



Minutes of the Canadian Nuclear Safety
Commission (CNSC) Meeting Held on
October 11 and 12, 2017

Minutes of the Canadian Nuclear Safety Commission (CNSC) meeting held Wednesday and Thursday, October 11 and 12, 2017, beginning at 3:00 p.m. and 9:00 a.m., respectively, at the Public Hearing Room, 14th floor, 280 Slater Street, Ottawa, ON.

Present:

M. Binder, President

Dr. S. McEwan

Dr. S. Soliman

Dr. S. Demeter

Mr. R. Seeley

K. McGee, Assistant Secretary

L. Thiele, Senior General Counsel

S. Baskey, P. McNelles, M. Hornof, Recording Secretaries

CNSC staff advisors were: R. Jammal, G. Frappier, A. Viktorov, H. Tadros, K. Murthy, J. Amalraj, B. Torrie, L. Forrest, K. Owen-Whitred, C. Purvis, C. Moses, S. Mortimer, H. Rabski, M. Broeders, P. Fundarek, A. Gaw, K. Noble, S. Faille, L. Simoneau, J. Schmidt, J. Sigetich, P. Matthews, N. Ringuette and K. Dewar

Other contributors were:

- Bruce Power: F. Saunders
- OPG: R. Manley, P. Seguin, J. Lehman and B. Vulcanovic
- NB Power: M. Hare
- BWXT Nuclear Energy Canada Inc. (BWXT): J. MacQuarrie, D. Snopek and A. Connell
- Canadian Industrial Radiography Safety Association: A. Brady and T. Levey
- Canadian Radiation Protection Association: J. Dovyak and T. Beniston
- Canadian Environmental Law Association: M. Siersbaek and K. Blaise

Constitution

1. With the notice of meeting CMD 17-M40 having been properly given and all permanent Commission members being present, the meeting was declared to be properly constituted.
2. Since the meeting of the Commission held August 16-17, 2017, Commission member documents CMD 17-M40, CMD 17-M42 to CMD 17-M44, CMD 17-M49, CMD 17-M52 and CMD 17-M53, were distributed to members. These documents are further detailed in Annex A of these minutes.

Adoption of the Agenda

3. The revised agenda, CMD 17-M40.B, was adopted as presented.

Chair and Secretary

4. The President chaired the meeting of the Commission, assisted by K. McGee, Assistant Secretary and S. Baskey, P. McNelles and M. Hornof, Recording Secretaries.

Minutes of the CNSC Meeting Held August 16-17, 2017

5. The minutes of the August 16-17, 2017 Commission meeting will be approved at a later date.

STATUS REPORTS

Status Report on Power Reactors

6. With reference to CMD 17-M43, which provides the Status Report on Power Reactors, CNSC staff reported updates on the following:
 - Pickering Nuclear Generating Station (NGS) Unit 8 was shut down on October 8, 2017 for a planned outage and is expected to return to service in late November.

Pickering NGS Unit 1 Primary Heat Transport System (PHTS) Blockage

7. The Commission asked for details regarding the PHTS blockage that occurred at Unit 1 of the Pickering NGS on August 20, 2017. The Ontario Power Generation Inc. (OPG) representative provided additional information about the PHTS flow blockage, explaining that it had originated from the inappropriate closure of the MV10 valve during a planned outage.
8. The Commission further enquired about how many fuel channels were affected during the event and whether the fuel channels had been inspected for potential local damage. The OPG representative responded that half of the 390 fuel channels were affected during this event but stated that, since the system temperature was that of the nominal safe shutdown state, at no time was there potential for damage to either the equipment or the fuel. The OPG representative further explained that the highest measured temperature at the outflow of the heat transport system increased by only six degrees Celsius to 37 degrees Celsius during the event, which was approximately ten times lower than the typical operating temperature. CNSC staff confirmed the information

provided by OPG and explained that, although the event represented a violation of operating procedures, CNSC staff had independently assessed that local damage to the fuel was extremely unlikely. CNSC staff confirmed that follow-up assessments would be carried out.

9. The Commission requested a description of the alarm systems that were engaged during the event despite the temperatures being so low. The OPG representative clarified that the alarm function was tied to the valves of the heat transport system to register any time certain valves came off of the fully open position, indicating that a flow path could be blocked.

Bruce Power NGS, Unit 7 Forced Outage

10. The Commission requested additional information about the cause of the water leak on the conventional side of the station that forced the outage at Bruce NGS Unit 7. The Bruce Power representative explained that the water leak occurred when a threaded joint failed and that a complete shutdown of Unit 7 was required to fix it as there was no alternate route to the downstream heat exchanger.

New Brunswick Power (NB Power) Point Lepreau NGS Forced Shutdown

11. The Commission requested additional information about the erratic behavior of the GV6 governor valve responsible for the forced shutdown. The NB Power representative explained that a manual shutdown had been necessary because the governor valve that controlled the steam emission into the turbine had been changing states, between full-open and full-close, which led to pressure fluctuations in the boiler.

Darlington NGS Unit 2 Refurbishment

12. The Commission asked for an update about the Darlington NGS Unit 2 refurbishment project and enquired if there had been any surprises. The OPG representative reported that the project had been progressing ahead of schedule and that work to date was completed without any contamination control events. The OPG representative also reported that OPG had taken the opportunity to improve project management and tooling during the work that had been carried out to date, noting that there had been no surprises pertaining to the condition of major components. CNSC staff confirmed the information provided by OPG and stated that CNSC staff was monitoring the project closely and that further testing and inspections would be conducted as appropriate.

