

Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held Monday, June 28, 2010 beginning at 1:00 PM, and Tuesday, June 29, 2010, beginning at 9:00 AM, at the Public Hearing Room, 14th floor, 280 Slater Street, Ottawa, Ontario.

Present:

M. Binder, President
M. J. McDill
A. Graham
R.J. Barriault
D.D. Tolgyesi

M. Leblanc, Secretary
L. Thiele, Senior Counsel
S. Gingras and S. Dimitrijevic, Recording Secretaries

CNSC staff advisors were: G. Rzentkowski, K. Lafrenière, R. Jammal, P. Thompson, I. Gingras, P. Elder, A. Régimbald, K. Murthy, A. Licea, H. Rabski, É. Fortier, C. Purvis

Other contributors were:

- Ontario Power Generation: P. Pasquet, P. Tremblay,
- Bruce Power: M. Burton, P. Milojevic, M. McQueen, J. Hegarty
- Hydro-Québec: C. Gélinas
- Métaltec: D. Hébert
- Atomic Energy of Canada Limited: R. Swartz

Adoption of the Agenda

1. The revised agenda, CMD 10-M33.B, was adopted as presented.

Chair and Secretary

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

Constitution

3. With the notice of meeting, CMD 10-M32.A, 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 May 19, 2010, Commission Member Documents CMD 10-M32 to CMD 10-M40.1 were distributed to the Members. These documents are further detailed in Annex A of these minutes.

Minutes of the CNSC Meeting Held May 19, 2010

5. The Commission Members approved the minutes of the May 19, 2010 Commission Meeting as presented in CMD 10-M34.

STATUS REPORTS

Early Notification Reports

Ontario Power Generation: Pickering A and B Nuclear Generating Stations – Instrumented Pressure Relief Valve Activation

6. With reference to CMD 10-M35, CNSC staff presented information regarding a spurious opening of the valve that connects the reactor building to the vacuum building at the Pickering station. The event occurred on May 27, 2010, and resulted in lower reactor building pressure in operating Units 1, 4 and 5, temporary impairment on shutdown system 1 and 2 and emergency coolant injection.
7. CNSC staff informed the Commission about the actions taken by OPG and stated that CNSC staff at the site had been overseeing OPG's response and had participated in the site management centre during this emergency.
8. CNSC staff added that OPG would investigate to determine the cause of the valve activation and provide a detailed event report within 45 days of the event.
9. Representatives of OPG explained the role of the pressure relief duct and provided more details on the event. They explained the action taken and stated that, in accordance with procedures, a station emergency was declared to allow for counting of plant personnel only, and that the event did not technically represent an actual station emergency.
10. Representatives of OPG added that they had determined that an employee, who was working in the vicinity of the valve, had struck inadvertently the switch causing the momentary opening to the pressure relief valve, and that OPG has taken short-term actions to prevent the reoccurrence.
11. Representatives of OPG said that the event did not represent a radiological risk to plant personnel, to the community or to the environment.

12. The Commission inquired about the design of similar systems at other sites and on the likeness that this event occurs at other sites. Representatives of OPG said that this was the common system design for the Pickering station, and CNSC staff responded that it is a common configuration at multi-unit sites, such as Bruce A, Bruce B, and Darlington, which would have the similar configuration.
13. The Commission asked if information on this event has been shared with the other stations. CNSC staff responded that this type of events is shared in weekly operational experience (OPEX) meetings so that all members would look at this event to see the applicability to their station and then take the appropriate measures.
14. The Commission asked if the employee who caused the event had been evaluated and found to be fit for work. A representative of OPG responded that the employee had been evaluated and was fit for work. They added that the employee did what was expected of him and came forward and reported to the site operations supervision that he might have inadvertently made contact with that hand switch.
15. The Commission further inquired on the loss of productivity due to the event. A representative of OPG responded that there had been some loss of production in Unit 5 since the reactor power had been lowered.
16. The CNSC expects to receive the final report on the event within the required interval of 45 days from the event occurrence¹. The Commission requests that all reports be written in plain language with clear explanation of safety concerns and potential impact of an event to the public, workers and the environment.

Bruce Power: Bruce B Nuclear Generating Station, Unit 6 – Moderator Water Spill

17. With reference to CMD 10-M35, CNSC staff presented information regarding a moderator spill that had resulted from a backflow of moderator water into an open vent line, caused by an excessive pressure created in the drain line. The event occurred on May 31, 2010, while Bruce B Unit 6 was in the shutdown stage undergoing a maintenance outage.
18. CNSC staff reported that, after a moderator spill and moisture sensor alarm had alerted the station's staff, Bruce B had declared a station emergency and ensured that no workers remained in the affected areas.

¹ CNSC staff confirmed after the Meeting that the event report was received on July 26, 2010, but that more information was expected to be provided.

19. CNSC staff added that, as a result of the spill, the tritium concentration had increased on the north side of Units 5 and 6; however, no heavy water had escaped from the room and the regulatory dose limits were not exceeded.
20. CNSC staff said that Bruce Power had restricted station access and had initiated an increased bioassay sampling to determine potential uptakes received by workers.
21. CNSC staff also reported that Bruce Power had submitted a preliminary report, as required by S-99 Regulatory Document², and is required to submit a report describing the root cause of the event and listing lessons learned by the end of the 45-day interval after the occurrence of the event³.
22. CNSC staff informed the Commission that they had completed the incident inspection at the Bruce site, and that the considered corrective actions were acceptable. CNSC staff added that they would continue to monitor Bruce Power investigation process and ensure that adequate corrective measures are in place.
23. Bruce Power representatives provided a brief review of the event and informed the Commission that they were finalizing the investigation into it. They said that they would be sharing the results with CNSC staff and with other nuclear utilities via industry groups such as the CANDU Owners' Group (COG).
24. Bruce Power representatives stated that the tritium air releases had been well within the derived release limits and action levels, and had been approximately one quarter of one percent of the yearly derived release limit. They added that the regulatory dose limit to the workers had not been exceeded; however, Bruce Power's stringent internal dose limit had been exceeded for 38 workers. Seven of these 38 workers have been involved in other events related to alpha emissions.
25. Bruce Power representatives added that the procedure applied had been suspended and would be thoroughly reviewed.
26. The Commission sought more details on the event and the causes for the pressure increase in the vent line, and asked how often such an event occurs. The Bruce Power representative responded that they were expecting the results of the root cause analysis, and added that an event like this one had not occurred before.

