

Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held Wednesday, September 12, 2007 beginning at 4:03 p.m. and Thursday, September 13, 2007 beginning at 8:35 a.m. in the Public Hearing Room, CNSC Offices, 280 Slater Street, Ottawa, Ontario.

Present:

L.J. Keen, Chair

A. Graham
C.R. Barnes
M.J. McDill

M. Leblanc, Commission Secretary
S. Maislin Dickson, Acting General Counsel
S. Gingras, Recording Secretary

CNSC staff advisers were: P. Fundarek, A. Régimbald, B. Howden, H. Rabski, S. Lei, I. Grant, P. Elder, G. Schwarz, T. Schaubel, M. Couture, J. Clarke, T. Viglasky, D. Newland, B. Ecroyd, P. Webster, G. Lamarre and J. Cameron

Other contributors were:

- Air Canada Cargo: B. Sullivan
- Cameco Corporation: T. Gitzel, A. Oliver, A. Thorne and K. Vektor
- Golder Associates Ltd: T. McIelwain
- Bruce Power: F. Saunders, S. McDougall, J. Hegarty and R. Nixon
- Ontario Power Generation Inc.: W. Robbins, B. Martin, C. Pike, M. Elliott, T. Mitchell, F. Dermarker, P. Tremblay and P. McNeil
- New Brunswick Power Nuclear: G. Thomas
- Atomic Energy of Canada Limited: D. Togerson
- Hydro-Québec: N. Sawyer
- Greenpeace Canada: S-P. Stensil
- AREVA Resources Canada Inc.: S. Hamilton

Adoption of the Agenda

1. The revised agenda, CMD 07-M28.B, was adopted as presented.

Chair and Secretary

2. The President chaired the meeting of the Commission, assisted by M. Leblanc, Commission Secretary and S. Gingras, Recording Secretary.

Constitution

3. With the notice of meeting, CMD 07-M27, having been properly given and a quorum of Commission Members being present, the meeting was declared to be properly constituted.
4. Since the meeting of the Commission held June 21, 2007, Commission Member Documents CMD 07-M27 to CMD 07-M34 were distributed to Members. These documents are further detailed in Annex A of these minutes.

Minutes of the CNSC Meeting Held June 21, 2007

5. The Commission Members approved the minutes of June 21, 2007 Commission Meeting without modifications.
6. With reference to item 5 of the minutes, the Commission requested an update on emergency management issues for site-wide operations at the Bruce site. CNSC staff reported that it reviewed the arrangements between the licensees on site regarding the coordination of site-wide emergencies at the Bruce site and found them to be acceptable.
7. CNSC staff also noted that an inspection on this issue will be coordinated with the site staff and specialists during the year 2008. CNSC staff added that coordination will also take place within CNSC employees to ensure an adequate overview of the site.
8. Bruce Power commented that there are agreements in place with Ontario Power Generation Inc. (OPG) and Atomic Energy of Canada Limited (AECL) and that it was of the view that this issue is properly managed.

DECISION

Technical Briefing on Tritium¹

9. With reference to CMD 07-M34, CNSC staff presented its technical briefing on tritium. CNSC staff presented a first section on general information on the properties of tritium, its biological behaviour, and health and environmental effects, followed by a second section providing an update on the CNSC tritium studies.

¹ This item was presented on September 12, 2007.

10. Regarding the first section on the properties of tritium, the Commission asked for more information on action levels relating to a nuclear power plant (NPP). CNSC staff responded that licensees are required to have action and administrative levels in place to monitor emissions of tritium and determine if actions are necessary for a better control.
11. The Commission suggested that information on the ranges of action levels surrounding NPPs and other tritium generating facilities would be useful.
12. The Commission asked whether the International Atomic Energy Agency (IAEA) is involved in the regulation of tritium. CNSC staff responded that the IAEA does provide guidance on what is an acceptable dose for the public while the World Health Organization covers specific recommended levels of tritium in mediums such as food or drinking water. The International Commission on Radiological Protection provides analysis of the relationship between dose and risk which is used by the relevant jurisdictions, including the CNSC, for setting guidelines and making regulations.
13. Regarding section 2 of the technical briefing, the Commission enquired on whether the planned studies could lead to conclusions that might influence other jurisdictions. CNSC staff responded that the purpose of the studies is to address uncertainties and gaps and to determine how the available information applies in a Canadian context. CNSC staff's primary objective is to improve, if necessary, the regulatory framework of the CNSC in making recommendations to the Commission on tritium issues. CNSC staff further noted that Health Canada and the Ontario Drinking Water Advisory Council are aware of the ongoing studies and will be kept informed as the studies progress.
14. The Commission asked whether there were regular reports available on the analysis of drinking water from different sources such as cities. CNSC staff responded that this information is available and has been reported to the Commission in specific licensing proceedings.
15. Regarding the involvement of the public at this stage, the Commission asked whether CNSC staff took into account public input when identifying the topics to be covered in the tritium studies. CNSC staff explained that it developed the project charter based on the consideration of concerns raised by members of the public and interested groups at various proceedings, as well as the