Event Initial Reports (EIR)*Bruce A Unit 3 Primary Heat Transport (PHT) Pump Gland Seal Leak*

13. With reference to CMD 17-M52, CNSC staff presented information regarding an event involving the failure of the Bruce A Unit 3 PHT pump 4 gland seal. This item was first reported to the Commission during the August 2017 Commission Meeting.¹
14. With reference to CMD 17-M52.1, a Bruce Power representative provided the Commission with an update on this event, explaining that the failure of the PHT pump 4 gland seal resulted from a setup misalignment following previously conducted maintenance. Specifically, the pump motor shaft coupling tolerance was at its maximum limit, inducing an imbalance of the rotating assembly and leading to contact between the pump shaft and stationary seal components. The Bruce Power representative provided the Commission with additional detailed information and images regarding the failure of the gland seal and the corrective actions taken.
15. The Commission enquired about whether any predictive assays existed that could predict unique incidences such as this one. The Bruce Power representative responded that events such as this one provided for lessons learned about system tolerances and sensitivities; however, without a progressive failure trend there wasn't a metric that could be used in future diagnostics.
16. The Commission enquired about the effect of the forces on the pump during this event and the types of destructive and non-destructive tests that were used in these assessments. The Bruce Power representative described the forensic exams conducted on the parts and reported that the shaft had a minor deflection and visible wear, but there was no evidence that areas of the shaft were weak or had cracked.
17. The Commission requested an explanation about the alarm systems that were in place to detect leaks and why the system had expelled 6,000 litres before the leak was stopped. The Bruce Power representative provided detailed information about the various alarm mechanisms in place in the control room and explained that the leak was promptly detected and that the Bruce Power operators had shut down the pump and heat transport system in accordance with approved procedures. However, as per these same procedures, the system continued to leak heavy water until the PHT system depressurized from 7 MPa to 1 MPa. The Bruce Power representative also confirmed to the Commission that there was no

¹ Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held on August 16 and 17, 2017.

- impact to the health and safety of persons or the environment from this incident.
18. The Commission enquired about how often pumps were replaced at the Bruce NGS. The Bruce Power representative explained that there were no end-of-life criteria for the pumps themselves but noted that the motors were replaced on an approved replacement schedule. The Bruce Power representative also informed the Commission that Bruce Power had already replaced 22 of 32 pump motors at the Bruce NGS and that the Bruce A Unit 3 pump 4 motor was awaiting replacement. The Bruce Power representative also reported that enhanced vibration monitoring had been installed at Bruce A Unit 3 and that Bruce Power was now planning to install enhanced vibration monitoring at all Bruce A units during upcoming maintenance outages.
 19. The Commission also asked CNSC staff regarding lessons learned from this event that could be incorporated into CNSC inspections. CNSC staff confirmed Bruce Power's findings to the Commission, noting that Bruce Power was conducting the investigation adequately. CNSC staff also stated that the CNSC staff review of the root cause analysis was still ongoing.

Beryllium Occupational Exposure Level Exceedance for Two Workers at BWXT Nuclear Energy Canada Inc. (BWXT) – Peterborough

20. With reference to CMD 17-M53, CNSC staff presented information regarding an incident involving the use of incorrect Powered Air Purifying Respirator (PAPR) cartridges leading to a beryllium occupational exposure level exceedance for two workers at the BWXT facility in Peterborough, Ontario. CNSC staff explained that the root cause investigation revealed several safety system process failures and that recent CNSC follow-up inspections had confirmed that BWXT was taking action concerning the proper use of personal protective equipment (PPE).
21. A BWXT representative provided the Commission with additional information about the incident, including the repeated nature of the exposure and the perceived failure in the application of the BWXT management system. The BWXT representative stated that BWXT would implement changes to improve its administrative controls and human performance program.
22. The Commission requested additional information about why one employee was exposed to increased levels of beryllium 14 times while the other employee was only exposed a single time. The BWXT representative responded by explaining that the work that required the PAPR to protect against beryllium exposure was

- infrequently carried out and that the more extensively exposed individual was the primary individual who performed this particular work.
23. The Commission sought clarification about the discrepancies in beryllium exposure limits prescribed by the Province of Ontario ($2 \mu\text{g}/\text{m}^3$) when compared to those of the CNSC ($0.05 \mu\text{g}/\text{m}^3$). CNSC staff explained that its occupational exposure limits were in accordance with the requirements of the *Canada Labour Code* (CLC),² specifically, the *Canada Occupational Health and Safety Regulations* (COHSR)³ and that the Ontario provincial exposure limit was expected to be lowered in early 2018.
 24. Further, the Commission enquired if these occupational beryllium exposure limits aligned with those prescribed by the U.S. Department of Labour, noting that the U.S. limits were dependent on the time interval of exposure. CNSC staff clarified that the CLC used an eight-hour time weighted average and that the limits prescribed by the COHSR used the same values as prescribed by the American Conference of Governmental Industrial and Hygiene.
 25. The Commission requested additional information about other chemical pollutants that may not have been filtered out with the incorrect PAPR cartridges that didn't contain a HEPA filter. The BWXT representative explained that there were no other chemicals of concern that would not have been filtered out by the incorrect cartridges.
 26. The Commission expressed concern about the individual subjected to repeated beryllium exposures and enquired as to whether it was possible to calculate the probable cumulative beryllium exposure, noting that this exposure could be important to this individual's risk of developing a beryllium-related condition. The BWXT representative stated that the beryllium exposure concentration was known in thirteen of the fourteen incidents, but explained that BWXT did not have the means to calculate a cumulative exposure. BWXT's occupational health nurse explained to the Commission that individual risk factors were critical when considering the likelihood of a particular subject developing beryllium sensitivity, noting that this was a necessary precursor to increased risk associated with developing a chronic beryllium-related condition.
 27. The Commission requested additional information about the tests used to assess the likelihood of developing a beryllium-related condition. BWXT's occupational health nurse explained that a

² Revised Statutes of Canada, 1985, chapter L-2.

³ SOR/86-304.

blood test that characterized lymphocyte proliferation in response to beryllium was the current beryllium sensitivity test. The BWXT representative also explained that employees underwent annual beryllium sensitivity screenings and that the two overexposed individuals were now being tested every six months for at least the next two years. The BWXT representative also reported that the two overexposed individuals had not yet demonstrated any beryllium sensitivity. CNSC staff also informed the Commission that BWXT had been given until October 31, 2017 to reply to a CNSC request in this matter pursuant to subsection 12(2) of the General Nuclear Safety and Control Regulations (GNSCR).⁴