² Regulatory Standard S-99, "Reporting Requirements for Operating Nuclear Power Plants", CNSC, March 2003.

³ CNSC staff confirmed after the Meeting that the report is expected to be submitted by August 26, 2010.

27. The Commission asked if the workers were equipped with personal dosimeters and sought more information on dosimeter sensitivity to tritium, moisture alarms and performed bioassays. The Bruce Power representative responded that routine bioassays were conducted to determine if tritium had been inhaled by the personnel involved in the event. They informed the Commission that personal dosimeters record an exposure to radiation, while moisture sensors, which trigger an alarm, are more sensitive to the presence of radioactive vapours.
28. The Commission asked CNSC staff whether the number of early notification reports was increasing. CNSC staff responded that such an impression could be present since the notification criteria had been changed to include not only safety concerns or safety consequences, but also public perception or public interest in a given event.
29. The Commission further inquired on the exact amount of the moderator spill and asked for details on the workers' exposure compared to administrative and regulatory dose limits. Bruce Power representative responded that the amount of spilled moderator was 240 litres. They explained that the administrative dose limit of 20 millisieverts per year (mSv/y) is the limit included in the operating licence for the purpose of internal control within Bruce Power, compared to the regulatory limit of 50 mSv/y. Bruce Power representative added that the administrative dose limits had been exceeded in few cases, but not the regulatory dose limits.

Bruce Power: Potential Alpha Exposure of Workers

30. With reference to CMD 10-M35.C, CNSC staff presented information regarding the alpha contamination screening program that Bruce Power had expanded to its operating units. CNSC staff specified that the screening results had indicated that at least one fuel handler from the operating unit may have been exposed to an elevated alpha dose.
31. CNSC staff stated that, under section 12(2) of the General Nuclear Safety and Control Regulations⁴, they had sent a letter to Bruce Power requesting timely completion of corrective action and a review of the alpha dosimeter program. CNSC staff added that similar letters had been sent to all CANDU licensees, and information on the event had been distributed to facility licensees other than power reactors.

⁴ Statutory Orders and Regulations, S.O.R.\2000-202.

32. CNSC staff reported that Bruce Power had submitted the action plan, the dose histories for the fuel handling and maintenance work groups and a list of work controls that had been implemented. Unable to meet all requests within the timeline defined in the letter, Bruce Power had proposed an alternative plan comprising bioassay samples being collected on priority sequence based on exposure probability. Bruce Power also proposed to establish monthly meetings with CNSC staff to share information on dose estimates and to have active dialogue as the dosimetry model is developed and further refined. CNSC staff found this plan acceptable.
33. CNSC staff informed the Commission on Bruce Power's negotiations with McMaster University to establish an accredited alpha dosimetry service in order to be able to timely process the increased volume of samples. CNSC staff noted that they have not received an application to issue a licence for this new laboratory⁵.
34. Representatives of Bruce Power informed the Commission on the status of their corrective actions and progress of the screening program. Bruce Power stated that no doses above the regulatory limits had been received by the tested employees, and that the results for a representative sample of 38 employees with various tenures of fuel handling staff will be available by August 31st, 2010.
35. Representatives of Bruce Power added that the screening criteria will be updated based on the results from the first group, and that the program procedures and training revisions were included in the corrective actions.
36. The Commission asked if alpha exposure had occurred in other areas of the facility. Representatives of Bruce Power responded that the primary areas of concern are the fuel handling areas and areas where the heat transport system comes into contact with the equipment.
37. The Commission asked about CNSC staffs' reaction to the event with regard to testing in other nuclear generating stations. CNSC staff reiterated that the letter under section 12(2) of the General Nuclear Safety and Control Regulations had been issued to other licensees to notify them about the potential harm and to prompt them to evaluate their situation and decide on corrective actions.

⁵ CNSC staff confirmed after the Meeting that, as of August 12, 2010, no application for an alpha dosimetry service had been received by the CNSC from McMaster University.

38. The Commission further asked CNSC staff about the protocol developed for this kind of events, and when the Commission will receive information on other licensees who received this request. CNSC staff responded that most of the licensees were already implementing measures. CNSC staff added that all the requests had been included in the "12(2) letter" where the focus was primarily to identify work practices that could lead to exposure, so that the exposure could be avoided if possible, and, secondly, to identify workers potentially exposed. Such an approach includes risk characterization, application of corrective measures and implementation of changes to the radiation protection programs.
39. The Commission expressed concerns over the fact that alpha radiation has not been detected earlier, even though it is one of the contaminants typical for this kind of workplace and requires an adequate protection of employees. CNSC staff responded that the monitoring of workers' exposure has been based on beta-to-alpha radiation ratio, which has been assumed to be 1000:1; however, based on the recent experience at Bruce site, it appears that in the fuel handling facilities this ratio could be almost 1:1.
40. CNSC staff added that they have been reviewing currently implemented radiation protection programs to assess whether the whole body counting is appropriate as a screening method in cases like this one. CNSC staff said that they will also review their regulatory practices, taking into account lessons learned from this experience, as well as the available international experience, to make sure that the regulatory practices rely on validated assumptions.
41. The Commission also expressed concerns about the possibility that some other emissions and exposures could have passed un-noticed during the operation of nuclear facilities. Representatives of Bruce Power responded that they also had begun to review areas of assumption or other areas of source term characterization to see if there was any applicability within their radiation protection program. Representatives of Bruce Power added that the assumptions that protection from beta radiation also provides protection from alpha radiation, as well as other assumption are under re-validation to make sure that all expected radionuclides are included in protective measures.
42. CNSC staff noted that monitoring of workers for alpha exposure has been present in Canadian facilities for a decade and that the National Dose Registry keeps reports on alpha radiation exposure for facilities such as Ontario Power Generation and New Brunswick Power nuclear generating stations, and Atomic Energy of Canada Ltd. However, it has been found that the screening method used to determine subjects for additional bioassay has not been appropriate.

