



Minutes of the Canadian Nuclear Safety
Commission (CNSC) Meeting Held on
March 15, 2018

Minutes of the Canadian Nuclear Safety Commission (CNSC) meeting held Thursday, March 15, 2018, beginning at 9:00 a.m., in the Public Hearing Room, 14th floor, 280 Slater Street, Ottawa, ON.

Present:

M. Binder, President
Ms. R. Velshi
Dr. S. Demeter
Ms. K. Penney
Mr. T. Berube

K. McGee, Assistant Secretary
L. Thiele, Senior General Counsel
S. Baskey, P. McNelles, S. Smith, Recording Secretaries

CNSC staff advisors were:

P. Elder, G. Frappier, M. Rinker, C. Moses, E. Leader, L. Sigouin, E. Lemoine, W. Grant, N. Riendeau, K. Hazelton, C. Purvis, H. Robertson, K. Owen-Whitred, D. Miller, B. Torrie, G. Lamarre, A. Bouchard, T. Hewitt, P. Adams, M. Broeders, V. Goebel, K. Heppel-Masys, P. Fundarek, D. Estan, P. Larkin, M. Hornof, M. Leblanc, C. Pike and J. Stevenson

Other contributors were:

Ontario Power Generation: R. Manley, B. Vulcanovic, R. Geofroy and I. Edwards
Bruce Power: M. Burton
New Brunswick Power: R. Gauthier
20/20 ND Technology: D. Pimm
Health Canada: R. Wilkins
Windsor Regional Hospital: C. Pullo

Constitution

1. With the notice of meeting CMD 18-M5 having been properly given and a quorum of permanent Commission members being present, the meeting was declared to be properly constituted.
2. Since the meeting of the Commission held January 23, 2018, Commission member documents (CMD) 18-M9, 18-M10, 18-M13, 18-M14, 18-M12, 18-M11, 18-M15, 18-M16 and 18-M18 were distributed to members. These documents are further detailed in Annex A of these minutes.

Adoption of the Agenda

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

Minutes of the CNSC Meeting Held December 13-14, 2017

4. The draft minutes of the December 13-14, 2017 Commission meeting, CMD 18-M7 were approved by Commission members S. Demeter and M. Binder. Previous Commission members S. McEwan, S. Soliman and R. Seeley who participated in the December 13-14, 2017 meeting had approved the minutes secretariially.

Minutes of the CNSC Meeting Held January 23, 2018

5. The draft minutes of the January 23, 2018 Commission meeting, CMD 18-M8 were approved by Commission members S. Demeter and M. Binder. Previous Commission members S. McEwan, S. Soliman and R. Seeley who participated in the January 23, 2018 meeting had approved the minutes secretariially.

STATUS REPORTS

Status Report on Power Reactors

6. With reference to CMD 18-M9, which provides the Status Report on Power Reactors, CNSC staff provided updates on the following:
 - Bruce Nuclear Generating Station (NGS) A Unit 2 was placed into an unplanned outage on March 11, 2018 to install enhanced monitoring on the primary heat transport pumps (HTPs).
 - Ontario Power Generation Inc. (OPG) stopped work in contamination control areas associated with refurbishment activities at the Darlington NGS Unit 2 due to deficiencies in radiation safety practices identified by CNSC inspectors and OPG. OPG carried out a full radiological assessment and characterization of the affected contamination control areas and these were later returned to service. CNSC staff will consider this issue during its upcoming reactive inspection at the Darlington NGS Unit 2.
 - Pickering NGS Unit 4 was in a guaranteed shutdown state following the start of a planned outage on March 7, 2018.

- At the Pickering NGS, a safety stand down was proactively conducted on March 12, 2018 by OPG management to reinforce safety expectations following the observation of a negative trend in regard to safety practices. CNSC staff will continue to survey and monitor safety practices at the Pickering NGS.

OPG Darlington NGS Unit 2 Supply Transformer Overheating

7. The Commission enquired about whether the root cause analysis had explained why the Unit 2 supply transformer overheated. The OPG representative provided details about the event, noting that there was no impact on public or worker safety. The OPG representative further explained that the temperature increased because of excessive current demands being placed on the transformer and stated that corrective actions had been implemented. The Commission was satisfied with the information provided on this event.

OPG Safety Stand Downs

8. The Commission noted OPG's increasing need for safety stand downs due to an increased frequency of safety incidents and requested additional information from OPG about their effectiveness and lessons learned. The OPG representative provided the Commission with information about OPG's safety goal of zero workplace injuries and explained that the rationale behind a safety stand down was to communicate with and impart safety expectations to staff. The OPG representative further stated that OPG's maximum reasonable potential for harm event frequency was decreasing and submitted that this was indicative of the success of recent safety stand downs.
9. The Commission requested additional information regarding the negative trend in safety practices that had been observed at the Pickering NGS prior to the safety stand downs. CNSC staff provided additional details about the event that led to the Pickering NGS stand down on March 12, 2018 and about the corrective actions that OPG took in response to the negative trend that was observed. OPG expressed agreement with the information provided by CNSC staff and stated that the proactive actions which were immediately taken in relation to this event were indicative of OPG's commitment to the health and safety of its workers and the public.

10. Noting OPG's submission that safety stand downs were common industry best practice and could be reflective of the effectiveness of an organization's safety culture, the Commission requested additional information in this regard and whether OPG's stand downs had been required by the CNSC. CNSC staff responded that OPG had a strong safety culture and that each of the recent safety stand downs had been a proactive safety action taken by OPG. The OPG representative provided additional information about actions taken to further improve OPG's safety culture.