INFORMATION ITEMS

Annual Program Report for 2016-2017: Regulatory Framework Program

28. With reference to CMD 17-M49, CNSC staff presented its 2016-2017 annual program report for the Regulatory Framework Program, including information on CNSC staff's progress on discussion papers, regulatory amendments, REGDOCs, and public consultation.
29. In response to the Commission's enquiries about the completion of the remaining 30 REGDOCs by 2020, CNSC staff explained that every REGDOC had already been started, many with substantial portions completed. CNSC staff also reported that the publically-available REGDOC schedule was annually reviewed and revised to reflect corporate priorities and the availability of technical experts.
30. The Commission sought confirmation that the 58 planned REGDOCs would replace all legacy regulatory documents, guides and policies. CNSC staff confirmed that this was the case and explained to the Commission that the legacy documents would in many cases be updated and/or be integrated into the REGDOC framework.
31. The Commission enquired about whether CNSC staff proactively identified and reached out to stakeholders during public consultation activities. CNSC staff responded that proactive and targeted stakeholder consultations were carried out and that CNSC staff was actively increasing its activities in this regard through targeted emails to subscribers, known stakeholder groups, and other interested parties; participant funding to encourage and facilitate document review; and the conduct of community and industry outreach events. CNSC staff also provided specific

⁴ SOR/2000-202.

information regarding targeted consultation that it had carried out for draft REGDOC-2.7.3, *Radiation Protection Guidelines for Safe Handling of Decedents*.⁵

32. The Commission asked about the CNSC's collaboration with other governmental agencies during the development of REGDOCs and regulatory instruments. CNSC staff explained that, during the development of discussion papers, regulatory documents and regulations, CNSC staff actively collaborated with technical or subject matter experts from other governmental organizations, as required, to ensure consistency and technical accuracy of these instruments.
33. The Commission expressed its recognition of the amount of work that CNSC staff had completed in regard to the CNSC's REGDOC framework and congratulated CNSC staff on these efforts.

Regulatory Oversight Report on the Use of Nuclear Substances in Canada: 2016

34. With reference to CMD 17-M42, CMD 17-M42.A, and CMD 17-M42.B, CNSC staff presented the annual *Regulatory Oversight Report on the Use of Nuclear Substances in Canada: 2016* (the ROR). This report summarizes the safety performance of 1,584 licensees holding a total of 2,233 licenses and which are authorized by the Canadian Nuclear Safety Commission (CNSC) for the use of nuclear substances in the medical, industrial, academic and research, and commercial sectors. For 2016, the highlights of this report included:
 - CNSC staff conducted 1,452 inspections, including 228 security inspections and three inspections related to the export of high-risk sealed sources.
 - CNSC staff took 22 escalated compliance enforcement actions against licensees, including the issuance of 14 orders and eight Administrative Monetary Penalties (AMPs).
 - CNSC staff received reports from licensees regarding 139 reportable events, with 136 of those events ranked as Level 0 (no safety significance), two as Level 1 (anomaly) and one ranked as Level 2 (incident), on the International Nuclear and Radiological Event Scale.

⁵ CNSC Regulatory Document REGDOC-2.7.3, *Radiation Protection Guidelines for the Safe Handling of Decedents*, under development.

- CNSC staff monitored radiation doses for 62,013 workers, representing 22,606 Nuclear Energy Workers (NEW) and 39,407 non-NEWs, across four sectors. Exposures to radiation continued to be very low for workers in 2016, which was consistent with previous reporting years.

As a result of the CNSC's comprehensive regulatory oversight of the industries using nuclear substances, CNSC staff informed the Commission that the use of nuclear substances in Canada continued to be safe, with adequate provisions for the protection of the health, safety and security of persons and the environment in place.

Oral Intervention from the Canadian Industrial Radiography Safety Association (CMD 17-M42.1 and CMD 17-M42.1A)

35. In its intervention, the Canadian Industrial Radiography Safety Association (CIRSA) raised a number of matters of importance to the industrial radiography industry. The Commission expressed appreciation for the information provided in CIRSA's intervention.
36. The Commission noted that CNSC staff applied a graded response to licensee non-compliances and requested additional information in this regard. CNSC staff reported that in 2005 and 2008, CNSC staff had launched several compliance-improvement initiatives in the industrial radiography sub-sector. CNSC staff reported that there were significant improvements in that sub-sector and that these licensees were inspected every year due to the high-risk nature of their operations. Further to its risk-informed regulatory approach, CNSC staff reported to the Commission that it considered performance trends and the level of risk associated with licensed activities, and assigned the appropriate inspection frequency for each licensee. Addressing the prospect of international comparisons, CNSC staff responded that it had monitored the reports on international events.
37. The Commission asked about the breakdown of high, medium and low risk licensees in the industrial sector. CNSC staff provided the Commission with this information, noting that industrial radiography represented 5.1% of licences issued by the Directorate of Nuclear Substance Regulation (DNSR), and 6% of the total number of licences issued for high- and medium- risk activities. The Commission noted that such a statistic would be a useful inclusion for future RORs with CNSC staff acknowledging this recommendation for future RORs.
38. The Commission noted that CIRSA is a member of the Industrial Radiography Working Group (IRWG) and enquired about the main

- activities performed by that working group. The CIRSA representative provided the Commission with information regarding IRWG initiatives and informed the Commission that these initiatives had led to incident reduction and licensee improvement with respect to compliance with regulatory requirements.
39. The Commission requested additional information regarding the concerns expressed by CIRSA in regard to CSA PCP-09, *Certified Exposure Device Operator Personnel Certification Guide*.⁶ The CIRSA representative explained that PCP-09 was under revision, and that there was some uncertainty among licensees regarding when the revised guide would be published. CNSC staff explained that operators of exposure devices must be certified pursuant to the *Nuclear Substances and Radiation Devices Regulations*.⁷ CNSC staff further explained that the criteria in CSA PCP-09 had improved the knowledge and understanding of the workers using exposure devices, and CNSC staff provided detailed information about the phased implementation of the 5-year certified exposure device operator (CEDO) renewal cycle, which was aligned with the guidance presented in PCP-09.
40. The Commission recognized that, in its intervention, CIRSA requested additional specificity in the ROR's worker dose statistics. The Commission noted that this information could be of use to CIRSA and other intervenors, and enquired about whether this request could be accommodated. CNSC staff provided information to the Commission regarding its methodology for the collection of average worker dose data from licensees and stated that information on individual worker doses was directly submitted to the National Dose Registry (NDR), not to the CNSC. The CIRSA representative reported that the CNSC had not published annual reports for worker doses since 2006; however, the NDR would provide that data upon request and that CIRSA was of the view that this data had value for trending and comparison purposes. The Commission recommended that CNSC staff, industry representatives and the NDR work cooperatively to develop a mechanism to provide more detailed dose information to interested parties.

