMD 23-M5). Key elements of the presentation were:

    - The safeguards regulatory framework
    - The roles that the IAEA, CNSC and licensees each play in implementing safeguards
    - The evolution of safeguards implementation
    - The difference between the IAEA's initial state-level approach of integrated safeguards and its revised state-level approach
    - The IAEA's new equipment-based approach
    - Current CNSC safeguards activities

23. CNSC staff highlighted that Canada has maintained a "broader conclusion", the highest level of safeguards conclusion from the IAEA, since it first achieved the designation in 2005. The IAEA issues a "broader conclusion" designation to a state when it concludes that all declared nuclear material remained in peaceful activities and that there are no indications of undeclared activities.

24. Regarding specific impact on safeguards in Canada, CNSC staff reported that the revised state-level approach has introduced:

    - New practical arrangements[2]
    - An equipment-based approach for spent fuel transfers to dry storage
    - Modified short notice random inspections for the verification of fresh fuel
    - A return to annual physical inventory verifications

    CNSC staff assured the Commission that the focus of the IAEA's revised approach remains on ensuring that nuclear material[3] is not diverted from peaceful nuclear activities.

[2] The practical arrangements replace the IAEA's integrated safeguards procedures and contain the IAEA's safeguards measures and expectations for the CNSC and licensees for the planning, preparing and conducting IAEA in-field verification activities.
[3] With respect to safeguards, nuclear material means plutonium-239, uranium-233, uranium enriched in the isotopes of 235 or 233, uranium containing the mixture of isotopes occurring in nature, uranium depleted in isotope 235 and thorium. The term nuclear material does not apply to uranium or thorium in ore, ore residue or other naturally occurring materials.

25. Asked for more information on what makes Canada unique from a safeguards perspective, CNSC staff said that, compared to other non-nuclear weapons states, Canada has a long nuclear history, a large uranium processing industry, and CANDU reactors which are refuelled online.

26. Regarding the accountancy of nuclear material during transportation, CNSC staff said that, in some cases, IAEA seals or detectors are used in the shipment of nuclear materials. In other cases, retention periods can be used to offer the IAEA an opportunity to verify the material where it is received. Regarding transportation outside of Canada, CNSC staff noted that transfers of nuclear material to and from other states are also reported to the IAEA. CNSC staff added that the IAEA reviews these transfers and notifies the states on a quarterly and semi-annual basis if there are any discrepancies, and that CNSC staff are responsible for conducting research and working with other states to resolve any such discrepancies.

27. The Commission asked CNSC staff to provide more information on equipment that is reportable to the IAEA. CNSC staff said that equipment, such as dry storage containers or glove boxes, that does not contain nuclear material but could be used in nuclear activities is reportable to the IAEA. CNSC staff added that software designed for a specific nuclear purpose could also fall into this category. CNSC staff confirmed that the IAEA also completes verification activities for suppliers of nuclear-related equipment.

28. The Commission asked for additional information on the accountancy of small quantities of nuclear material in Canada. CNSC staff said that it has identified locations in Canada where the material is most likely to be located, such as research institutions and industrial locations. CNSC staff said that it is working to leverage existing reporting mechanisms with these facilities to simplify reporting to the IAEA. CNSC staff noted that reporting small quantities of nuclear material should not cause a significant administrative burden for most licensees.

29. Regarding the IAEA's equipment-based approach, CNSC staff reported that the IAEA will increasingly rely on installed equipment to remotely monitor the movement of nuclear fuel. CNSC staff said that the IAEA plans to install two sets of equipment: the first to monitor fuel loadings, and the second to monitor transfers of fuel from wet to dry storage. CNSC staff noted that licensees have estimated that fuel loading verification would take 3-5 years to implement and spent fuel transfer verification would take 2-3 years to implement.

30. Asked how information from IAEA equipment is securely stored and transferred, CNSC staff said that the IAEA has robust information technology infrastructure and a secure safeguards system that is accessible on a need-to-know basis. CNSC staff provided examples of information transfer methods and informed the Commission that all transfers are managed in accordance with security requirements. Regarding camera feeds, CNSC staff noted that the CNSC's and licensees' security and safeguards teams work with the IAEA when installing the cameras to ensure that camera sightlines do not include any elements that may compromise the security of a facility.

31. The Commission asked for more information on how disputes are resolved between the IAEA, the CNSC, and licensees. CNSC staff noted that safeguards agreements require Canada to cooperate with the IAEA, but also provide that IAEA safeguards will not unduly impact operations. CNSC staff explained that, when concerns are raised by the licensees regarding operational impacts, the IAEA, the CNSC, and the licensees work together to find an agreeable solution that satisfies safeguards obligations.

32. The Commission asked licensees if they had concerns with the implementation of the revised state-level approach. Representatives from Bruce Power, NB Power, OPG, Cameco Corporation, and BWXT Nuclear Energy Canada all affirmed their organizations' commitment to continuing to uphold safeguards obligations. Representatives from Bruce Power, NB Power, and OPG noted that they were actively working with the CNSC and the IAEA to resolve an outstanding issue related to the implementation of the IAEA's equipment-based approach. Licensee representatives were confident that they would be able to reach an effective solution.

33. The Commission found CNSC staff's presentation to be informative and appreciated the information provided by CNSC staff and the licensees in response to the Commission's questions.

Closure of the Public Meeting

34. The public portion of the Commission meeting closed at 03:05 p.m.

McMillan, Megan

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Recording Secretary — February 23, 2023
Date

Saumure, Den

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Registrar — February 23, 2023
Date

APPENDIX A

23-M1	2022-12-20	6939191
Notice of Virtual Meeting of the Commission on January 25, 2023		
23-M2	2023-01-13	6948833
Agenda for January 25, 2023 Commission Meeting		
23-M2.A	2023-01-19	6954945
Revised Agenda for January 25, 2023 Commission Meeting		
23-M2.B	2023-01-24	6957403
Revised Agenda for January 25, 2023 Commission Meeting		
23-M7	2023-01-13	6950536
Information Items Event Initial Report - NB Power – Partial Loss of Class IV Power and Heavy Water Leak at the Point Lepreau NGS Written submission from CNSC Staff		
23-M7.1	2023-01-18	6954536
Information Items Event Initial Report - NB Power – Partial Loss of Class IV Power and Heavy Water Leak at the Point Lepreau NGS Presentation by Énergie NB Power		
23-M4	2023-01-19	6955212
Information Items Status Report on Power Reactors Written submission from CNSC Staff		
23-M3	2022-11-24	6951418
Information Items Responses to questions from EAC on Heq Update Written submission from CNSC Staff		

23-M3.A	2023-01-19	6955343
Information Items Responses to questions from EAC on Heq Update Supplementary written submission from CNSC Staff		
23-M3.1	2023-01-13	6951431
Information Items Responses to questions from EAC on Heq Update Written submission from Bruce Power		
23-M3.2	2022-12-06	6951457
Information Items Responses to questions from EAC on Heq Update Written submission from Ontario Power Generation		
23-M3.3	2023-01-23	6957385
Information Items Responses to questions from EAC on Heq Update Written submission from the External Advisory Committee		
23-M6	2022-10-31	6951211
Information Items Follow up from previous Commission Proceeding - Update on Decision on Radionuclides as Chemicals of Mutual Concern Written submission from CNSC Staff		
23-M5	2023-01-11	6949399 - English 6957599 - French
Information Items Update on Safeguards Implementations in Canada Presentation from CNSC Staff		