OPG Darlington NGS Unit 2 Worker Injury

11. The Commission requested more details about the worker injury due to a trip reported at Darlington NGS Unit 2 on February 26, 2018. Asked about the severity of the trip, the OPG representative provided information about the hazard that caused the trip and about the injury sustained to the worker. The OPG representative further explained that the event had not resulted in a lost-time accident and that corrective actions were immediately taken to improve housekeeping in the work area. The Commission was satisfied on this point.

Bruce NGS Unit 2 Derating due to a Turbine Steam Valve Issue

12. The Commission requested further information to clearly explain the reported turbine steam valve issues at Bruce NGS Unit 2. The Bruce Power representative explained there had been a timing issue with the closing of one of the emergency stop valves which was taken out of service in order to be closed. Additionally, the Bruce Power representative reported that Unit 2 was derated but remained in operation while troubleshooting was carried out on the valve. The Bruce Power representative further noted that Unit 2 had since been shut down for maintenance and the valve issue would be corrected during the shutdown.

Event Initial Reports (EIR)

Bruce Power: Failure of the Primary Heat Transport (PHT) Pump Seals at Bruce A NGS Unit 4

13. With reference to CMD 18-M13, CNSC staff presented information regarding an event involving the failure of a Bruce NGS Unit 4 PHT pump gland seal that resulted in a heavy water leak.
14. With reference to CMD 18-M13.1, the Bruce Power representative provided the Commission with additional information about the

PHT pump setup, ongoing actions and the next steps that would be involved in completing the forensic investigation into the failure mechanism. The Bruce Power representative also described the similarities between this event and the Unit 3 PHT pump gland seal failure that occurred in August 2017 and was reported on during the August 2017¹ and October 2017² Commission meetings.

15. The Commission requested comments from Bruce Power about the severity of the accident and potential circumstances that could have exacerbated the situation. The Bruce Power representative stated that this was considered a minor event but noted that it could have been more severe had there been concurrent fuel damage and provided details in this regard. CNSC staff confirmed Bruce Power's information, explaining that contamination of the coolant water bypassing the containment barrier was the primary concern, and provided additional details about the releases observed during the August 2017 and March 2018 PHT pump gland seal leaks relative to the worst-case scenario.
16. Asked about whether lessons learned from the August 2017 Unit 3 gland seal failure could have prevented this event, the Bruce Power representative reported that, as of the first observed event in August 2017, the occurrence of these failures had been classified as extremely rare and the immediate shutdown of the remaining units had not been warranted. The Bruce Power representative also stated that, at the time of the August 2017 event, Bruce Power had planned to implement enhanced vibration monitoring for Units 2 and 4 during maintenance outages. The Bruce Power representative further explained that, with the Unit 4 PHT pump gland seal failure within a year of the gland seal failure at Unit 3, Unit 2 had been proactively shut down. CNSC staff informed the Commission that CNSC staff had accepted Bruce Power's timeline to implement the vibration monitoring enhancements to prevent further PHT pump gland seal failures.
17. Commenting on the rarity of the pump seal failures, the Commission expressed surprise at seeing two such failures in seven months and requested comments regarding aging management for the PHT pumps. The Bruce Power representative provided information regarding the age of the seals that had failed and their expected performance during the usual pump seal life cycle. CNSC staff stated that more accurate information would be available

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

² *Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held on October 11 and 12, 2017.*

when the analyses and investigations were complete, noting that changes to maintenance approaches or tolerance build-ups would be considered in CNSC staff's investigations.

18. The Commission enquired whether these PHT pumps were unique to the Bruce NGS or whether other operators could provide additional data. CNSC staff stated that international operational experience with these pumps showed that this was not a unique situation. The Bruce Power representative provided information about the history of pump seal failures over the total reactor operation time, the pump configuration and the similarity of the seals between the Bruce, Darlington and Point Lepreau NGS PHT pumps.
19. Asked for additional details about containment boundary concerns during pump seal failures, the Bruce Power representative explained that any pump seal failure was undesirable, even if it occurred within the containment boundary, but that Bruce Power had control room alarms in place to monitor inner seal pressure to quickly and easily detect these events preventing any external releases.
20. The Commission requested additional information about the dose received by the workers responding to the event. The Bruce Power representative explained that the dose to the workers originated from tritium exposure and external gamma radiation inherent to the area, which was close to the reactor. CNSC staff further noted that the tritium exposure had been significantly attenuated by the use of appropriate full body personal protective equipment. CNSC staff reiterated the information provided in the EIR and stated that all exposures were well below regulatory limits.
21. Following the Commission's enquiry about what would be done with the heavy water from the leak, the Bruce Power representative explained that the heavy water would be transferred to an on-site facility to remove impurities and then recycled.
22. The Commission asked for comment from each the OPG and New Brunswick Power (NB Power) representatives about whether preventive actions would be taken as a result of the gland seal failure events. The OPG representative explained that OPG was in contact with Bruce power to understand the event as it evolved, share operational experience and will review information as it is made available. The OPG representative also informed the Commission about a new pump seal design pilot project underway and provided a summary of OPG's practice to evaluate the

condition of their pumps. The New Brunswick (NB) Power representative stated that they were also aware of the situation at Bruce Power and, while Point Lepreau operated similar seals, it had not experienced the same problem and that monitoring programs had not noted any anomalies. The NB Power representative also explained that forensic information from Canadian Nuclear Laboratories was needed to plan any specific future actions.