- direction provided by the Commission. CNSC staff further noted that, while there had been no specific public consultation, a communications plan has been developed to effectively and proactively communicate information regarding the studies as it becomes available. This includes publishing the findings on the CNSC Web site and holding meetings in the affected communities to present the information and answer questions from the public.
16. The Commission asked about the impact of climate change on the behaviour of tritium in the environment. CNSC staff responded that the impact of climate change was not specifically included in the studies. However, CNSC staff noted that other researchers have identified climate changes that may happen in Canada in different regions, and this information could be used in models that predict the atmospheric behaviour of tritium.
 17. The Commission suggested that CNSC staff submit the project plan to the CNSC Regulatory Advisory Committees for their information.

STATUS REPORTS

Significant Development Report

18. The Commission considered the Significant Development Report (SDR) no. 2007-4, submitted by CNSC staff as documents CMD 07-M30, 07-M30.A and 07-M30.B.
19. With reference to item 4.1.1 of CMD 07-M30 on high radiation exposure at the Air Canada Cargo facility in Montreal, Quebec, the Commission asked whether the method used to estimate radiation doses to workers was adequate. Air Canada responded that it considers the estimated doses to workers to be accurate, with individual monitoring performed at the Montreal office, where doses are the highest, and dose assessment based on transportation index performed at the other Air Canada sites.
20. As a response to the Commission's request for more information on the inspection rate for this type of facility, CNSC staff explained that the regulatory program for transport carriers is risk-informed and that, for low risk facilities such as Air Canada, inspections are carried out less frequently. CNSC staff noted that it is establishing a systematic compliance verification program for all carriers in Canada.

21. The Commission asked for more information on the tracking of doses within the facility. Air Canada responded that new procedures are being implemented to monitor workers at its Montreal headquarters. CNSC staff also intends to contact other carriers to make them aware of the event and verify that they have adequate procedures in place.
22. CNSC staff indicated that there is no requirement for low-risk carriers to monitor its workers. CNSC staff added that the current procedures in place for low-risk carriers have been reviewed and that it is satisfied that these are adequate.
23. The Commission noted that licensees are responsible for knowing the requirements of the *Nuclear Safety and Control Act*² and its *Regulations*, as well as being responsible for the safety of its employees. The Commission expects Air Canada to perform a very thorough follow-up on this incident, as well as on the adherence to the radiation program in place at the facility. The Commission also expects CNSC staff to have a more vigorous compliance oversight of Air Canada's follow-up on this incident.
24. The Commission requests CNSC staff to present a report at a future proceeding of the Commission on its assessment of the types of radiation protection programs and procedures needed for the transportation industry based on the associated risks.
25. With reference to item 4.1.2 of CMD 07-M30 on contaminants uncovered under Cameco Corporation's (Cameco) uranium hexafluoride (UF₆) plant, CNSC staff commented that the event report was submitted within the timelines set out in the operating licence.
26. CNSC staff noted that consultants hired by Cameco continue to drill groundwater wells in order to be able to delineate the subsurface impacts of the incident. CNSC staff also indicated that examination of the integrity of the plant's in-ground structures is still ongoing and that the root cause analysis of the incident was not yet complete.
27. CNSC staff explained that the plant remains shut down and that restart of production would be phased-in and carried out according to guidelines.

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² S.C. 1997, c. 9.