43. Representative of Ontario Power Generation confirmed that they have been monitoring employees for alpha exposure and that some gaps in the program had been identified. He added that OPG is collaborating with Bruce Power and that they had formed a team to look at establishing criteria for improvements.
44. The Commission expects CNSC staff to prepare a consolidated update on this issue. CNSC staff confirmed that they will provide further updates on this issue and expressed confidence that an effective radiation protection program is being implemented across all licence sites.

ACTION
by
December
2010

Hydro-Québec: Heavy Water Spill at Gentilly-2 Nuclear Generating Station

45. With reference to CMD 10-M35.B, CNSC staff provided a brief review of an incident at Gentilly-2 Nuclear Generating Station involving a heavy water spill in which some workers were contaminated. CNSC staff reported that they had received the preliminary event report and expected to receive a detailed report around July 15, 2010⁶.
46. Hydro-Québec explained that three cases of contamination (7 mSv, 0.24 mSv and 0.29 mSv) had been identified on the day of the event, that a fourth person who had helped close the water pipe received a dose of 0.2 mSv, and that six other persons who had helped collect the heavy water and clean up (using the appropriate protective equipment) received a dose of less than 0.1 mSv. The annual allowable dose limit for a nuclear sector worker is 50 mSv.
47. The Commission sought further details on the quantity of heavy water spilled. Hydro-Québec responded that approximately 500 litres of heavy water had spread over the upper floor, very little of which had leaked into the basement.
48. The Commission asked why the ice plug had failed. Hydro-Québec responded that the mechanic who had attempted to form the plug had not used the proper technique to check whether the plug had solidified properly. Hydro-Québec added that, in the initial analysis of the root causes of the event, the method taught to mechanics for checking the ice plug when using carbon dioxide had been discovered to be inadequate.
49. The Commission asked whether a protocol for forming ice plugs existed. Hydro-Québec responded that a protocol was in place and that the employee's supervisor was supposed to check whether the employee was qualified for that type of work, but that the

⁶ CNSC staff confirmed that the detailed report was received on July 14, 2010.

supervisor might have misunderstood the qualification data tables. Hydro-Québec added that, following the event, a letter had been sent to all supervisors setting out expectations of supervisors for such work.

50. In response to a question by the Commission on evaluating the employee's aptitude for the work, Hydro-Québec explained that, while there is no formal evaluation of an employee's aptitude for the work, a meeting was held with the employee the day after the event because his actions after puncturing his glove ran counter to radiation protection expectations.
51. The Commission asked Hydro-Québec whether atmospheric measurements of tritium had been taken. Hydro-Québec responded that, while the tritium release values in the stack were above average that day, they did not exceed the allowed limits.
52. The Commission asked what action had been taken to measure doses to workers. Hydro-Québec explained that workers provide a urine sample before and after each work shift and again two hours after each work shift or on the next day.
53. CNSC staff confirmed that they were satisfied with Hydro-Québec's response to the event and would review the detailed event report and question Hydro-Québec about it. CNSC staff indicated that they did not expect to reappear before the Commission on the matter unless a problem was identified.

Ontario Power Generation: Earth Tremors – June 23, 2010

54. With reference to CMD 10-M35.D, CNSC staff presented information regarding the June 23rd, 2010 earth tremors and their impact on operation of the Darlington, Pickering and the Gentilly-2 facilities. CNSC staff noted that there was no measurable seismic activity recorded on either Bruce or Point Lepreau sites and that S-99 reportable criteria were not met.
55. CNSC staff provided a brief summary of the event and stated that the earthquake had been felt at the Darlington and Pickering nuclear power plants. CNSC staff added that OPG had confirmed, after inspecting and reviewing station systems, structures and components, that there were no consequences in either Pickering or Darlington plants.
56. CNSC staff said that they had contacted OPG and CNSC site offices to ensure that workers were safe and appropriate actions were taken; there were no injuries or indications of any impact on the stations. CNSC staff added that they had posted an information notice on the International Atomic Energy Agency (IAEA) Nuclear Event web based system.

57. The Commission inquired on the magnitude of an earthquake that would set off the alarm set points. CNSC staff responded that the values are usually 10 to 20 percent of the design earthquake for the site. CNSC staff added that, in this event, they had assessed the vibration spectra from on-line monitoring of components of the heat transport system and the turbine and that there had been a noticeable spike, which had disappeared at the end of the seismic activity.
58. The Commission asked about other, non-visual, ways of inspecting structures for potential damages. CNSC staff answered that there is online monitoring for system and components, but not for structures, and, since no visual cracks were noticed, further non-destructive testing has not been anticipated.
59. The Commission further asked about influence of ageing on concrete structures at nuclear power plants. CNSC staff responded that the ageing management programs cover concrete structures, and there are procedures in place that allow for the detection of those ageing mechanisms, which may eventually affect the integrity of concrete structures.

Hydro-Québec: Earth Tremors – June 23, 2010

60. With reference to CMD 10-M35.E, CNSC staff indicated that the report was the same as that for the Pickering and Darlington reactors.
61. The Commission asked about possible non-destructive tests available to Hydro-Québec in order to establish the quality and resistance of aged concrete. Hydro-Québec explained that measurements were taken regularly, by sampling.
62. The Commission asked CNSC staff if they had collected samples from other facilities. CNSC staff responded that they have a specialist division that looks after concrete ageing management program. CNSC staff added that they had reviewed the seismic programs for all stations to make sure that they were adequate. CNSC staff said that there are CSA standards for the ageing management of concrete structures and that CNSC specialists participate in an international working groups to develop regulatory requirements including periodic inspection programs for the concrete structures. CNSC staff also said that, during the refurbishment of the Point Lepreau nuclear generating station, samples of the concrete had been taken to determine its characteristics, strength and its ability to withstand loads.