23. The Commission expects that additional information will be presented following completion of forensic investigations and root causes analyses.

ACTION
Oct. 2018

Ontario Power Generation: Darlington Refurbishment Retube Waste Processing Building – Internal Contamination Event

24. With reference to CMD 18-M14, CNSC staff presented information regarding an internal contamination event at the Darlington NGS refurbishment retube waste processing building (RWPB).
25. The Commission expressed its concern over OPG's failure to properly recognize the alpha hazard potential of this event. Recognizing the Commission's concerns, the OPG representative stated that OPG strived to have zero unplanned radiation exposures and acknowledged the importance of fully understanding the potential radiological hazards at the NGS. The OPG representatives provided additional details about the event and explained that initial work in the RWPB had been conducted in accordance with an Alpha Level 3 hazard classification and with personal protective equipment appropriate for that hazard classification. However, during this initial work there had been no presence of alpha radiation or significant levels of contamination, resulting in the declassification from an Alpha Level 3 hazard to an Alpha Level 1 hazard.
26. The Commission requested additional explanation of the rationale behind the alpha hazard-level declassification in the RWPB work area. The OPG representative provided the Commission with information about OPG's alpha monitoring program and about how alpha level hazards were determined, and provided further clarification about why the hazard level for the RWPB work had been downgraded. The OPG representative confirmed to the Commission's satisfaction that measures were in place to move forward treating waste as Alpha Level 3 until there was substantial evidence to the contrary. CNSC staff stated that CNSC's radiation monitoring and control expectations were clear and that baseline

characterization should always be revalidated when there is new or changing work. CNSC staff also informed the Commission that more information about the work area reclassification would be available when CNSC staff's and OPG's investigations were completed.

27. Noting that no significant contamination was detected during the initial work at the RWPB, the Commission requested additional information about the routine surveillance and real-time monitoring capabilities during this work. CNSC staff stated that approved monitoring was being carried out and that the most recent CNSC inspection of the radiation protection practices in the RWPB found that the characterization of the contamination control areas had been performed in compliance with regulatory requirements. CNSC staff provided additional details about inspection activities following the event and stated that increased field presence by CNSC staff, as well as follow-up field inspections to confirm OPG's corrective actions, were being performed.
28. Noting that the EIR indicated that OPG had not itself filed an event report and were prompted by CNSC staff to do so, the Commission requested an explanation. The OPG representative provided a summary of reporting mechanisms that OPG used in compliance with CNSC REGDOC-3.1.1, *Reporting Requirements for Nuclear Power Plants*,³ and stated that at no time did OPG's health physicists evaluate a possible dose exceedance of an action level or regulatory limit during this event. The Commission expressed its dissatisfaction at OPG's justifications for not proactively filing an event report with the CNSC, noting that alpha events had in the past been high profile and reportable. In the Commission's view, it was unacceptable for OPG to not know this was reportable.
29. Asked whether the affected individuals were contractors and if they had suitable radiological training and supervision, the OPG representative informed the Commission that the workers were contractors and that they had received training from OPG radiation protection technicians that qualified them to work in a radiological area. The OPG representative also provided details about the radiological monitoring equipment used by OPG supervisors. OPG also informed the Commission that estimated dose consequences to the exposed workers were low and no action levels or regulatory limits had been exceeded.

³ CNSC Regulatory Document REGDOC-3.1.1, *Reporting Requirements for Nuclear Power Plants*, Version 2, April 2016.

30. The Commission expects that an update will be provided following the availability of additional information and inspections.

ACTION
Oct. 2018

20/20 ND Technology Inc.: Potential dose limit exceedance for a certified exposure device operator (CEDO)

31. With reference to CMD 18-M15, CNSC staff presented information regarding an event involving a potential dose limit exceedance for a CEDO employed by CNSC licensee 20/20 ND Technology Inc. (20/20 NDT) that occurred on December 18, 2017. During radiography operations at a third-party site, the 20/20 NDT's radiation safety officer (RSO), who was also a CEDO, was contacted to perform a source retrieval. Following the source retrieval, the direct reading dosimeter worn by the RSO recorded a whole body dose of 0.45 mSv, similar to the calculated dose included in the licensee's report. However, the results of the RSO's dosimeter from a CNSC-licensed dosimetry service provider showed a dose of 151.48 mSv, which is in excess of the annual dose limit for a nuclear energy worker (NEW) of 50 mSv, and the five-year dosimetry limit of 100 mSv.
32. Noting that the proper emergency response procedures were not followed during the event, the Commission requested additional details in this regard. The 20/20 NDT representative responded that the proper equipment had not been used because it had not been readily available and that notification to the CNSC had not been done in the prescribed timeframe. CNSC staff provided additional details about the equipment used and clarified that, due to the remoteness of the area in which the event occurred, the correct action that the licensee should have taken was to secure the area until the proper equipment could have been obtained to safely retrieve the source.
33. Regarding the difference in recorded dose between the direct reading dosimeter and the body dosimeter, the Commission enquired about the methods that could be used to analyze blood samples to estimate actual dose and about the type of dosimeter used by the RSO. The Health Canada representative provided the requested information about blood testing to estimate radiological dose and stated that results were not yet available. With regard to the type of dosimeter used, CNSC staff explained that an optically stimulated luminescence dosimeter (OSLD) had been used.
34. The Commission asked for additional details about Health Canada's dose assessment and whether a definitive estimate of the dose received would be available. The Health Canada representative responded that, although there would be some

uncertainty in the dose estimate, it would be possible to estimate a range in the dose to the worker.