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⁶ PCP-09, *Certified Exposure Device Operator Personnel Certification Guide*, CSA Group, 2015.

⁷ SOR/2000-207.

41. The Commission recognized the concerns raised by CIRSA regarding the training and certification of Radiation Safety Officers (RSOs), as well as the need for additional guidance documents specific to RSOs. A detailed discussion with respect to RSO training, certification, and guidance documents can be found in paragraphs 60-63 of this document.

Oral Intervention from the Canadian Radiation Protection Association (CMD 17-M42.2 and CMD 17-M42.2A)

42. In its intervention, the Canadian Radiation Protection Association (CRPA) raised a number of matters of importance to radiation protection professionals. The Commission was appreciative of the CRPA for the information presented in this intervention.

43. Commission Member Demeter disclosed that he was a general member of the CRPA without any governance appointments. Dr. Demeter also disclosed that he worked within the same building and health authority as CRPA representative Mr. Dovyak. Commission Member McEwan also disclosed that he worked in the same building as CRPA representative Mr. Beniston.

44. The Commission requested additional information regarding the CRPA's suggestion that more detailed event summaries be provided in the ROR. The CRPA representative provided information regarding the benefits of United States Nuclear Regulatory Commission's (USNRC's) online event reporting process. CNSC staff provided the Commission with additional information regarding the USNRC's reporting system and explained the various means by which the CNSC shared operating experience with licensees, noting its commitment to continued sharing of operating experience and lessons learned with licensees.

45. The CRPA representative provided to the Commission information regarding an additional proposal, with respect to additional guidelines and metrics for worker dose measurements. The CRPA representative added that these proposed measures would be discussed internally within the CRPA, and with CNSC staff during CRPA-CNSC working groups. The Commission recommended that the CRPA and CNSC staff continue their collaborative efforts with respect to worker dose rate measurements, and noted that CSA standards were another instrument for the continued improvement of worker dose measurements.

46. The Commission enquired about the changes in several licence conditions with respect to iodine-123 (I-123) and iodine-124 (I-124), as well as the outreach performed by CNSC staff in order

- to inform the relevant licensees regarding those changes. CNSC staff provided information to the Commission regarding the reasons for the amendments to those licence conditions, the processes used to make those amendments, the chemical composition of I-123 and I-124 covered under these amendments, as well as the communication and outreach activities that were carried out with affected licensees.
47. Noting the CRPA's concerns about the level of outreach carried out in regard to these licence amendments, the Commission recommended that CNSC staff review its procedures in this regard. CNSC staff expressed appreciation of the feedback from licensees in this regard and stated that the feedback would be used to improve future licensee outreach activities.
48. The CNSC staff described to the Commission how the amended licence conditions were implemented in the relevant licenses. CNSC staff noted that CNSC Regulatory Document RD-58, *Thyroid Screening for Radioiodine*⁸ addresses I-125 and I-131, and that the draft REGDOC-2.7.2, *Dosimetry*,⁹ would also address I-123 and I-124 if it were to receive approval from the Commission. CNSC staff further stated that licensees or intervenors were encouraged to provide comments and communicate with CNSC staff regarding licensing issues at any time.
49. The Commission directed CNSC staff to provide the Commission and the relevant licensees with additional information regarding the health and technical basis for the inclusion of I-123 and I-124 in the aforementioned licence conditions, and with the CNSC expectations in regard to the implementation of these licence conditions. The Commission also directed CNSC staff to provide the Commission and licensees with information on the iodine-based compounds that were addressed by the new licence conditions
50. In response to a Commission enquiry, CNSC staff reported that draft CNSC REGDOC-2.7.3, *Radiation Protection Guidelines for the Safe Handling of Decedents*¹⁰ would address the safe handling of deceased persons who were the recipients of a broad spectrum of radioactive implants and radiotherapy treatments. Asked if the CRPA would provide comments on the draft REGDOC, the CRPA representative stated that the CRPA may not directly take a

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⁸ Canadian Nuclear Safety Commission Regulatory Document, RD-58, *Thyroid Screening for Radioiodine*, July 2008.

⁹ Canadian Nuclear Safety Commission Regulatory Document, REGDOC-2.7.2, *Dosimetry*, draft, to be published at a later date.

¹⁰ Canadian Nuclear Safety Commission Regulatory Document – REGDOC-2.7.3, *Radiation Protection Guidelines for the Safe Handling of Decedents*, (Draft).

position on it before the deadline for comments has passed. CNSC staff added that comments were welcome at any time, and could be considered during future reviews of that document.

Oral Intervention from the Canadian Environmental Law Association (CMD 17-M42.3 and CMD 17-M42.3A)

51. In its intervention, the Canadian Environmental Law Association (CELA) raised a number of matters that were of importance to that organization. The Commission expressed appreciation for CELA's intervention.
52. In considering CELA's intervention, the Commission invited CNSC staff to comment on the risks to the environment due to the use of nuclear substances. CNSC staff noted that the vast majority of nuclear substances regulated by the DNSR had no impact on the environment and provided additional information on the protection measures and reporting requirements with respect to those nuclear substances.
53. The Commission further asked about the potential effects of climate change on the safe operation of the licensees reported on in the ROR. CNSC staff responded that all licensees were required to identify potential risks, emergencies, and response measures, and provided the Commission with an overview of the health and safety measures that were in place. Asked by the Commission to respond, the CELA representative noted that catastrophic weather events may become more frequent due to climate change, and proposed that the issue of climate change be explicitly stated in the LCHs or a REGDOC.
54. The Commission enquired about the information that is available to intervenors regarding DNSR's activities, and the CELA representative provided the Commission with CELA's understanding of the level of risk of the licenced activities in the ROR. The Commission further recommended that CNSC provide additional educational outreach specific to the licenced activities that were regulated by DNSR.
55. The Commission requested additional details regarding CELA's request on the CNSC's use of the As Low As Reasonably Achievable (ALARA) Principle in its regulatory activities. The CELA representative explained that there was a lack of clarity surrounding how the ALARA Principle was implemented in practice. CNSC staff acknowledged that the implementation of the ALARA Principle in the CNSC's regulatory activities could be more transparent and provided information on how the principle was used in practice.

