Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held Wednesday, March 30, 2011 beginning at 9:04 AM, and Thursday, March 31, 2011, beginning at 9:30 AM, at the Public Hearing Room, 14th floor, 280 Slater Street, Ottawa, Ontario.

Present:

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

M. Leblanc, Secretary
J. Lavoie, Senior General Counsel
D. Major and S. Dimitrijevic, Recording Secretaries

CNSC staff advisors were: A. Régimbald, H. Rabski, S. MacDonald, P. Fundarek, R. Wells, G. Frappier, A. Blahoianu, R. Jammal, B. Ecroyd, S. Shim, R. Ravishankar, S. Faille, G. Rzentkowski, K. Lafrenière, T. Jamieson and T. Schaubel

Other contributors were:

- Tracerco Radioactive Diagnostic Services: P. Hewitt and N. Lanier
- Cameco Corporation: A. Wong, K. Quesnel, R. Morrisson and D. Clark and D. Ingalls
- Bruce Power: F. Saunders and N. Sawyer
- Hydro-Québec: C. Gélinas
- Natural Resources Canada: M. Lamontagne
- Ontario Power Generation: P. Tremblay
- New Brunswick Power: R. Eagles

Constitution

1. With the notice of meeting, CMD 11-M12, having been properly given and a quorum of Commission Members being present, the meeting was declared to be properly constituted.

2. Since the meeting of the Commission held January 19 and 20, 2011, Commission Member Documents CMD 11-M12 to CMD 11-M25 were distributed to Members. These documents are further detailed in Annex A of these minutes.

Adoption of the Agenda

3. The revised agenda, CMD 11-M13.B, was adopted as presented.

Chair and Secretary

4. The President chaired the meeting of the Commission, assisted by M. Leblanc, Secretary, and D. Major and S. Dimitrijevic, Recording Secretaries.

Minutes of the CNSC Meeting Held January 19 and 20, 2011

5. The Commission Members approved the minutes of the January 19 and 20, 2011 Commission Meeting as presented in CMD 11-M14.

STATUS REPORTS

Early Notification Reports

Cameco Corporation: Injured Miner at McArthur River

6. With reference to CMD 11-M24, CNSC staff and representatives of Cameco Corporation (Cameco) informed the Commission that one contractor miner had been injured by a falling rock while cleaning a blasting hole at the McArthur River site. The miner had been transported to Saskatoon for medical assessment. CAT scan results indicated fractures to four vertebrates and the left leg. CNSC staff added that the miner had been released from hospital, and that full recovery was expected in about three months.

7. Representatives of Cameco provided schematics of the mine and explained the situation at the 590-metre level mine development at the time of the event. They also explained their managing of mine development and safety measures in place. Cameco representatives corrected the information presented in CMD 11-M24, and stated that the rock weight was 150 pounds, instead of the reported 150 kilograms.

8. With respect to the preliminary investigation, representatives of Cameco stated that the rock face and ceiling had been properly scaled and prepared, and that ground control standards had been met and all procedures followed. They added that miners and ground control specialists had inspected the area prior to the event and determined that normal procedures were sufficient to address risk.

9. Representatives of Cameco said that they have since revised ground support standards and that all requirements would be reviewed once the follow-up investigation is completed. They added that the follow-up investigation that includes a root-cause analysis by an external investigator was underway. The investigation is focused on engineering controls and human performance.

10. CNSC staff noted that the initial investigation by Cameco had indicated that the worker had taken all appropriate measures required for this operation and had been in full compliance with standards and procedures. CNSC staff added that the crew had examined the rock face for loose rocks before starting the work.

11. CNSC staff further informed the Commission that Cameco was conducting a full investigation. During this investigation, Cameco had implemented immediate changes to additionally secure the rock face and improve workers' protection.