35. The Commission asked for details about the provision of medical advice and follow-up for the RSO if the dose received was in fact consistent with the higher dose recorded by the OSLD. CNSC staff explained that the CNSC's role in this situation was to evaluate a return to work request for the RSO and to identify the appropriate path forward. CNSC staff further explained that, in such cases, the primary care physician would be the likely starting point for follow-up medical care and advice, if required.
36. The Commission further enquired about whether there were any known health impacts to the RSO. CNSC staff responded that, although the estimated dose was above the 50 mSv annual dose limit for a NEW, the estimated dose was still well below the threshold for acute health effects.
37. The Commission enquired about the training that had been provided to the RSO and whether this could have been a contributing factor in this event. CNSC staff responded that CNSC regulations specify general training requirements in situations of source retrieval. The 20/20 NDT representative acknowledged that the RSO's training was out of date and that the RSO had been scheduled for the next available course, but had not completed it at the time of the event. The 20/20 NDT representative provided the Commission with information about other contributing factors to this event and stated that 20/20 NDT was updating its procedures to prevent similar occurrences in the future.
38. The Commission asked for additional details about the amount of time that passed between the event and the licensee's report to the CNSC. CNSC staff stated that this type of event should have been reported immediately, provided detailed information on reporting requirements for this type of event and explained to the Commission that 20/20 NDT's delayed reporting would be among the factors that CNSC staff would follow up on with the licensee.
39. Noting the Commission's concern that several weeks had passed before 20/20 NDT sending out the dosimeter to be read, CNSC staff explained that the accountability in this regard was solely the licensee's and that the dosimeter should have immediately been sent for reading. CNSC staff added that, during a CNSC inspection on January 18, 2018 when it was discovered that the OSLD had not been sent to be read, CNSC staff instructed 20/20 NDT to do so immediately.

40. The Commission requested additional details regarding the device that failed and whether such issues were frequent or indicated a design problem with the device. CNSC staff explained that this model was in widespread use across Canada and that issues were not common as long as the device was maintained and operated correctly in accordance with instructions and regulations.

41. The Commission requested that it be updated on this event, including the reporting delay and the final dose estimate results, when CNSC staff's investigations were completed and this information was available.

ACTION
by
May 2018

20/20 ND Technology Inc.: Industrial radiography vehicle fire – No damage to exposure device

42. With reference to CMD 18-M16, CNSC staff presented information regarding an event involving a fire in a vehicle belonging to 20/20 NDT that occurred on March 1, 2018. The vehicle contained an exposure device with a Category 2 iridium-192 sealed source for which 20/20 NDT holds a CNSC licence. The licensee recovered the exposure device following the fire and CNSC staff verified that the device was undamaged, which was expected since the device was certified as a Type B package and therefore had been verified to be capable of sustaining thermal stresses.

43. The Commission expressed satisfaction with the pictures provided by CNSC staff and enquired as to whether the fire department was aware that the vehicle contained an exposure device during its response and what precautions were taken as the fire was contained. The 20/20 ND Technology Inc. representative stated that monitoring equipment was used throughout the response to the fire and that the firefighters had appropriate direct reading dosimeters and had been instructed to evacuate in the event of an alarm. CNSC staff confirmed that the vehicle had been properly placarded for the type of device being transported.

44. The Commission enquired whether CNSC staff had inspected the licensee's vehicle and the exposure device during its follow-up. CNSC staff indicated that the exposure device had been examined and that it showed no signs of damage, with the measured surface dose rate typical for that exposure device with intact shielding.

45. The Commission expressed its satisfaction with the prompt action during this event by all parties and with CNSC staff's proactive follow-up at the site of the event upon learning about the event from social media. This matter is closed.

Windsor Regional Hospital: Exceedance of a regulatory dose limit by a nuclear energy worker (NEW) during a diagnostic nuclear medicine procedure

46. With reference to CMD 18-M18, CNSC staff presented information regarding an event involving the exceedance of regulatory dose limit by a NEW at the Windsor Regional Hospital. The worker, a nuclear medicine technician, was contaminated with technetium-99m macro aggregated albumin (MAA) on the right wrist while working with the radionuclide. The estimated extremity dose to the worker was 3.6 Sieverts (Sv), or 3,600 milliSieverts (mSv), several times higher than the 500 mSv annual regulatory dose limit to an extremity. CNSC staff noted a typo in the EIR and explained that the event and all subsequent actions occurred in 2018, not in 2017.
47. The Commission asked about whether the worker was showing visible symptoms as a result of the exposure and about typical symptoms at a 3.6 Sv dose to an extremity. CNSC staff responded that the worker was not showing any visible effects as a result of the exposure to Tc-99m. CNSC staff further explained that, for an exposure of 2 to 6 Sv, skin reddening may be observed.
48. The Commission expressed surprise that no visible symptoms were observed on the worker in this event when the estimated dose of 3.6 Sv was of a level where skin reddening would be expected to occur. CNSC staff clarified that the exposure estimate was a conservative dose estimate and represented the highest likely dose. CNSC staff further explained why the actual dose received to the worker may have been lower.
49. Noting the corrective actions being implemented by the Windsor Regional Hospital in response to this event, the Commission requested further details about the equipment and procedures that were being used when this event occurred. The Windsor Regional Hospital representative provided the Commission with details about the equipment that the worker was using during the event as well as the detailed procedures that were followed, including the use of lead shielding around the syringe. The Windsor Regional Hospital representative, while noting that such events do occur due to the manual nature of the work, also explained that the Windsor Regional Hospital had purchased additional safety equipment,