63. The Commission asked whether improvements to the Gentilly-2 Nuclear Generating Station had increased the resistance of the seismic supports. Hydro-Québec responded that the tremor had been quite weak and that the generating station and the control room personnel, as well as site operators, hadn't felt anything.

Atomic Energy of Canada Limited, Chalk River Laboratories: Earth Tremors – June 23, 2010

64. With reference to CMD 10-M35.F, CNSC staff presented information on the event as observed at the Chalk River Laboratories. CNSC staff stated that the tremors were detected but were not strong enough to exceed seismic trip-set points. CNSC staff added that all buildings had been inspected for structural damage.
65. CNSC staff reported that the NRU reactor vessel was not operational, but was full of heavy water at the time of the earthquake. CNSC staff added that AECL conducted a complete visual inspection from the outside of the reactor after the earthquake and had made comparisons to some inspections conducted the day before, to confirm that there had been no impact from the earthquake.
66. CNSC staff also informed the Commission that they had confirmed with all the other Class 1 facilities in the region, including Nordion's facility in Kanata, SRB Technologies in Pembroke, Shield Source Inc. in Peterborough, RMC in Kingston and SLOWPOKE reactor at École Polytechnique in Montreal, that there were no impacts from the earthquake.
67. The Commission asked if AECL had inspected its underground storage for leaks. CNSC staff responded that AECL has leak detection for their underground storage tanks, and that the status would be checked and reported to the Commission. The Commission expressed its concerns over the behaviour of these ageing structures and over the fact that the status of them had not been included in the report. CNSC staff responded that this report was a preliminary oral one, and that they expect a detailed report within 45 days from the event, as required by S-99. Within that report, CNSC staff will require information on the underground storage tanks.
68. The Commission inquired about methods for inspections inside the reactor vessel and asked if AECL was using ultrasonic or x-ray tests. CNSC staff responded that at that moment, AECL was doing visual inspections with special cameras. The Commission expressed its expectation regarding the update on NRU status, and expects to get information on the seismic pumps that have been tested for the first time.

ACTION
by
July 5, 2010

Elekta, Inc., University Health Network and Southlake Regional Health Centre: Uncertified Class II accelerators used at two Ontario hospitals

69. With reference to CMD 10-M35.A, CNSC staff informed the Commission on the findings that uncertified Class 2 accelerators had been used at two Ontario hospitals. This item affects three different licensees: Elekta Inc., University Health Network and Southlake Regional Health Centre.
70. CNSC staff said that, on May 27th, 2010 during a desktop review of documents presented in support of an operating licence of a medical facility at the University Health Network (UHN), Princess Margaret Hospital in Toronto, CNSC staff became aware that the Elekta Infinity linear accelerator had not been certified by the CNSC as a Class II prescribed equipment.
71. CNSC staff reported that they had contacted immediately the Radiation Safety Officer (RSO) for UHN and that the RSO had responded immediately by issuing an internal stop work order for UHN to cease the use of the accelerator.
72. CNSC staff further reported that, on May 31st, 2010, two CNSC inspectors had visited the UHN and confirmed that the equipment installed was indeed the Infinity. During the visit, CNSC inspectors became aware that three similar Infinity units were being used since March 2010 for patient treatment at the Southlake Regional Health Centre in Newmarket, Ontario.
73. CNSC staff pointed out that the equipment manufacturer, Elekta, did not obtain CNSC certification for the model Elekta Infinity, but instead for the model Elekta Synergy. As a result, CNSC inspectors issued two orders on June the 2nd, 2010.
 - to Elekta to immediately cease the sale and service of the Elekta Infinity linear accelerator in Canada, and
 - to Southlake Regional Health Centre to submit information to the CNSC demonstrating that the use of the Elekta Infinity linear accelerator was safe.
74. On June 3rd, 2010, CNSC staff inspected Southlake and verified that the safety systems at the facility were functional and being tested as required by the licence for such equipment. The Elekta Infinity was certified by the CNSC on June 9th, 2010. CNSC staff confirmed on June 11th, 2010 that both Elekta and Southlake had complied with all terms and conditions of the orders.
75. CNSC staff added that no worker received a radiation dose in excess of the action levels set by UHN or Southlake in their licence and that there were no exposures to members of the public.

76. The Commission asked for reasons that Elekta representative did not appear at this meeting to explain the reasons for supplying an uncertified model instead of a certified one. CNSC staff responded that Elekta and UHN and Southlake had been told that they need not be present at this meeting since this was an early notification report; however, if the Commission wanted them to be present, they would be invited to the September 2010 meeting of the Commission. CNSC staff added that Elekta believed that the equipment that they were marketing as Infinity was not sufficiently different from the Elekta Synergy to warrant certification. CNSC staff also added that they will prepare a CMD with the update on this matter, and that all involved licensees would be invited.
77. The Commission further asked about differences between the two models. CNSC staff explained that the Infinity is more powerful, has x-ray capability, and has a more powerful image processing software. CNSC staff added that the Synergy model was no longer in production.
78. The Commission asked how often the desktop reviews like this one are performed, and could things like this remain uncovered. CNSC staff responded that this particular review was in relation to a licence application, and that a similar situation could be discovered during an inspection. CNSC staff added that this kind of verification happens at three different points during the process of approving a facility for routine operations.
79. The Commission asked CNSC staff if they intend to change the procedure to include an inspection at the site to make sure that what was delivered is exactly compliant with what was expected to be delivered. CNSC staff responded that, as a routine procedure, licensees would be required to provide the CNSC certificate number of the equipment that they are intending to install. Licensees would also be required to submit a photographic evidence, including the name plate which identifies that the equipment is what they claim it is in their licence application.
80. The Commission further asked for how long were used the unlicensed machines. CNSC staff responded that they had been used for the purpose of commissioning for three months in 2009, and then from March 2010.
81. The Commission expressed its concerns about the possibility that a fraction of newly installed equipment in Canada, which is large in numbers, might be not accounted for for the purpose of CNSC certification. The Commission asked CNSC staff how verifications are made to ensure that this is not happening with other types of equipment that are nuclear-related and should be certified. CNSC staff responded that some actions should be taken in cooperation

with Health Canada so that manufacturers and licensees understand what their obligations are. CNSC staff added that they have sent an email to every licensee informing them of this event, and reminding them of their obligation under the *Nuclear Safety and Control Act* to have certified, prescribed equipment. The event had also been reported on the MedPhys list server to which every medical physicist subscribes. CNSC staff confirmed that they were planning on auditing all of the hospitals that have such equipment.