12. CNSC staff added that the coordinated review with the Saskatchewan Ministry of Labour and Workplace Safety was underway, and that Cameco must file a "Dangerous Occurrence" report with the province. CNSC staff said that both regulators will review the Cameco's investigation report and follow-up on implementation of corrective actions.

13. The Commission noted that removing the injured worker from the mine took 45 minutes and asked if there was a faster way to do this. Representatives of Cameco responded that the area of the mine in question is one of the farthest away from the shaft and pointed out that members of the mine rescue team were underground and had responded within five minutes of the call. They also said that the mine has safe underground areas with equipment to treat injuries.

14. The Commission inquired about technical details on mining techniques, daily working procedures and schedule, surface preparation, loading, blasting and presence of water. Cameco representatives provided detailed responses to the Commission's questions and noted that the conclusions would be drawn from results of the root cause analysis that was underway.

Ontario Power generation Inc.: Pickering Nuclear Generating Station B, Unit 5 Shutdown System 2 Tripped on Spurious Signal

15. With reference to CMD 11-M24.B, CNSC staff informed the Commission that a trip had been caused by a failure of an amplifier in one channel of the trip circuit while another channel was being tested. CNSC staff added that the amplifier had been replaced and the unit restarted. CNSC staff explained that there is a known problem with the aging of these particular amplifiers and that a program exists to replace those with new amplifiers.

16. The Commission sought more information on replacements for aged amplifiers. OPG representatives responded that they have had a program in place for replacement of these amplifiers; however, they had to resolve a number of quality issues with delivered amplifiers, and put together a program to replace those amplifiers while the units were online.

Cameco Corporation: Indoor Spill of Electrolyte in Uranium Conversion Plant in Port Hope, Ontario

17. With reference to CMD 11-M24.C, CNSC staff and Cameco representatives informed the Commission that a worker had been sprayed by a solution containing potassium fluoride (KF) and hydrogen fluoride (HF) while monitoring the electrolyte level in one of the cells of the fluorine/hydrogen production circuits. The circuit had been previously shut down due to unusual pressure fluctuations.

18. Representatives of Cameco described the operation in cell header room of the UF_6 plant and informed the Commission on improvements in their procedures, training programs, safety barriers and containment systems. Providing more information on the event, the Cameco representative noted that the Emergency Response Team had acted quickly and effectively, and had prevented a more serious injury from occurring.

19. Representatives of Cameco further informed the Commission on their preliminary investigation and interim corrective actions that had been implemented with all UF_6 crews prior to the safe restart of the plant. The interim corrective actions included the following:

    - Procedure for handling a cell following an unusual condition;
    - Modification of the cell room procedure for checking the electrolyte level of cells; and
    - Improvement of the personal protective equipment requirements for cell room activities.

20. Representatives of Cameco said that a root cause investigation was underway by a third party investigator, and stated that the findings and corrective actions will be reviewed by the management team and reported to CNSC staff.

21. CNSC staff reported that Cameco had shut down the cell room and the rest of its uranium hexafluoride (UF_6) plant production circuits in order to investigate potential causes of the incident and to propose and implement corrective actions. Cameco's on-site Emergency Response Team had been called in to assist with cleaning the cell room.

22. CNSC staff further reported that the worker had been equipped with the required personal protection equipment (PPE). However, the worker had received HF burns on the chest, required medical aid and hospitalization and had lost time from work. CNSC staff added that the worker was back at work.

23. CNSC staff added that the results of Cameco's initial investigation and CNSC staffs' inspection indicate that a small "hydrogen fire" had occurred inside the cell and caused the system pressure to increase. CNSC staff further said that Cameco's incident investigation and root cause analysis were underway, and that a final report was due by the end of April 2011 for CNSC staff's review. The Commission expects to be informed about final findings and results of the analysis.

ACTION
by
August
2011

24. The Commission asked if there had been any release of hydrofluoric acid vapours during the incident and how the HF had been neutralized. Cameco representatives responded that the vapours had been present only within the room, that the releases to the environment had been prevented and that the HF had been neutralized with a potassium hydroxide solution.