including safety gloves with extended cuffs, and that this equipment would be expected to reduce the likelihood of this type of event in the future. CNSC staff added that, in regard to the sharing of operational experience, information about this event and the additional safety equipment that had been put in place by the licensee would be shared with other licensees carrying out similar work. The Commission indicated that it was satisfied with the information provided by CNSC staff and the Windsor Regional Hospital representatives. This matter is closed.

INFORMATION ITEMS

Status of the Designated Officer Program: 2016

50. With reference to CMD 18-M10 and CMD 18-M10.A, CNSC staff presented information on the Designated Officer (DO) Program, including a description of the program and information and statistics concerning the program during the 2016 calendar year.
51. The Commission expressed its satisfaction at the relatively low number of Administrative Monetary Penalties (AMPs) issued in 2016. The Commission noted that there had been some concern from licensees about the potential for overuse of this enforcement mechanism, but that the 9 AMPs issued in 2016 indicated that there was no overuse.
52. The Commission asked for clarification as to the meaning of the wording on Slide 16 of CNSC staff's presentation, which stated "17 inspector order confirmations or revocations orders that were revoked should have been confirmed." CNSC staff explained that these situations occurred when an order was revoked during a DO's review of the order after all conditions of the order had been met. CNSC staff further stated that this was not the proper process and that the orders should have been confirmed and closed once conditions were met. CNSC staff further explained that corrective actions had been put in place in order to ensure that orders would be properly confirmed in the future.
53. The Commission asked for CNSC staff comment on the challenges faced by DOs in making DO decisions. CNSC staff explained that challenges included ensuring that actions taken by DOs followed the process laid out in the *Nuclear Safety and Control Act* (NSCA) and its regulations, as well as understanding complex changes in corporate structure. CNSC staff additionally identified opportunities to be heard as a potential source of challenge, particularly in cases where sufficient information had not been

provided by the licensee in the licence application and there were time constraints, such as licence expiry.

54. The Commission requested additional details regarding timelines that were followed for making DO licensing decisions. CNSC staff provided information about the timelines established in *Canadian Nuclear Safety Commission Rules of Procedure*⁴ for matters related to DO statutory decision making.
55. The Commission called for additional information regarding the issuance of notices of violation and AMPs. CNSC staff explained that additional information was posted on the CNSC website whenever an AMP was issued and that any significant issues and events were reported to the Commission immediately.
56. The Commission requested that future annual summaries for the DO Program include information on the total number of licences held by CNSC licensees to give a sense of scale to evaluate the number of actions taken. CNSC staff agreed to include this information in future reports on the DO Program, but also clarified that some of this information was included in the annual Regulatory Oversight Report (ROR) on the Use of Nuclear Substances.
57. Further on DO Program reporting, the Commission asked CNSC staff to explain what information in the DO status report was also included in the annual RORs and what was unique to the DO status report. CNSC staff explained that certain DO activities did not fall within the context of any of the RORs, such as decisions made by DOs within the Directorate of Security and Safeguards. CNSC staff also explained that the DO status report also allowed reporting on issues unique to the DO Program, such as the upcoming DO Community Forum that would be held in April 2018. CNSC staff further explained that the DO status report allowed for reporting on all DO decisions in an aggregated fashion and met the requirements for the reporting on certain decisions to the Commission under subsection 37(5) of the NSCA. For the 2017 calendar year, CNSC staff agreed to determine whether a separate report in fall 2018 would be required, or whether it would be possible to report all information via regulatory oversight reports. CNSC staff explained that if there were to be a separate report for 2017, CNSC staff would determine whether it could be presented during a public Commission meeting or through other means.

⁴ SOR/2000-211.

DECISION ITEMS ON REGULATORY DOCUMENTS

Regulatory Document REGDOC-1.1.1, *Site Evaluation and Site Preparation for New Reactor Facilities*

58. With reference to CMD 18-M12 and 18-M12.A, CNSC staff presented CNSC Regulatory Document REGDOC-1.1.1, *Site Evaluation and Site Preparation for New Reactor Facilities*, to the Commission for consideration. This document is intended to supersede CNSC regulatory document RD-346, *Site Evaluation for New Nuclear Power Plants*⁵ and will establish updated and clearer requirements and guidance for site evaluation and preparation.
59. The Commission commented that it was good to see potential licensees involved in the public consultation process of the proposed REGDOC-1.1.1 and enquired about whether consultation results had met CNSC staff's expectations. CNSC staff reported that a conscious effort had been made to include appropriate representation from industry and other public stakeholders and that CNSC staff was satisfied with the consultation that had been carried out.
60. Noting that some comments received contradicted each other, the Commission enquired about how CNSC staff had dispositioned these comments. CNSC staff stated that its consultation with respect to regulatory documents was taken seriously and that it believed that its dispositioning of all comments that had been submitted was adequate. CNSC staff further explained that, when appropriate, an explanation of why a comment was not accepted was provided to the commenter.
61. The Commission requested clarification about whether this proposed REGDOC would apply to siting for small modular reactors (SMRs). CNSC staff confirmed that this REGDOC provided guidance for SMR siting, noting that the REGDOC was meant to be applied as part of a risk-informed approach and that, as such, there were no thresholds which would limit the document's scope.
62. Asked about what types of nuclear and hazardous substances could be released during the site preparation stage, CNSC staff explained that the proposed REGDOC considered nuclear and hazardous substances that could be encountered during excavation, particularly if work was being carried out on an existing site.