28. In its presentation, Cameco summarized the primary steps and the equipment used in the production of uranium hexafluoride, the actions taken and planned to mitigate the impact of the event, the investigation into the contamination, and the public information activities carried out to date.
29. In response to a question from the Commission, CNSC staff stated that, at this time, there was no indication that the licence had been contravened.
30. The Commission further questioned Cameco on the probable cause of the release of contaminated water to the subsurface. Cameco responded that the investigation shows the original method of construction and the deterioration of the concrete are the probable causes that created the pathway for liquid to leave the trench and gain access to the subsurface.
31. The Commission asked questions regarding the location of the monitoring wells. Cameco responded that additional wells have been installed on the east side of the property which will be monitored as part of the routine groundwater monitoring program and will eventually become permanent monitoring stations.
32. CNSC staff reported that findings obtained to date from the ongoing investigation has determined that the front of the groundwater plume has progressed outside the footprint of the plant building, but not outside of the licensed site boundary.
33. The Commission sought further information on the shape of the groundwater plume and the rate of spreading of contamination. Cameco responded that groundwater was confirmed through recent testing to flow from the northwest to the southeast. Cameco added that the investigation is still ongoing regarding the determination of the rate of spreading since the onset date of the incident is uncertain. Cameco explained that while it was unable to accurately determine an exact date, it was confident that the start date of the release was significant prior to 2007 and not a recent event.
34. The Commission asked for comments regarding the extent of contamination. Cameco responded that the distribution of both the uranium and arsenic in the ground suggests that there is a principal focal point of release to the subsurface, and that a minor additional source within the effluent treatment room exists. CNSC staff commented that it has been closely monitoring the situation and that it was in general agreement with Cameco and its consultant's assessment of the situation.

35. The Commission sought assurances that the plant could be safely heated during the upcoming months while remaining shutdown. Cameco responded that it was currently determining a way to carry out this task. CNSC staff recognized that heating of the building is an important component of the actions to be taken by Cameco to ensure the protection of the health and safety of its workers and the public and the integrity of the building. In this regard, CNSC staff noted that it would assess a formal proposal from Cameco on how to address this issue.
36. In response to a question from the Commission, Cameco stated that the root cause analysis would be completed by October 15, 2007, pending the delivery of results from the hydrogeological and concrete assessments.
37. The Commission expects CNSC staff to present an update on this issue at the next Commission Meeting in December 2007. The Commission also notes that CNSC staff shall immediately notify the Commission if there are any significant changes regarding the status of this event.
38. With reference to item 4.1.3 of CMD 07-M30 on a forced outage caused by a reactor trip during routine refuelling at the Bruce Nuclear Generating Station (NGS) A Unit 3, CNSC staff reported that following the event, Bruce Power immediately initiated an event review and determined that the apparent cause of the event was linked to human performance. Bruce Power then determined that a root cause analysis was necessary, and that this work is currently in progress.
39. CNSC staff also reported that Bruce Power identified some immediate corrective actions to be implemented before the completion of the root cause analysis. This included a briefing to every certified operator at the Bruce NGS, as well as the communication of an instruction to perform an independent verification of digital control computer inputs prior to the refueling of instrumented channels. Bruce Power also revised the procedures for the fuelling of instrumented channels to include such an independent verification.
40. CNSC staff stated that it was satisfied with Bruce Power's immediate actions and expects the root cause report to be submitted during the month of September 2007.

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41. CNSC staff committed to report to the Commission at the next Commission Meeting if there were any further significant additional corrective actions taken by Bruce Power.
42. In response to comments requested by the Commission on human performance issues at the facility, Bruce Power explained that the individual was removed from the role and will have to go through a requalification process prior to returning to normal duties. Bruce Power added that it considers this event not to be an indication of a systemic human performance issue and that there have been no prior events of this type.
43. With reference to item 4.1.4 of CMD 07-M30 on the Containment Isolation on High Activity at the Bruce Nuclear Generating Station B, CNSC staff reported that Bruce Power has met all of the reporting requirements, and that it is conducting a root cause analysis of the event with a focus on the cause of the defect in the fuel bundle. CNSC staff also noted that a preliminary inspection of the defected bundle showed a weld failure characteristic of a manufacturing flaw.
44. CNSC staff added that Bruce Power has implemented a number of corrective actions and notified other NGS that use the same type of fuel. CNSC staff stated it was satisfied with Bruce Power's immediate actions and indicated that it will be reviewing the root cause analysis once it is submitted, approximately at the end of September 2007.
45. Bruce Power reported that it performed an operability assessment in both the Bruce A and B NGS and that it concluded that operating the NGS would be safe and that there are no ongoing indications of significant fuel failures at this time.
46. The Commission enquired on inspections performed on the fuel bundles upon reception at the plant. Bruce Power responded that fuel bundles are inspected as part of the manufacturing process, and that the manufacturer has a quality assurance program in place. Bruce Power added that there are procedures at the NGS for reviewing the overall integrity of the bundle, without inspecting every bundle. Bruce Power noted that it relies on the quality control program at the manufacturer and is aware that the concerned manufacturer is also doing its own root cause analysis.
47. At the request of the Commission, CNSC staff confirmed that it will provide an update to the Commission on its review of the root cause report once completed.