25. The Commission inquired about similar incidents in the plant. Cameco representatives responded that events of similar severity occur rarely and pointed out that, before this one, they had more than one million working hours without a lost time accident.

26. The Commission further inquired about PPE. Cameco representatives responded that the worker involved in the accident had been equipped with gloves, safety glasses and a face shield, and explained that the area between the top of coveralls and below the face shield had been exposed to the spill. Cameco representatives added that one of the interim actions prescribes the use of a full chemical suit that covers the head and neck area, and a different type of face shield that extends around the face and provides wider protection around the head.

27. The Commission sought more information on the hydrogen fire inside the cell. Cameco representatives responded that the cause of the fire had been a recombination of hydrogen and fluorine resulting from the failure of the gas separator. They added that the fire had been fully contained within the pipe situated just outside of the cell.

28. Responding to the Commission's question about detecting the gas separator failure, Cameco representatives said that some early warning signs had come from the temperature and pressure detectors located in the cell. They added that the cell components had been inspected regularly on the basis of hours of operation, and added that, by all criteria, the failure had occurred prematurely, so that one of the interim actions would be to make sure that pressure and temperature are carefully verified before any operation with a given cell.

Ontario Power Generation Inc.: Pickering Nuclear Generating Station A, Unit 4 Outage and Moderator Spill

29. With reference to CMD 11-M24.D, CNSC staff presented information regarding a spill of moderator water inside the reactor building, which had occurred following the unit shutdown to investigate increased leakage of the moderator. CNSC staff explained that a spill of 6 000 litres of heavy water had occurred as a result of a failure of a moderator pump seal, due to improper installation of a pump coupling during a previous outage a year before. They added that the pump had been replaced and the unit returned to service, and that the event had no impact to the health and safety of workers, public or to the environment.

30. CNSC staff reported that, after the Early Notification Report (ENR) had been already prepared, they had decided to send a request for information under subsection 12(2) of the *General Nuclear Safety and Control Regulations*[1] (GNSCR), due to concerns that the unit had been restarted with a known problem.

31. OPG representatives said that their operation staff had been monitoring the internal seal leakage from this pump to the collection system, which was low and manageable until February 23, 2011, when the collection rate had increased, prompting the decision to shut the unit down. They added that all the moderator water had been contained within the moderator room located inside of the containment, and that the recovery of this water had been safely performed.

32. OPG representatives informed the Commission that all moderator pump couplings in Units 1 and 4 had been inspected and that Unit 4 had returned to full power with no issues identified with the performance of the moderator air pumps. They added that a root cause investigation had been initiated to determine the cause of the event in order to prevent recurrence.

[1] Statutory Orders and Regulations, SOR/2002-202

33. The Commission inquired about the duration of the moderate leak, and what was the leak rate that triggers a shutdown. OPG representatives responded that the leak had been noticed in December 2010, and had never reached a shutdown limit; their decision to shut the unit was a precautionary one.

34. Asked to comment, CNSC staff said that an event like this one would be considered an operational issue rather than a safety issue. CNSC staff added that the threshold limit exists for the leaks from the heat transport system, but not for the moderator leaks.

35. Noting that a root cause analysis has been initiated, the Commission inquired about concerns that the unit had been restarted with a known problem. OPG representatives described in details the sequence of events and said that the unit had met all the readiness for service criteria, which is a process that they use to examine the health of the unit before it is returned in service. OPG representatives stated that they would not restart the unit until all the readiness for service criteria were met.

Ontario Power Generation Inc.: Pickering Nuclear Generating Station A, Unit 1 Manual reactor Trip from Full Power

36. With reference to CMD 11-M24.E, CNSC staff informed the Commission that on March 7, 2011, Unit 1 had been manually tripped from full power after a fine control valve, which controls moderator level, failed to operate properly. CNSC staff added that the failure had not caused any immediate adverse effects on the unit operation, since it had operated steadily at full power. The control had been assumed by the regulating system coarse control valves and the reactor had been tripped from full power manually to avoid a potential automatic reactor trip, which might occur during the normal shut-down procedure when the moderator level is coarsely controlled.