⁵ CNSC Regulatory Document RD-346, *Site Evaluation for New Nuclear Power Plants*, November 2008.

63. The Commission requested additional details about timelines for site evaluations, in particular concerning environmental assessments, over a project's life cycle. CNSC staff informed the Commission that the site evaluation process would begin with a licence application for site preparation which would then likely trigger a federal environmental assessment under the *Canadian Environmental Assessment Act, 2012*⁶ (CEAA 2012).
64. The Commission also enquired about public consultations conducted during the EA process. CNSC staff provided information about public consultation under the current EA model and further explained that this concept would be expanded on in the proposed *Impact Assessment Act*⁷ to replace CEAA 2012.
65. The Commission noted that the guidance in the proposed REGDOC moved between site evaluation and site preparation with minimal reference to the required environmental assessment (EA) process(es) and requested CNSC staff to include references to acknowledge where the EA process fit in the site preparation licencing process.
66. Noting CNSC staff's assertion that the proposed REGDOC had not introduced any new expectations on licensees, the Commission asked for information about how gaps in the current guidance would be addressed by the proposed REGDOC. CNSC staff explained that there would not be any new changes for licensees to take into account that they would not already be expected to deal with during environmental assessment reviews or licence renewals.
67. The Commission enquired about which CNSC regulatory or guidance document was being replaced through the inclusion of site preparation guidance in REGDOC-1.1.1. CNSC staff provided additional details about the evolution of the original siting RD-346 document and explained how section 4 in REGDOC-1.1.1, which would cover site preparation, codified and captured previous practices that were not explicitly stated in RD-346.
68. The Commission further asked about how REGDOC-1.1.1 contributed to a more streamlined process of regulatory oversight. CNSC staff explained this REGDOC improved the visibility of the CNSC's expectations and clarified regulatory requirements while removing the need for lengthy instructions in response to each new

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⁶ S.C. 2012, c. 19, s. 52.

⁷ House of Commons Canada, Bill C-69, An Act to enact the Impact Assessment Act and the Canadian Energy Regulator Act, to amend the Navigation Protection Act and to make consequential amendments to other Acts, First Reading, February 8, 2018.

application the CNSC received.

69. Asked whether CNSC staff were aware of any limitations with the content of the REGDOC that could require action in the near future, CNSC staff stated that there were no foreseeable limitations in the current REGDOC in respect of emerging or future technologies and also explained the flexible nature of the REGDOC amendment process.
70. Noting stakeholder concerns about the requirement of not having to specify a particular reactor technology in an application, the Commission requested additional information about how an EA would be conducted without these details. CNSC staff explained that an applicant's alternative to specifying a particular reactor technology would be to develop a plant parameter envelope which they would use to present the maximum releases of nuclear and hazardous substances from all considered candidate technologies. The Commission expressed its satisfaction with the practice of bounding expected environmental releases and noted that this approach had been validated with respect to EAs.⁸
71. The Commission requested clarification about whether REGDOC-1.1.1 applied to uranium mines. CNSC staff informed the Commission that mines were not specifically addressed in the proposed REGDOC but the included references on environmental protection apply to all facilities. CNSC staff provided further information about the overlap between information that CNSC required in order to conduct a licensing assessment for a facility and the information that would be needed for an EA to be carried out under CEAA 2012.
72. The Commission complimented staff on REGDOC-1.1.1 and commended their robust and thorough public consultation.

Decision on REGDOC-1.1.1

DECISION

73. With the change noted at paragraph 65 of these minutes, the Commission approves regulatory document REGDOC-1.1.1, *Site Evaluation and Site Preparation for New Reactor Facilities*, for publication and use.

Regulatory Document REGDOC-2.1.2, *Safety Culture*

74. With reference to CMD 18-M11 and CMD 18-M11.A, CNSC staff

⁸ Greenpeace Canada *et al.* v. OPG *et al.* 2015 FCA 186, leave to appeal dismissed April 28, 2016, SCC No. 36711.

presented to the Commission CNSC Regulatory Document REGDOC-2.1.2, *Safety Culture*, for consideration. This document provides more specific criteria and guidance related to safety culture, as an elaboration on the management system requirements contained in N286-12, *Management system requirements for nuclear facilities*. It sets out safety culture program criteria and guidance for Class I facility licensees and uranium mines and mills licensees.