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48. With reference to item 4.1.5 of CMD 07-M30 on the contamination of virgin heavy water at the Darlington NGS, CNSC staff made the following correction to the report: the import licence number is 4174.1/2007 instead of 4174.0/2007. CNSC staff also reported that the contaminated heavy water was returned from the United States (U.S.) to OPG.
49. CNSC staff added that OPG has completed its root cause analysis of the event and that CNSC staff was informed of the findings. CNSC staff expects to receive the report shortly. CNSC staff is of the view that if the recommended corrective actions are implemented appropriately, CNSC staff would be in a position to allow heavy water shipments to resume.
50. OPG declared having ceased all shipments of virgin heavy water pending the results of its investigation. OPG also reported working with its U.S. customer to ensure that the contaminated heavy water was promptly quarantined and controlled. OPG stated that verifications confirmed that there was no contamination from the heavy water at the affected facilities. OPG further reported that there were no dose consequences to its staff, to the customer's staff or to any member of the public from the incident. OPG declared having learned from the event and that actions were initiated to mitigate any further repeat consequences.
51. The Commission asked for more information on the methods used by OPG to verify the existence of contamination in shipments made since 2006. OPG responded that there are very thorough records on the location and movement of the drum, and that there was no indication that contamination had occurred. OPG added that sampling was also performed on drums shipped to customers and that the results were negative.
52. The Commission sought more information on the causes of the event. OPG responded that the initial root causes included violation of procedures by an employee and ineffective management oversight in monitoring the heavy water transactions. OPG reported that it has made corrections to the management oversight and that the concerned employee has been disciplined.
53. In response to questioning by the Commission, CNSC staff indicated that there was no violation of the *Nuclear Non-Proliferation Import and Export Control Regulations*. CNSC staff added that a separate export licence was not required according to these regulations since the ratio of tritium to hydrogen (by atoms)

- was well below the minimum number above which a licence is required. CNSC staff also noted that OPG possessed the necessary licence to import the contaminated heavy water.
54. The Commission asked for more information on the impact of the event on safety culture at the facility. OPG responded that the fact that the employee came forward and admitted to the mistake showed a very strong safety culture at the Darlington NGS. CNSC staff commented that it reviews safety culture matters at the facility during inspections, and that it considers that OPG handled the event appropriately and in such a way that it should not discourage future reporting by the employees.
 55. With reference to item 4.1.6 of CMD 07-M30.A on an update of the June 21, 2007 Commission meeting SDR regarding the shutdown of Units 1 and 4 of Pickering A because of potential loss of electrical power, CNSC staff reported that since the preparation of this SDR report, OPG has successfully completed testing of the modified inter-station transfer bus. OPG has also requested CNSC approval of the temporary operational changes required to resolve the loading problems of this bus. CNSC staff further noted that it intends to approve this request and that the return to service of Units 1 and 4 is imminent. CNSC staff indicated that it will review the root cause analysis recently submitted by OPG.
 56. The Commission enquired as to when OPG realized the severity of the issue. OPG responded that the sequence of events started in 2005 when low voltage was first measured. OPG described the events that followed until the discovery that the inter-station transfer bus was significantly below capacity.
 57. In response to a question from the Commission, OPG confirmed that it intends to implement permanent modifications, and that the design process has started and should be completed by March 2008. CNSC staff stated that an action item was raised on this issue.
 58. The Commission enquired on the root cause of insufficient engineering rigor used in the design. OPG responded that the original design was done several years ago and that the engineering processes and verifications are much more rigorous today. OPG added that rigor has been added to the current design process. CNSC staff stated that it would keep oversight of the planned remediation and would be following up with inspections to verify the engineering rigor.