Written Intervention from the Algonquins of Ontario CMD 17-M42.4)

56. In its intervention, the Algonquins of Ontario (AOO) raised a number of matters that were of importance to that organization. The Commission noted the usefulness of the intervention, the importance of the matters addressed in that intervention, as well as the opportunity for additional educational outreach by CNSC staff.
57. Asked about the engagement activities that CNSC staff had carried out with the AOO, CNSC staff informed the Commission that it had engaged the AOO on several files concerning environmental assessments, and could provide additional outreach with respect to the use of nuclear substances. CNSC staff stated that there were a number of licensed activities and facilities within AOO territory that the AOO was not familiar with, and that CNSC staff would discuss these matters, as well as matters relating to radiation protection and the CNSC's regulatory framework with the AOO, to address any concerns that the AOO may have. The Commission was satisfied with the CNSC staff's commitment to engage more thoroughly with the AOO in regard to the nuclear activities being carried out in their traditional territory.

General Comments from the Commission

58. The Commission expressed satisfaction with the quality of the ROR and the accompanying presentation. The Commission also appreciated the inclusion of the descriptive figures in the ROR but recommended that additional explanation for the figures should be included in future RORs to ensure greater clarity.

CNSC Inspectors and Industrial Radiation Safety Officers

59. The Commission asked about the number of CNSC inspectors available to conduct licensee inspections. CNSC staff provided to the Commission a detailed breakdown of the number of inspectors that inspected the licensees covered by this ROR, including information on the location of the CNSC offices and CNSC staff's plans regarding recruiting and training additional inspectors.
60. The Commission enquired as to the total number of Radiation Safety Officers (RSO) employed by the licensees in the industrial sector. CNSC staff informed the Commission that every licensee considered in the ROR was required to have an RSO to oversee their licenced activities and that licensees with complex operations or multiple geographic locations could employ multiple RSOs.

61. The Commission voiced concern with respect to the issue that RSOs may have insufficient time to carry out their radiation safety related duties due to time spent on other tasks. The CIRSA representative reported that industrial radiography licensees were knowledgeable, had specific training in relevant radiation safety matters, that the data in the ROR showed improving trends in that sub-sector and that the success of an RSO was evident in how the RSO conducts their duties. CNSC staff reported that the adequacy of how an RSO was carrying out the required duties would be seen during its evaluation of compliance activities and that CNSC staff would take appropriate enforcement actions as necessary. CNSC staff further informed the Commission that additional verification activities were carried out in respect of licensees where the RSO had additional duties to perform and therefore was not solely dedicated to the management of radiation safety programs.
62. Upon request from the Commission, CNSC staff provided the Commission with detailed information regarding the requirements of an RSOs knowledge, education and training, as well as CNSC staff's risk-informed approach for the evaluation of RSO qualifications. Asked by the Commission about its views in this regard, the CIRSA representative advocated for the creation of a guidance document containing more specific guidance for RSOs in the industrial sector; however, the CIRSA representative also noted the potential challenges in regard to the development of such a document.
63. The Commission enquired about the CRPA's views in regard to RSO certification. The CRPA representative informed the Commission regarding the history and the requirements of its own professional designation program for Registered Radiation Safety Professionals (RRSPs). The CRPA representative stated that the CRPA's support of RSO certification would depend on what the exact certification process would entail, and noted that the CRPA's current professional designation process was developed using advice that was provided by CNSC staff.

Compliance Ratings, Verification and Enforcement

64. The Commission requested additional information about the CNSC's rating system for licensees and how this differed from the previous compliance rating system, noting that CELA, CIRSA, and the CRPA raised concerns about the licensee ratings in their interventions. CNSC staff provided to the Commission a detailed explanation on how licensees were rated and provided clarification to the Commission regarding the differences between a compliance rating of "unacceptable" and the previously-used compliance rating

of “seriously compromised”. The Commission expressed the view that the compliance rating categories should be clearer, that examples for how licensees would be rated should be provided, and that ratings should be linked to the risk associated with the licensed activities. CNSC staff noted the feedback provided by the Commission on this matter, and stated that CNSC would be presenting a comprehensive explanation of the rating system to the Commission at the March 2018 Commission meeting.

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65. The Commission enquired about the apparent downward trend in compliance ratings for the medical sector. CNSC staff provided the Commission with information about non-compliances in this sector, noting that many were related to management system, operating performance and radiation protection, and provided the Commission with details about the performance-based oversight approach that CNSC staff was taking to address these findings. The Commission also noted the percentage of non-compliances within the security area of the medical sector, due to non-compliances with respect to the criteria of REGDOC-2.12.3, *Security of Nuclear Substances: Sealed Sources*,¹¹ during the first phase of its implementation in 2015. CNSC staff provided additional details to the Commission regarding the actions CNSC staff would take to ensure licensees meet the criteria of that REGDOC.
66. Further to these aforementioned downward trends, the Commission enquired about challenges unique to that sector. CNSC staff provided the Commission with information about the complexities of the regulated activities carried out in the medical sector, the challenges associated with these activities, and the means by which CNSC staff was addressing these trends with licensees. The Commission noted that these trends were analyzed by subsector and licensed activity and that inspections were scheduled and prioritized in that regard. CNSC staff added that this drop in performance would be assessed through the CNSC’s risk-informed regulatory program.
67. The Commission noted that certain regulated activities of the commercial sector such as cyclotron facilities were of a particularly high risk and recommended that these activities be categorized by the risk level. The Commission further recommended that the level of risk associated with regulated activities in the medical sector also be subdivided into low-, medium- and high-risk categories, in order to improve public understanding of the risks associated with the use of nuclear substances in that sector.

¹¹ Canadian Nuclear Safety Commission Regulatory Document REGDOC-2.12.3, *Security of Nuclear of Substances: Sealed Sources*, May, 2013.