75. The Commission invited affected licensees to provide the Commission with comments in regard to the proposed REGDOC. The OPG representative stated that OPG concurred with the importance of a healthy safety culture in the nuclear field and asserted OPG's commitment to the continued improvement of its safety culture. The OPG representative also stated that OPG also recognized the opportunities provided for stakeholders to engage with CNSC staff regarding the drafting of the proposed REGDOC. The OPG representative provided the Commission with detailed information regarding OPG's concerns regarding four overall aspects of the proposed REGDOC: the time and resources required to implement a security culture assessment; CNSC staff's proposed safety culture framework; the safety culture maturity model; and the prescriptive wording in certain sections on guidance. The OPG representative also informed the Commission about the resources required to implement the criteria of the proposed REGDOC and stated that an analysis of the corresponding safety benefit would have been beneficial to OPG.
76. The Commission requested additional information about the CNSC's safety culture framework as compared with international nuclear industry standards. The OPG representative responded that OPG had used the Institute of Nuclear Power Operations (INPO) standard to develop its nuclear safety culture framework.⁹ CNSC staff informed the Commission that its proposed framework emerged from its own extensive research, and that the proposed REGDOC also included information on security assessments and information for non-NPP licensees, which the INPO standard did not provide. CNSC staff also stated that, although there was no universal safety culture framework, the International Atomic Energy Agency (IAEA) had started the development of such an international framework. CNSC staff clarified that licensees were allowed to use a framework of their own choosing, as long as licensees provided the CNSC with a mapping of their framework against the safety culture and security culture criteria in the proposed REGDOC.

⁹ INPO 12-012, *Traits of a Healthy Safety Culture*, Institute of Nuclear Power Operations (INPO), 2012.

77. Asked to provide details on the process for mapping the safety culture frameworks, CNSC staff informed the Commission that once the framework had been verified, it would not have to be re-mapped or re-verified, as long as the framework remained unchanged. CNSC staff provided additional details regarding preliminary mappings that were performed on the INPO framework and OPG's framework.
78. In regard to the level of effort and resources that would be required for the implementation of the proposed REGDOC, the OPG representative provided information regarding OPG's preliminary implementations of the criteria in the proposed REGDOC and that, if approved, OPG would work to ensure the correct implementation of that document. CNSC staff stated that the licensees would submit a detailed implementation plan to the CNSC and that CNSC staff would be open to discussions with licensees regarding a reasonable timeline for the REGDOC's implementation.
79. The Commission requested information about the assessment of a licensee's security culture. CNSC staff stated that formal assessments of licensees' security culture had not yet been performed. However, CNSC staff explained that, from compliance verification activities of licensee security programs, CNSC staff had an understanding of the current status of licensee security cultures. CNSC staff informed the Commission about the current state of licensee security culture assessments, work that licensees had done to improve their security cultures, as well as IAEA guidance in this regard. CNSC staff further noted that the enhancement of security cultures was codified in the *Amendment to the Convention on the Physical Protection of Nuclear Material*.¹⁰
80. The Commission noted the inherent difficulty in changing or regulating an organization's culture and asked about the rationale behind the proposed REGDOC. CNSC staff responded that the REGDOC was intended to assist licensees with the understanding and continuous improvement of all aspects of their safety cultures and to capture safety culture at the highest level of a licensee's management system, not to regulate a licensee's safety culture. CNSC staff added that safety culture had already been considered through the *Class I Nuclear Facilities Regulations*.¹¹ which reference a licensee's management system.

¹⁰ *Amendment to the Convention on the Physical Protection of Nuclear Material*, IAEA, INFCIRC/274/Rev. 1/ Mod. 1, entry into force: 8 May 2016.

¹¹ SOR/2000-204.

81. The Commission enquired as to what future safety culture improvements would occur, once the licensee reached the final stage of the maturity model, as depicted in certain figures in the proposed REGDOC. CNSC staff clarified that the final stage in the maturity model considered “continuous improvement”, therefore there would be no end to the improvements and regulatory oversight regarding safety culture.
82. The OPG representative explained OPG’s concerns regarding the resources that may be required to implement an additional tool such as the maturity model, or a mapping of its safety culture framework to the proposed framework. The OPG representative further stated that OPG had maintained and validated its own tools and terminology for monitoring and assessing its safety culture. The Commission requested confirmation from CNSC staff that, should a licensee submit an appropriate safety culture framework and self-assessment tools, licensees could continue to use them. CNSC staff clarified for the Commission that licensees were not required to use CNSC’s maturity model and that CNSC staff did not expect a significant change in the way the NPP licensees monitored and assessed their safety cultures. CNSC staff further provided information regarding the intended implementation of the proposed REGDOC.
83. Noting that safety culture was qualitative, rather than quantitative, with a self-assessment potentially providing industry a gap analysis tool to evaluate their safety culture programs, the Commission enquired about the consistency and reliability of the CNSC’s proposed safety culture self-assessments across various industries. CNSC staff responded that licensee safety culture self-assessments could provide CNSC staff evidence of healthy safety culture characteristics in an organization as well as avenues for further improvements. CNSC staff stated the expectation that licensees follow up on any areas of weakness that were identified in the self-assessment and that, through its review of the self-assessments and through compliance verification activities, CNSC staff would obtain a detailed picture of the licensee’s performance in this regard.
84. Regarding peer reviews of the CNSC’s regulatory oversight of safety culture, CNSC staff informed the Commission that the IAEA had undertaken safety culture review missions at licensee sites and was working at integrating safety culture assessment in its Integrated Regulatory Review Service. CNSC staff provided additional details regarding its research and data collection of international best practices, legislative frameworks, and other

activities regarding safety culture, noting that the Nuclear Energy Agency had an international safety culture working group in which Canada was participating.