82. The Commission requires that CNSC staff communicate to Health Canada the obligation that every facility that operates equipment approved by Health Canada be compliant with the CNSC requirements and be certified. The Commission expects CNSC staff to report on this issue as soon as possible⁷.

ACTION

By
September
2010

83. The Commission also suggested that CNSC contact Industry Canada and other agencies to verify the status in other, non-medical applications.

Tracerco: Elevated Neutron Radiation Level

84. CNSC staff informed the Commission about an event that occurred on April 21st, 2010, where CNSC inspectors had discovered neutron radiation dose rates six to nine times higher than the typical background radiation level. The neutron radiation dose rate was emanating from two americium-241/beryllium radioactive sealed sources that were in the licensee's (Tracerco Company situated in Edmonton) storage area and inside their Type A transport container. Tracerco was using these sources to measure liquid level in tanks and vessels commonly used in the petroleum industry. Tracerco is licensed by the CNSC, and the previous inspection determined that the licensee was meeting CNSC regulatory expectations.
85. CNSC staff stated that the inspectors determined that the two sources were stored too close to the outside perimeter walls separating the licensee's location from a commercial establishment occupied by members of the public. The inspectors have also found that the licensee's neutron measurement instrument was out of calibration and did not contain batteries.
86. CNSC staff added that no worker had received any dose that exceeds any of the action levels set for this licence. However, it had been determined that a member of the public occupying the location adjacent to the licensee received an estimated radiation dose of 1.866 milliSieverts (mSv). CNSC staff noted that there are no health effects associated with radiation dose at this level.

⁷ CNSC staff confirmed on August 10, 2010 that they had contacted Health Canada on this issue.

87. CNSC staff stated that they had contacted the individual affected to let the person know that it likely received this dose and that the person had not communicated back to the CNSC about any health related concerns.
88. CNSC staff informed the Commission that the licensee had immediately relocated the two sources within their transport container at a safe distance away from the perimeter wall to eliminate any further risks to the members of the public. The licensee had also relocated one of the sources to another licensed storage facility in the United States, and will conduct monthly radiation surveys within the storage area to ensure that the dose rates do not exceed 2.5 microSieverts per hour. The licensee will also include quarterly monitoring at the workplace adjacent to their operations to ensure that the public does not receive doses in excess of the public limit.
89. CNSC staff reported that they had inspected the licensee's location on June 24th, 2010 and were satisfied that the licensee had implemented the corrective measures. CNSC staff stated that they will report to the Commission when the investigation is completed.
90. The Commission noticed that the events with small enterprises are reoccurring, and sought more information on formal training requirements before licenses are issued to such organisations. CNSC staff responded that regulatory requirements were developed to ensure that companies are properly qualified to conduct their operation and that they offer appropriate training to their employees.
91. The Commission sought more information on re-certification procedure for similar licensees, and noted that typically large employee turnover might have an impact on personnel qualification. CNSC staff responded that licensees are required to provide the proper training to new employees regarding the company's safety procedures and make sure that the employees are qualified to handle radioactive material. CNSC staff added that they conduct compliance inspections, verify all the training records, and review annual compliance reports submitted by the licensees to make sure that the employees continue to be qualified.
92. The Commission asked how often compliance inspections are performed. CNSC staff responded that the inspections are performed annually for this type of licensees.

ACTION
by
December
2010

Status Report on Power Reactors

93. With reference to CMD 10-M37, which includes the Status Report on Power Reactors, CNSC staff presented an update on the following items:
- Unit 3 of Bruce A nuclear generating station: the unit was at 92 percent of full power operation after completion of maintenance work on a condensate extraction pump, and
 - Unit 5 of Bruce B: the unit was at 50 percent of full power operation due to problems with the fuelling machine.
94. The Commission inquired about installation of calandria tubes in the Point Lepreau and Bruce A stations. CNSC staff explained that, at Point Lepreau station 336 calandria tubes had been installed and 318 successfully leak tested on the East Side. In Bruce A station 380 calandria tubes had been installed on Unit 2 and 80 tubes installed on Unit 1. CNSC staff added that the installation was proceeding according to the schedule, and that expected fuel reload has been scheduled for December 2010 for the Unit 2 and March 2011 for the Unit 1.
95. The Commission sought more information on the differences, regarding leak-tightness, between calandria tubes at Point Lepreau and at Bruce sites. CNSC staff responded that AECL is investigating why the rolled joints aren't as leak tight at Point Lepreau as they are at Bruce site. CNSC staff pointed out that reactors at the two sites differ in design and that there are some metallurgical and dimensional differences, as well as differences in remote tooling for the calandria tubes used at the two sites.
96. The Commission inquired into the procedures for Bruce Power to restart its Unit 2 reactor and asked about the schedule to restart Point Lepreau. CNSC staff responded that the Commission had authorized the CNSC executive vice-president to give the permission to restart Unit 2, with three hold points; however, CNSC staff stated that they would report to the Commission on the releases of these hold points. With respect to Point Lepreau, CNSC staff stated that they were trying to discuss the schedule with Point Lepreau and that AECL was not committing to a schedule at that moment.
97. The Commission further inquired into the duration of the activities at Gentilly-2. The representative of Hydro-Québec responded that the station has been expected to return to power by June 7th, 2010; however, supplementary work had to be done, and the return to full power is expected to be around July 7th, 2010.⁸

⁸ CNSC staff provided an update and reported that the return to full power has been additionally delayed for about four weeks.