68. CNSC staff provided the Commission with detailed information about the regulatory guidance and oversight activities applied to organizations where the management system was separate from the front-line workers, such as RSOs and technologists, to ensure that the licensees' management support infrastructure was adequate. The Commission noted the use of Type I inspections¹² as one such oversight activity.
69. Noting the event previously reported to the Commission at the Vancouver Coastal Health Authority,¹³ the Commission enquired about the methods by which CNSC staff would address concerns regarding a licensee's radiation protection program (RPP). CNSC staff provided the Commission with information about how it addressed that specific event, and on how non-compliances with regards to RPPs are addressed by CNSC staff.
70. Addressing the Commission's questions about compliance verification and enforcement activities for licensees based outside of Canada, CNSC staff provided an overview of those activities. CNSC staff further explained that CNSC licensee inspections could be carried out by CNSC staff outside of Canada if required, and provided details and an example of such an event.
71. CNSC staff informed the Commission of its internal processes and procedures which had governed all compliance oversight work, such as the regulatory response to non-compliances. CNSC staff further reported that the inspector training and qualification program ensures that inspectors are qualified and are authorized to take immediate action, when necessary.
72. Asked to detail how a Designated Officer determined whether an AMP should be issued against a licensee, CNSC staff stated that the *Administrative Monetary Penalties Regulations*¹⁴ provided all of the requirements in regard to the issuance of an AMP, and provided to the Commission a detailed explanation of the process for the issuance of an AMP. The Commission noted that this information should be added as an Appendix in this ROR, and

¹² A systematic, planned and documented process to determine, through objective evidence, whether a licensee program, process or practice complies with the regulatory requirements as expressed in the compliance criteria associated with the inspection. Also called audit; evaluation. (Canadian Nuclear Safety Commission Regulatory Document – REGDOC-3.6, *Glossary of CNSC Terminology*, December, 2016).

¹³ Canadian Nuclear Safety Commission, CMD 16-M72, *Vancouver Coastal Health Authority: Exceedance of a regulatory dose limit by a nuclear energy worker during a therapeutic nuclear medicine procedure*, December, 2016.

¹⁴SOR/2013-139.

stated that it would have been beneficial if CNSC staff had categorized the orders and AMPs discussed in the ROR by their sectors and subsectors, as an additional performance measure for those sectors.

73. The Commission asked whether CNSC staff tracked licensees with repeated non-compliance issues. CNSC staff responded that the compliance history of licensees was tracked and used in the preparation for future inspections to determine if the licensees addressed those non-compliances or if CNSC staff would need to take additional enforcement actions. CNSC staff added that discussions between CNSC staff and the RSO and/or applicant authority were an effective means for resolving repeated non-compliances.

Packaging and Transport

74. The Commission enquired as to why “Packaging and Transport,” which was a standalone SCA, was included in the ROR under “reported events” and not reported on separately. CNSC staff responded that the four SCAs that were specifically reported on were representative of the industries considered in this ROR, noting that not all licensees carried out packaging and transport activities. CNSC staff further informed the Commission that any events or non-compliances related to packaging and transport were communicated to the Commission as well as reported in the ROR. The Commission stated that the reasoning for not directly including the remaining SCAs should be added to the ROR.
75. The Commission requested additional information about the event involving unauthorized ride-share services during the transport of nuclear substance packages that was reported to the Commission during the December 14, 2016 Commission meeting.^{15,16} In that event, the driver had advertised on a travel share website and offered to drive passengers while making deliveries of packages that contained nuclear substances without disclosing the contents of the packages to the passengers, nor did the driver display the required placards on the vehicle. This event resulted in multiple non-compliances pursuant to the *Packaging and Transport of Nuclear Substance Regulations, 2015*¹⁷ and the *Transportation of Dangerous Goods Regulations*.¹⁸ CNSC staff provided the

¹⁵ Canadian Nuclear Safety Commission Member Document – CMD 16-M69, *Report on an overexposure to members of the public during transport of packages containing nuclear substances*, December, 2016.

¹⁶ Canadian Nuclear Safety Commission Meeting Minutes – *Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held on December 14, 2016*, December, 2016.

¹⁷ SOR/2015-145.

¹⁸ SOR/2017-137.

Commission with this information and noted that an AMP¹⁹ was issued and that this matter is now considered closed.

Portable Gauges and Device Tracking

76. The Commission noted that there were several reported incidents of malfunctioning portable gauges and asked about the follow-up that would be performed in this regard. CNSC staff provided the Commission with an overview of the requirements and the process for reporting on malfunctioning gauges, including those provided for by the *Nuclear Substance and Radiation Device Regulations*²⁰ that required a device to be serviced before it was returned to use. CNSC staff added that it certified all portable gauge devices and tracked information related to events, therefore if a deficiency was identified with a particular device, CNSC staff would encourage the manufacturer to make modifications to the design.
77. The Commission noted that the USNRC maintained a portable gauge database in order to track those devices across the USA and asked if a similar database was employed in Canada. CNSC staff provided the Commission with information on the reporting and tracking systems that were used by CNSC staff to monitor and track the use and transportation of licenced sources within Canada. CNSC staff added that licensees were required to report any changes to their device inventory to CNSC staff and that these inventories were physically verified during CNSC staff inspections. CNSC staff added that it had used the aforementioned tracking systems to collect and identify licensee inventories during the recent wildfires in Alberta and B.C.

Enhancing Oversight of Radiation Safety Officers and Radiation Protection Programs for Nuclear Substance and Radiation Device Licensees

78. Having completed the review of the 2016 Regulatory Oversight Report on the Use of Nuclear Substances in Canada, CNSC staff presented a new information item to the Commission regarding the CNSC's oversight of radiation safety officers (RSO) and licensee radiation protection programs (RPP) for Nuclear Substance and Radiation Device (NSRD) licensees as referenced in CMD 17-M44 and CMD 17-M44.A. In response to Commission requests from the October 2016²¹ and the April 2017²² Commission meetings, CNSC

¹⁹ Canadian Nuclear Safety Commission Notice of Violation (Individual) – AMP Number: 2017-AMP-04, March 10, 2017.

²⁰ SOR/2000-207.

²¹ *Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held on September 21 and 22, 2016*, paragraph 74.

²² *Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held on April 12, 2017*, paragraph 33.