85. The Commission expressed concern regarding the prospect that security programs of licensees were not reviewed by CNSC staff. CNSC staff confirmed that it had performed extensive compliance verification activities regarding licensee security programs, and provided details in that regard. CNSC staff clarified that it was the formal safety culture assessment that CNSC staff had not yet performed. The Commission was satisfied with the information provided regarding security-related compliance verification activities.
86. The Commission noted that there were no criteria in the proposed REGDOC for licensees to submit the safety culture self-assessments to CNSC staff and requested additional information in this regard. CNSC staff responded that, although not addressed in the REGDOC, CNSC would have full access to those safety culture assessments, that the assessments would be discussed with licensees and that CNSC staff would interview licensee safety culture personnel in this regard. CNSC staff confirmed that it would be able to access and assess all information that was needed to perform compliance verification activities.
87. The Commission suggested, in consideration of the continuous evolution of the topic of safety culture in the coming years, that CNSC staff should remain open to amending of the proposed REGDOC should new research and evidence come to light in the spirit of continuous improvement.

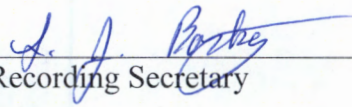
Decision on REGDOC-2.1.2

DECISION

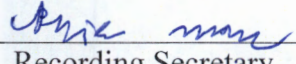
88. After considering the recommendations submitted by CNSC staff, the Commission approves regulatory document REGDOC-2.1.2, *Safety Culture* for publication and use.

Closure of the Public Meeting

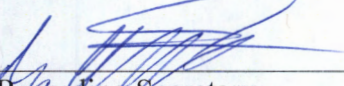
89. The meeting closed at 16:56.



Recording Secretary



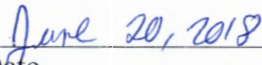
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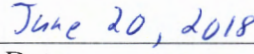
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Secretary



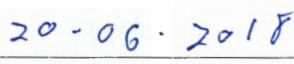
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Date

APPENDIX A

CMD	Date	e-Docs No.
18-M5	2018-02-14	5458607
Notice of Commission Meeting		
18-M6	2018-03-01	5464345
Agenda of the Meeting of the Canadian Nuclear Safety Commission (CNSC) to be held on Thursday, March 15, 2018, in the Public Hearing Room, 14 th floor, 280 Slater Street, Ottawa, Ontario		
18-M6.A	2018-03-09	5477212
Updated Agenda of the Meeting of the Canadian Nuclear Safety Commission (CNSC) to be held on Thursday, March 15, 2018, in the Public Hearing Room, 14 th floor, 280 Slater Street, Ottawa, Ontario		
18-M6.B	2018-03-13	5481678
Updated Agenda of the Meeting of the Canadian Nuclear Safety Commission (CNSC) to be held on Thursday, March 15, 2018, in the Public Hearing Room, 14 th floor, 280 Slater Street, Ottawa, Ontario		
18-M7	2018-03-08	5467572
Draft Minutes of the Meeting of the Canadian Nuclear Safety Commission held on December 13 and 14, 2017		
18-M8	2018-03-08	5467579
Draft Minutes of the Meeting of the Canadian Nuclear Safety Commission held on January 23, 2018		
18-M9	2018-03-07	5476145
Status Report on Power Reactors Submission from CNSC Staff		
18-M13	2018-03-08	5477231
Event Initial Reports Bruce power: Failure of the primary heat transport pump seals at Bruce A Nuclear Generating Station Unit 4 Submission from CNSC Staff		
18-M13.1	2018-03-13	5481493
Event Initial Reports Bruce power: Failure of the primary heat transport pump seals at Bruce A Nuclear Generating Station Unit 4 Presentation by Bruce Power		

CMD	Date	e-Docs No.
18-M14	2018-03-08	5477243
Event Initial Reports Ontario Power Generation: Darlington Refurbishment – Retube Waste Processing Building – Internal Contamination Event Submission from CNSC Staff		
18-M12	2018-03-02	5448619
Decision Items on Regulatory Documents REGDOC-1.1.1, Site Evaluation and Site Preparation for New Reactor Facilities Submission From CNSC Staff		
18-M12.A	2018-03-07	5449037
Decision Items on Regulatory Documents REGDOC-1.1.1, Site Evaluation and Site Preparation for New Reactor Facilities Presentation by CNSC Staff		
18-M11	2018-03-01	5470997
Decision Items on Regulatory Documents REGDOC-2.1.2, Safety Culture Submission from CNSC Staff		
18-M11.A	2018-03-07	5469114
Decision Items on Regulatory Documents REGDOC-2.1.2, Safety Culture Presentation by CNSC Staff		
18-M15	2018-03-08	5477250
Event Initial Reports 20/20 ND Technology Inc. – Potential dose limit exceedance for a certified exposure device operator (CEDO) Submission from CNSC Staff		
18-M16	2018-03-08	5477257
Event Initial Reports 20/20 Technology Inc. – Industrial radiography vehicle fire – no damage to exposure device Submission from CNSC Staff		
18-M18	2018-03-09	5477423
Event Initial Reports Windsor Regional Hospital – Exceedance of a regulatory dose limit by a nuclear energy worker during a diagnostic nuclear medicine procedure Submission from CNSC staff		

March 15, 2018

CMD	Date	e-Docs No.
18-M10	2018-02-27	5458570
Information Item Status of Designated Officer Program: 2016 Submission from CNSC staff		
18-M10.A	2018-03-07	5463626
Information Item Status of Designated Officer Program: 2016 Presentation by CNSC staff		