98. Responding to questions of the Commission, CNSC staff provided details on power levels and daily operations of reactors at the Bruce nuclear generating station.
99. The Commission sought more details on reported leaks on heat transport systems of units 7 and 8 of the Bruce B station. CNSC staff explained that the reported leaks of 20 kg/h for Unit 7 and 31 kg/h for Unit 8, were significantly below the shutdown limit and came from known sources such as pump valve seals. CNSC staff added that this amount of heavy water had been collected into an enclosed system so that there were no radiation hazards. The Commission suggested that CNSC staff include in their reports similar situations from other sites and provide explanations with details on the size of a leak and its potential safety impact.

Updates on items from previous Commission proceedings

Métaltec: Update on the radiation overexposure of a gamma radiography operator

100. With reference to CMD 10-M40 on the update to the radiation overexposure of a gamma radiography operator at Métaltec, CNSC staff provided a brief review of the event, reporting that the conservative radiation dose estimates calculated by Métaltec and accepted by CNSC staff indicated that the operator had received an effective whole body dose of 15 mSv (less than the regulatory dose limit of 50 mSv) and an equivalent dose to the hands of 1244 mSv (more than the regulatory dose limit of 500 mSv). CNSC staff further reported that the trainee involved in the incident had received a whole body dose of 3.8 mSv.
101. CNSC staff added that they had inspected Métaltec's premises in May 2010 and were satisfied with the corrective measures introduced by the company. CNSC staff added that they would conduct another inspection at Métaltec by year end 2010 to verify the effectiveness of those measures.
102. CNSC staff found that the operator involved in the event had been negligent in violating several CNSC regulations and failing to follow the safety rules established by the licensee. CNSC staff decertified the exposure device operator on June 1st, 2010.
103. Métaltec's representative provided a summary of the direct and indirect causes of the incident, and of the corrective actions taken by Métaltec to prevent a similar event.
104. When asked by the Commission whether the incident had been reported to the Commission de santé et de sécurité du travail (CSST), Métaltec's representative responded that it had.

105. The Commission suggested using a visual signal light to prevent too high a radiation dose. Métaltec's representative responded that, while that might be a possibility, operators might then become dependent on the detector and ignore procedures requiring them to check the radiation rate with a gamma monitor. The Commission commented that a visual signal light could have prevented the incident.
106. The Commission requested additional information on CNSC policy on work in severe cold. CNSC staff responded that the licensee must have an operational device to measure the radiation rate and that, if the device does not work, in severe cold, for example, the work must be stopped.
107. The Commission asked about accident frequency at Métaltec. Métaltec's representative responded that the last radiological incident (prior to the December 2009 incident) had occurred in September 2008, adding that non-radiological incidents were infrequent and that all incidents, radiological or other, were reported to the CSST in accordance with established criteria.
108. The Commission noted the need for improved workplace training. Métaltec's representative concurred and noted that training modules and employee work audits had been introduced.
109. The Commission requested information on verification activities and work task observations during inspections. CNSC staff responded that administrative checks were performed, as well as work task observations when activities were carried on during an inspection.
110. The Commission asked whether the worker and trainee involved in the incident were still with the company. Métaltec's representative replied that the worker had left in March 2010, while the trainee had passed the exposure device operator examination and was still with Métaltec.

Atomic Energy of Canada Limited (AECL): Whiteshell Laboratories' Corrective Action Plan for Implementation of the Decommissioning Quality Assurance Program

111. With reference to CMD 10-M36, CNSC staff updated the Commission on the corrective action plan for implementation of the decommissioning quality assurance program. CNSC staff stated that this update has been prepared in response to the Commission's request that CNSC staff provide more information on AECL's corrective actions and the staff assessments and conclusions.

112. CNSC staff informed the Commission on two directives and six action notices. CNSC staff stated that the implementation of the first directive (action on record keeping) was acceptable, and pointed out that the second one, about handling and storage of hazardous materials, was promptly addressed by AECL.
113. The Commission asked when the first directive would be closed. CNSC staff responded that the closure is expected to be around March 2011.
114. The Commission inquired on the sufficiency of funds for this operation. AECL responded that there had been sufficient funding, and CNSC staff explained that the project is funded by Natural Resources Canada as part of the Nuclear Legacy Liabilities Program. CNSC staff added that they are following the status of funds for this long decommissioning process, and that more information would be provided through the upcoming AECL licence renewal process.
115. The Commission commented on the efforts to improve the format of reports and suggested that, for decommissioning, regardless of how long the process is, CNSC staff and proponents always present information on high-level milestones and decommissioning end-game.

INFORMATION ITEMS

Presentation of the Tritium Studies Project Synthesis Report

116. With reference to CMD 10-M38, CNSC staff presented its Tritium Studies Project Synthesis Report. CNSC staff presented the key objectives of the project and provided information on public information reports available on the CNSC Web site. CNSC staff also provided the detailed findings from these studies and the resulting recommendations.
117. The Commission asked if CNSC staff considers the Synthesis Report to be a first draft or a final document. CNSC staff responded that, in seeking endorsement for the Synthesis Report, they were seeking endorsement for the work performed and the recommendations. CNSC staff added that some changes to the report will be made following comments made by intervenors.
118. At the request of the Commission, CNSC staff confirmed that, according to the report, there are no technologies for controlling tritium releases used outside Canada that could be imported into Canada. CNSC staff added that they will continue to use findings in the report for ongoing compliance and assessments.