- staff provided information about the CNSC initiative to evaluate the RSO role and to enhance RPP design and implementation. CNSC staff provided the Commission with an overview of recent industry trends resulting in the amalgamation of licences issued by the Directorate of Nuclear Substance Regulation (DNSR); the necessary elements of an effective NSRD licensee RPP; planned RPP guidance, including a new REGDOC; the roles of the Applicant Authority (AA) and the RSO; and the planned RSO evaluation.
79. The Commission expressed overall agreement with CNSC staff's suggested approach to evaluate and clarify the RSO role and enhance RPP guidance, but noted that the role of RSOs in facilities with complex governance structures, such as facilities that produced medical radioisotopes, should also be considered in the evaluation. CNSC staff agreed that there was benefit in evaluating the roles of RSOs in these organizations and that these would be included in the evaluation. CNSC staff further noted that, although industrial radiography was a high risk activity, the licensee organizational models and governance structures for this regulated activity were often simple and that their evaluation would provide less value. The Commission agreed with CNSC staff in this regard but suggested that CNSC staff consults with industry associations in planning for the evaluations.
80. The Commission requested additional information about CNSC staff's benchmarking exercise which compared the CNSC's RSO and RPP framework with that of the United States Nuclear Regulatory Commission (USNRC). The Commission noted that the USNRC was very prescriptive in its requirements for RSOs and RPPs, while Canada's framework was more risk-informed and did not provide extensive guidance. CNSC staff agreed with the Commission on this point and explained that, while benchmarking showed that the CNSC's RSO and RPP framework was, overall, similar to the USNRC's framework, the USNRC's prescriptive RSO qualifications and RPP structure guidance could be leveraged to enhance Canada's framework. CNSC staff also stated that a benchmarking exercise evaluating international RPPs and RSOs will be carried out to further enhance Canada's framework in this regard.
81. The Commission further enquired about how CNSC staff planned to leverage the USNRC's guidance while maintaining Canada's risk-informed and performance-based approaches to regulation, noting that the primary goal of licensee guidance should be to ensure and enhance licensee safety programs. CNSC staff explained that the proposed REGDOC would supplement

REGDOC-1.6.1²³ in providing constructive guidance that set clear expectations for all NSRD licensees in regard to RSO qualifications and RPP structure, regardless of a licensee's organizational nature, size or model. CNSC staff further explained that, due to the wide range of licensees to which this REGDOC would apply, extensive stakeholder consultation would be conducted during the REGDOC's development and, where applicable, additional benchmarking against other Canadian regulators would be carried out.

82. The Commission noted the long-term nature of the proposed REGDOC and RSO evaluation initiatives and their implementation, and enquired about shorter-term initiatives that CNSC staff were implementing to improve licensee performance. CNSC staff provided the Commission with information about its shorter-term performance improvement activities including: in-depth engagement with AAs to address or prevent systemic issues that had been identified in licensees' RPPs; increased communication with licensees about CNSC enforcement actions that had been taken; and the adoption of a more performance-based and proactive approach to licensee inspections, including increased Type I inspections²⁴ to inspect the implementation of licensee programs. CNSC staff also stated that, through this proactive approach to the CNSC's regulation of NSRD licensees and increased follow-ups with RSOs and AAs, CNSC staff had observed increased senior management engagement and implementation of proposed RPP improvements. The Commission expressed satisfaction with the apparent success of CNSC staff's efforts in improving the CNSC's regulatory oversight of these licensees in the shorter term.
83. The Commission requested additional information regarding current certification requirements for RSOs. CNSC staff responded that the CNSC certified Class II facility RSOs,²⁵ but noted that the certification of RSOs for the other DNSR-licensed sectors was not required. CNSC staff further explained that, considering the CNSC's risk-informed approach to regulation, the certification of RSOs had been previously evaluated and was found to not be necessary for other DNSR-licensed sectors. CNSC staff reported, however, that an RSO's qualifications were evaluated during the

²³ CNSC Regulatory Document REGDOC-1.6.1, *Licence Application Guide: Nuclear Substances and Radiation Devices*, Version 2, May 2017.

²⁴ Type I inspection: "A systematic, planned and documented process to determine, through objective evidence, whether a licensee program, process or practice complies with the regulatory requirements as expressed in the compliance criteria associated with the inspection. Also called audit; evaluation." As defined in REGDOC-3.6, *Glossary of CNSC Terminology*, January 2017.

²⁵ Pursuant to the *Class II Nuclear Facilities and Prescribed Equipment Regulations* (SOR/2000-205), section 15.02, radiation safety officers at Class II facilities must be certified by the Commission or a designated officer authorized under paragraph 37(2)(b) of the NSCA.

licensing assessment process and compliance verification activities, and provided the Commission with detailed information in this regard.

84. CNSC staff informed the Commission about its RPP compliance verification activities which included ensuring that an RSO was given adequate resources by the AA to effectively carry out and fulfill their licensing obligations. The Commission enquired about the means by which CNSC staff could assess whether an RSO had adequate resources at their disposal. CNSC staff explained that CNSC expectations in this regard were assessed through Type I and Type II inspections,²⁶ as well as through one-on-one interviews with licensee staff, the RSO and the AA. CNSC staff further explained that these mechanisms and the CNSC's suite of graduated enforcement tools enabled CNSC staff to effectively and accurately oversee licensee RPPs and the resources made available to RSOs by the AAs.
85. The Commission further enquired about how the CNSC's compliance verification activities ensured that a corporate RSO responsible for the management of several sites had adequate support from the AA and local site RSOs. CNSC staff reported that, through the licensing assessment process and CNSC inspections, CNSC staff could assess the organizational structure of a licensee in depth to ensure that these support mechanisms were in place. CNSC staff also stated that Type II inspections were carried out at individual licensee sites and that, during these inspections, CNSC staff assessed the performance of the site and whether the site staff was following corporate policies and licensing requirements.
86. The Commission asked about the number of AAs who could be specified on one licence. CNSC staff responded that each NSRD licence had to have a single, designated AA. However, CNSC staff noted that, in cases where a facility operated under several CNSC licences, the facility could have different AAs for each individual licence.
87. The Commission expressed a concern about the possibility for multiple AAs at a licensee site operating under multiple CNSC licences, and thus the potential for multiple RPPs at a single site. Regarding the Commission's concern that this could lead to a competition for resources and a potential breakdown of an RPP,

²⁶ Type II inspection: "A planned and documented activity to verify the results of licensee processes and not the processes themselves. Type II inspections are typically routine (item-by-item checklist) inspections and rounds of specified equipment and/or facility material systems, or of discrete records, products or outputs from licensee processes." As defined in REGDOC-3.6, *Glossary of CNSC Terminology*, January 2017.