59. The Commission asked whether the organizational structure is sufficiently vigorous to adequately support the engineering personnel in this area. OPG responded that, while it finds the reporting structure to be correct, one of the key findings of the root cause analysis is the importance of adequate support to the engineering group to prevent that short-term issues prevent the resolution of long-term problems.
60. The Commission expressed concern for this yet unresolved issue and expressed the view that there has been insufficient commitment from OPG to reach a permanent solution.
61. The Commission instructed OPG and CNSC staff to provide an update on this SDR at the next Commission meeting in December 2007.
62. With reference to item 4.1.7 on findings from the 28-element fuel (used at Pickering A and B) dry-out power tests, CNSC staff made the following correction to the text of the SDR. For Pickering B, the SDR mentioned a four percent penalty, while it should have mentioned a four percent margin that did exist and OPG is taking a one percent additional penalty.
63. Late reporting of the event is one of the issues identified in the SDR, and OPG stated that it takes reporting of events very seriously. OPG further noted that there has been extensive follow-up with the staff involved and that the issue was also discussed with other members of the industry. OPG also indicated that experimental results involve a lot of complexities that make it often difficult to determine when a result should be reported.
64. CNSC staff expressed the view that, while there have been some informal discussions between OPG and CNSC staff before the event was reported, an earlier report should have been made by OPG. CNSC staff noted that OPG immediately submitted the required report when requested to do so.
65. The Commission requested CNSC staff to provide an update on this event once it completes its review of the documentation submitted by OPG related to this event.
66. The Commission noted the seriousness of event reporting with regards to regulatory oversight. With reference to item 4.1.8 of CMD 07-M30.A on water in the pressure relief duct at the Pickering A and B NGS, the Commission enquired on measures taken to ensure that employees have a mean of communicating their concerns. OPG responded that it offers a number of

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reporting vehicles to its employees, but acknowledged that this event demonstrated a need to reinforce reporting practices. OPG noted it has reminded its staff of the communications mechanisms in place so that employees know the organization is receptive and open to communication.

67. The Commission asked whether OPG investigated the possibility of changing its public information practices. OPG responded that it reviewed its protocols and processes to ensure that correct information is provided to the public.

Status Report on Power Reactors

68. With reference to CMD 07-M31 on the Status Report on Power Reactors, CNSC staff did not have any additional information or updates.

REGULATORY DOCUMENTS REVIEW

69. The minutes for this item were prepared separately and approved at a special meeting of the Commission held on October 5, 2007. They have since been published on the CNCS Web site.

Closure of the Public Meeting

70. The public meeting closed at 2:53 p.m.

Chair

Recording Secretary

Secretary

APPENDIX A

CMD	DATE	File No
07-M27	2007-07-05	(6.02.01)
Notice of meeting held on Thursday, September 13, 2007 in Ottawa		
07-M28	2007-08-29	(6.02.02)
Agenda of the meeting of the Canadian Nuclear Safety Commission (CNSC) held in the public hearing room, 14th floor, 280 Slater Street, Ottawa, Ontario, on Thursday, September 13, 2007		
07-M28.A	2007-09-07	(6.02.02)
Updated Agenda of the meeting of the Canadian Nuclear Safety Commission (CNSC) held in the public hearing room, 14th floor, 280 Slater Street, Ottawa, Ontario, on Thursday, September 13, 2007		
07-M28.B	2007-09-12	(6.02.02)
Updated Agenda of the meeting of the Canadian Nuclear Safety Commission (CNSC) held in the public hearing room, 14th floor, 280 Slater Street, Ottawa, Ontario, on Thursday, September 13, 2007		
07-M29	2007-08-28	(1-3-1-5)
Approval of minutes of Commission meeting held June 21, 2007		
07-M30	2007-08-28	(1-3-1-5/6.02.04)
Significant Development Report no. 2007-4 for the period of June 2, 2007 to August 28, 2007		
07-M30.A	2007-09-07	(1-3-1-5/6.02.04)
Significant Development Report no. 2007-4 for the period of August 28, 2007 to September 7, 2007 – Supplementary Information		
07-M30.B	2007-09-10	(6.02.04)
Significant Development Report no. 2007-4 – Security incident – Bruce Power Nuclear Generating Station – July 16, 2007		
07-M31	2007-08-28	(1-3-1-5)
Status Report on Power Reactors units for the period of June 5, 2007 to August 28, 2007		
07-M33	2007-08-28	(1.03.04)
Introduction for an improved regulatory document framework starting with Regulatory Documents RD-310, RD-346, RD-337, RD-204, RD-360		

07-M33.A 2007-08-28 (1.03.04)

Regulatory Documents: RD-310, Safety Analysis for Nuclear Power Plants (Decision Item); RD-346, Site Evaluation for New Nuclear Power Plants (Information Item); RD – 337, Design of New Nuclear Power Plants (Information Item)

07-M33.B 2007-07-27 (1-8-8-204)

Regulatory Document RD-204, Certification of Persons Working at Nuclear Power Plants (Decision Item)

07-M33.C 2007-08-27 (1.03.04)

Regulatory Document RD-360, Life Extension of Nuclear Power Plants (Decision Item)

07-M34 2007-09-04 (6.01.04)

Technical Briefing to the Commission on Tritium