119. The Commission asked CNSC staff how a controlled zone would be identified for each licensed facility. CNSC staff explained that the control zone is intended to provide protection for off-site drinking water resources. CNSC staff added that this controlled zone would be drawn on the basis of the characteristics of the facility, including stack ventilation, the level of tritium releases and the atmospheric conditions at the site.
120. The Commission asked CNSC staff to comment on several intervenors' comments on the lack of scientific evidence for the proposed 100 Bq/L design objective for tritium levels in groundwater. CNSC staff stated that, in general, regulations represent policy decisions based on what is considered an acceptable level of risk. CNSC staff added that the science supporting these dose limits is based on epidemiological studies that CNSC staff have reviewed, as well as the linear non-threshold relationship that has been used by the International Commission on Radiological Protection (ICRP) to represent risk from radiation exposure levels where health effects are seen, and extrapolating to lower levels of radiation exposure.
121. The Commission asked for more details on the basis for the 100 Bq/L guideline for drinking water used in Europe. CNSC staff explained that this level is used by European countries as a screening parameter above which investigation is recommended but not mandatory.
122. In response to questioning from the Commission on the protection of drinking water, CNSC staff explained their point of view that no further action needs to be taken for the protection of drinking water around nuclear facilities since tritium levels in these areas are currently below 20 Bq/L.
123. The Commission asked for more information on tritium levels in fish. CNSC staff responded that some licensees monitor tritium in fish since it is a pathway for human exposure, and that this information is available in CNSC INFO document 0793, *Tritium Releases and Dose Consequences in Canada in 2006*⁹. CNSC staff added that they could plan for more work in this area in the future.
124. In response to further questioning from the Commission on the proposed 100 Bq/L limit in groundwater, CNSC staff explained that, while they are not looking at specific concentrations or specific values inside the perimeter, groundwater protection would rely firstly on the need for controls and be based on the best available technology. CNSC staff added that this value is a design objective for groundwater levels at the border of a new

⁹ INFO Document 0793, *Tritium Releases and Dose Consequences in Canada in 2006*, December 2009, ISBN 978-1-100-13930-2.

facility, and would not apply for existing facilities. CNSC staff noted that, should a drinking water standard of 20 Bq/L be adopted by the Province of Ontario, the facilities that could not meet that standard would need to discuss the issue with the province of Ontario.

125. The Commission asked for more information on the documentation provided by the Sierra Club that indicates tritium level results at Atomic Energy of Canada Limited, Chalk River Laboratories (CRL) site in excess of 200 000 Bq/L. CNSC staff stated that all tritium level measurements outside of the Chalk River site are well below levels that would affect members of the public. CNSC staff added that all groundwater contamination plumes on the CRL site have been extensively investigated and monitored, and that tritium levels in drinking water plants in the area are below 20 Bq/L.
126. The Commission asked CNSC staff for their plans for obtaining more public information for disseminating information in the report. CNSC staff responded that they were planning on attending the symposium on tritium to be held at McMaster University in August 2010. Also, CNSC staff was invited to attend the Mississippi-Rideau Source Protection Committee meeting in the fall. CNSC staff added that they had organized public information sessions in January 2008 and April 2010, published articles in scientific journals and reports on the CNSC external web site.
127. The Commission asked for CNSC staff's comments on Bruce Power's intervention stating that the impact of establishing 100 Bq/L in groundwater levels would be significant without evidence that it would provide additional benefits. CNSC staff explained that no formal discussions with licensees have occurred to date, but some are planned in the future. CNSC staff commented that they assessed the current situation and determined that there are no immediate regulatory consequences for implementing this requirement for existing licensees or new facilities.
128. At the request of the Commission, CNSC staff confirmed that, when the multi-stakeholder working group is formed, they would take into consideration recommendations made by the intervenors.
129. The Commission asked CNSC staff to comment on the International Institute of Concern for Public Health's statement that a number of studies in Canada have demonstrated the health detriments of tritium (including birth defects and diseases). CNSC staff explained that these types of studies cannot prove

cause as they are descriptive studies which are unable to determine causal relationships. CNSC staff described other studies that have found no statistically different rates of diseases near the Pickering and Darlington nuclear plants. CNSC staff noted that one study found higher rates of cancer among Canadian nuclear workers, but several researchers questioned the validity of the findings.

130. The Commission asked for comments on the accuracy of passive samplers versus active samplers used for measuring tritium levels in air. CNSC staff explained that there are measurement variability issues with both types of samplers, but that active samplers are commonly used elsewhere in the world. CNSC staff also noted that, according to letters received from OPG, OPG intends to use only active samplers, which can be calibrated and maintained. CNSC staff added that some companies use passive samplers since they require no electricity, and others use both and report the highest reading. CNSC staff noted that the cause of variation in readings by active or passive samplers from one area to another is still not well understood.
131. The Commission asked CNSC staff to comment on the First Six Years' statement that a young child could be exposed to up to 0.16 mSv of radiation in one year through the ingestion of dirt. CNSC staff explained that this intervenor presented calculations using a higher level of tritium in water measured several years ago at SRB Technologies (Canada) Inc., while CNSC staff used the highest level measured in 2007 and assumed that soil ingestion does not occur year round.
132. The Commission asked CNSC staff to comment on studies that take into account the vulnerability of children and infants to radiation. CNSC staff explained that the ICRP and the CNSC took the characteristics of children (body size, inhalation, ingestion rates, etc.) into consideration in their calculations, and the Synthesis Report reflects epidemiological studies that take children into account.
133. In response to more information requested from the Commission on tritium exposure over a long period of time, CNSC staff explained that the CNSC has regulatory requirements for monitoring and reporting doses to members of the public and workers, and that the information indicates that doses are well below doses that would cause health effects. CNSC staff explained that they intend to engage in collaborative work with other organizations worldwide in order to obtain access to databases of workers from other countries with a longer history of nuclear industry.

134. The Commission has read and approves in principle the Tritium Studies Report.

DECISION

135. The Commission directs CNSC staff to make appropriate changes to the report in accordance with comments provided by intervenors, and to provide the Commission with a table listing the changes made to the report and the rationale for these changes.

ACTION
by
October
2010

136. The Commission notes that CNSC staff should begin discussions with the industry on the implementation of a controlled zone, and that these discussions should follow the normal regulatory process for consultation. The Commission expects CNSC staff to provide a summary of these discussions with the nuclear industry at a future Meeting of the Commission.