CNSC staff explained that the diversity in operations, governance and funding structures within some large organizations led to the need for multiple licences with different RPPs and potentially multiple AAs at one site. CNSC staff also stated that combining RPPs in organizations with diverse operations had not always proven to be beneficial and emphasized the importance of the AA being a person who was not too far removed from day-to-day operations and who could maintain accountability for the licensed activities.

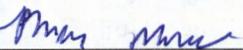
88. The Commission further noted that, with the recent trend of licence amalgamations at large facilities leading to large organizational radiation protection committees with several stakeholders, there was a risk of diluting the overall focus on radiation safety due to competing priorities. CNSC staff agreed that a delicate balance of priorities existed in this regard and that the proposed evaluation would help refine these complex aspects of licensee RPPs.
89. The Commission appreciated the information provided by CNSC staff. The Commission agreed that the proposed evaluation of the role of the RSO and the review of RPPs was required to ensure that effective RPPs were implemented by NSRD licensees and that those licensees had adequate guidance in this regard. The Commission provided CNSC staff with membership recommendations for to the proposed evaluation advisory committee, indicating that the committee should include a radiation oncologist or a nuclear medicine physician. CNSC staff stated that the Commission's recommendations would be implemented where practicable.

Closure of the Public Meeting

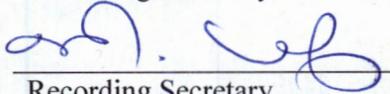
90. The meeting closed at 16:16 p.m.


Recording Secretary

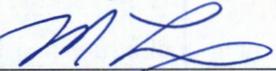
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Recording Secretary

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Recording Secretary

2017-12-14
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Secretary

15-12-2017
Date

APPENDIX A

CMD	Date	e-Docs No.
2017-M-02	2017-05-01	5240215
Notice of Participation at a Commission Meeting and Participant Funding		
2017-M-02 Rev. 1	2017-05-19	5254204
Revised Notice of Participation at a Commission Meeting and Participant Funding		
17-M39	2017-09-20	5340996
Notice of Commission Meeting		
17-M40	2017-09-27	5346393
Agenda of the Meeting of the Canadian Nuclear Safety Commission (CNSC) to be held on Wednesday and Thursday, October 11 and 12, 2017 in the Public Hearing Room, 14 th floor, 280 Slater Street, Ottawa, Ontario		
17-M40.A	2017-10-05	5346774
Updated Agenda of the Meeting of the Canadian Nuclear Safety Commission (CNSC) to be held on Wednesday and Thursday, October 11 and 12, 2017 in the Public Hearing Room, 14 th floor, 280 Slater Street, Ottawa, Ontario		
17-M40.B	2017-10-10	5357579
Updated Agenda of the Meeting of the Canadian Nuclear Safety Commission (CNSC) to be held on Wednesday and Thursday, October 11 and 12, 2017 in the Public Hearing Room, 14 th floor, 280 Slater Street, Ottawa, Ontario		
17-M43	2017-10-05	5355148
Status Report on Power Reactors		
17-M52	2017-10-05	5355148
Event Initial Report Bruce Power: Failure of the primary heat transport pump seals at the Bruce A unit 3 Nuclear Generating Station Submission from CNSC Staff		
17-M52.1	2017-10-06	5356865
Event Initial Report Bruce Power: Failure of the primary heat transport pump seals at the Bruce A unit 3 Nuclear Generating Station Presentation from Bruce Power		
17-M53	2017-10-05	5354496
Event Initial Report BWXT Nuclear Energy Canada Inc. Peterborough: Beryllium Occupational Exposure Level Exceedance for two workers Submission from CNSC Staff		

CMD	Date	e-Docs No.
17-M49	2017-09-27	5346268
Information Items 2016-2017 Annual Program Report, Regulatory Framework Program Submission from CNSC Staff		
17-M49.A	2017-10-11	5353368
Information Items 2016-2017 Annual Program Report, Regulatory Framework Program Presentation by CNSC Staff		
17-M42	2017-08-04	5312421
Information Items Regulatory Oversight Report on the Use of Nuclear Substances in Canada: 2016 Submission from CNSC Staff		
17-M42.A	2017-10-12	5353135
Information Items Regulatory Oversight Report on the Use of Nuclear Substances in Canada: 2016 Presentation by CNSC Staff		
17-M42.B	2017-10-05	5348645
Information Items Regulatory Oversight Report on the Use of Nuclear Substances in Canada: 2016 Supplementary information from CNSC Staff		
17-M42.1	2017-09-06	5335492
Information Items Regulatory Oversight Report on the Use of Nuclear Substances in Canada: 2016 Presentation by the Canadian Industrial Radiography Safety Association		
17-M42.2	2017-09-08	5335442
Information Items Regulatory Oversight Report on the Use of Nuclear Substances in Canada: 2016 Submission from the Canadian Radiation Protection Association		
17-M42.2A	2017-10-02	5350288
Information Items Regulatory Oversight Report on the Use of Nuclear Substances in Canada: 2016 Presentation by the Canadian Radiation Protection Association		
17-M42.3	2017-09-11	5336167
Information Items Regulatory Oversight Report on the Use of Nuclear Substances in Canada: 2016 Submission from the Canadian Environmental Law Association		

CMD	Date	e-Docs No.
17-M42.3A	2017-10-04	5353332
Information Items Regulatory Oversight Report on the Use of Nuclear Substances in Canada: 2016 Presentation by the Canadian Environmental Law Association		
17-M42.4	2017-09-25	53370123
Information Items Regulatory Oversight Report on the Use of Nuclear Substances in Canada: 2016 Submission from the Algonquins of Ontario		
17-M44	2017-09-27	5346856
Information Items Enhancing Oversight of Radiation Safety Officers and Radiation Protection Programs for Nuclear Substance and Radiation Devices Licensees Submission from CNSC Staff		
17-M44.A	2017-10-12	5353615
Information Items Enhancing Oversight of Radiation Safety Officers and Radiation Protection Programs for Nuclear Substance and Radiation Devices Licensees Presentation by CNSC Staff		