ACTION
by
April 2011

Closure of the Public Meeting


137. The meeting closed at 12:57 p.m.


Recording Secretary

2010-08-26
Date


Recording Secretary

2010-08-26
Date


Secretary

26-8-10
Date

APPENDIX A

CMD	DATE	File No
10-M32	2010-05-25	(Edocs 3552590)
Notice of Meeting of June 16, 2010		
10-M32.A	2010-06-03	(Edocs 3556726)
Revised Notice of Meeting of June 29, 2010		
10-M32.B	2010-06-24	(Edocs 3566464)
Revised Notice of Meeting of June 28 and 29, 2010		
10-M33	2010-06-17	(Edocs 3562982)
Agenda of the meeting of the Canadian Nuclear Safety Commission to be held on Tuesday, June 29, 2010, at the Public Hearing Room, 14 th floor, 280 Slater Street, Ottawa, Ontario		
10-M33.A	2010-06-24	(Edocs 3566281)
Updated Agenda of the meeting of the Canadian Nuclear Safety Commission to be held on Monday and Tuesday, June 28 and 29, 2010, at the Public Hearing Room, 14 th floor, 280 Slater Street, Ottawa, Ontario		
10-M33.B	2010-06-25	(Edocs 3566970)
Updated Agenda of the meeting of the Canadian Nuclear Safety Commission to be held on Monday and Tuesday, June 28 and 29, 2010, at the Public Hearing Room, 14 th floor, 280 Slater Street, Ottawa, Ontario		
10-M34	2010-06-21	(Edocs 3564265)
Approval of Minutes of Commission Meeting held May 19, 2010		
10-M35	2010-06-01	(Edocs 3556378)
Early Notification Reports: Ontario Power Generation: Pickering Nuclear Generating Stations A and B: P-2010-12738-Instrument Pressure Relief Valve Activation Bruce Power: Bruce B Nuclear Generating Station Unit 6 – Moderator Water Spill		
10-M35.A	2010-06-01	(Edocs 3563018)
Early Notification Report: Elekta, Inc., University Health Network and Southlake Regional Health Centre: Uncertified Class II accelerators used at two Ontario hospitals		
10-M35.B	2010-06-18	(Edocs 3564155)
Early Notification Report: Hydro-Québec: Heavy Water Spill at Gentilly-2 Nuclear Generating Station		
10-M35.C	2010-06-22	(Edocs 3565515)
Early Notification Report: Bruce Power: Potential Alpha Exposure of Workers		

10-M35.D 2010-06-25 (Edocs 3566880)

Early Notification Report:

Ontario Power Generation: Earth Tremors – June 23, 2010

10-M35.E 2010-06-25 (Edocs 3566886)

Early Notification Report:

Hydro-Québec: Earth Tremors – June 23, 2010

10-M35.F 2010-06-25 (Edocs 3566892)

Early Notification Report:

Atomic Energy of Canada Limited - Chalk River Laboratories:

Earth Tremors – June 23, 2010

10-M35.1 2010-06-25 (Edocs 3566938)

Early Notification Report:

Bruce Power: Potential Alpha Exposure of Workers – Oral presentation by Bruce Power

10-M36 2010-05-31 (Edocs3553218)

Atomic Energy of Canada Limited: Whiteshell Laboratories' Corrective Action Plan for Implementation of the Decommissioning Quality Assurance Program – Oral presentation by Atomic Energy of Canada Limited

10-M37 2010-06-21 (Edocs 3563924)

Status Report on Power Reactors units as of June 21, 2010

10-M38 2010-05-21 (Edocs 3533394)

Presentation of the Tritium Studies Project Synthesis Report – Oral presentation by CNSC staff

10-M38.1 2010-06-16 (Edocs 3562603)

Presentation of the Tritium Studies Project Synthesis Report – Written submission from Sierra Club Canada

10-M38.2 2010-06-16 (Edocs 3562612)

Presentation of the Tritium Studies Project Synthesis Report – Written submission from Atomic Energy of Canada Limited

10-M38.3 2010-06-16 (Edocs 3562627)

Presentation of the Tritium Studies Project Synthesis Report – Written submission from the Mississippi-Rideau Source Protection Committee

10-M38.4 2010-06-16 (Edocs 3562650)

Presentation of the Tritium Studies Project Synthesis Report – Written submission from Bruce Power

10-M38.5 2010-06-16 (Edocs 3562656)

Presentation of the Tritium Studies Project Synthesis Report – Written submission from Richard V. Osborne

10-M38.6 2010-06-16 (Edocs 3562670)
Presentation of the Tritium Studies Project Synthesis Report – Written submission from the International Institute of Concern for Public Health

10-M38.7 2010-06-16 (Edocs 3562680)
Presentation of the Tritium Studies Project Synthesis Report – Written submission from the Canadian Nuclear Association

10-M38.8 2010-06-16 (Edocs 3562695)
Presentation of the Tritium Studies Project Synthesis Report – Written submission from Ontario Power Generation

10-M38.9 2010-06-16 (Edocs 3562705)
Presentation of the Tritium Studies Project Synthesis Report – Written submission from The First Six Years

10-M38.10 2010-06-16 (Edocs 3562723)
Presentation of the Tritium Studies Project Synthesis Report – Written submission from McMaster University

10-M38.11 2010-06-16 (Edocs 3562741)
Presentation of the Tritium Studies Project Synthesis Report – Written submission from Damien McElvenny

10-M38.12 2010-06-16 (Edocs 3562749)
Presentation of the Tritium Studies Project Synthesis Report – Written submission from NB Power Nuclear

10-M40 2010-06-01 (Edocs 3556246)
Update on an item from previous Commission proceeding:
Métaltec: Update on the radiation overexposure of a radiography operator

10-M40.1 2010-06-21 (Edocs 3564536)
Update on an item from previous Commission proceeding:
Métaltec: Update on the radiation overexposure of a radiography operator – Oral presentation by Métaltec