37. OPG representatives provided more details on the sequence of events, and stated that a root cause investigation had been initiated to determine the cause of valve failure in order to prevent future recurrence.

38. Asked to comment on their statement that the valve was in a degraded condition, OPG representatives responded that the valve had been operable and controlled the system adequately, and that degradation had been observed by the operators during their inspection rounds. OPG representatives added that they had established additional monitoring for the degraded condition, and that the valve had been specifically scheduled for the outage in April 2011.

39. The Commission asked about the frequency of manual shutdowns, and what was the rationale behind the decision to perform it in this case. OPG representatives responded that their concern had been that there would be an automatic trip and added that the crew had made the decision based on practice in which a manual trip is always recommended when an automatic trip is anticipated.

40. The Commission asked how often reactors are operated under conditions when mechanical problems exist. OPG representatives responded that every detected problem is evaluated based on operating procedures that define the acceptable configuration and equipment availability for the safe operation of the unit. The decision to continue operation is made only if the equipment is available for safe operation of the reactor, as defined in the operating procedures.

41. The Commission further asked CNSC staff about statistical data on downtime of the reactors, maintenance and backlogs that could give an indication of the diligence regarding maintenance, repair and availability of the equipment. CNSC staff responded that these questions had been the reason for the issuance of the subsection 12(2) letter, and added that they consider reporting this kind of data in the annual report on nuclear power plants. OPG representatives added that they have the statistics on system and equipment availability, as well as on deficiencies present on the unit, and said that they had responded to the subsection 12(2) letter fully, prior to the restart of the unit.

Ontario Power Generation Inc.: Release of Demineralised Water at Pickering A Nuclear Generating Station

42. With reference to CMD 11-M24.F, CNSC staff informed the Commission that demineralised water from the auxiliary irradiated fuel bay had been discharged to the environment. The leak was caused by a failed pump seal. The water was estimated to contain about 1.3 Curies of tritium, which had caused an increase of radioactivity at the local water treatment plant of 0.5 Becquerels per litre (regulatory limit is 7000 Becquerels per litre). CNSC staff noted that there was no environmental consequence due to this event, but the release had triggered significant media and public interest and concern. The event had been reported by OPG to the Ministry of Environment and to the CNSC.

43. OPG representatives provided a brief summary of the event and stated that an accurate calculation had shown that the volume of the released water had been approximately 30 000 litres, instead of previously reported 73 000 litres. OPG representatives added that samples taken from the local water supply plants had confirmed that there had been no measurable increase in tritium levels. OPG representatives also stated that the path that had allowed water from the sump to reach the lake had been secured to prevent recurrence of the event.

44. The Commission noted that a number of events involving seals, pumps, valves and similar equipment have occurred recently and asked if that was caused by the state of the plant, or was just a series of independent events. OPG representatives agreed that a series of events had occurred in roughly the same broad timeframe, and said that they treat them independently and individually. They remarked that the causes are often different and that they still have to complete root cause evaluations for a number of these events.

45. The Commission further asked if the measures to prevent reoccurrence of the event have been applied to all fuel bays. OPG representatives responded that they had performed an additional condition evaluation of all fuel bays to check for potential vulnerabilities, and had not found any.

46. The Commission inquired on maintenance and the frequency of repairs for this kind of equipment. OPG representatives described their preventative and corrective maintenance programs for seals and rotating equipment. They also explained their review procedure that looks at all types of failure and whether the frequencies of maintenance need to be adjusted.

47. The Commission further inquired about the nature of monitoring of the fuel bays. OPG representatives explained that the fuel bays have been monitored visually, by operator surveillance, and alarms on level monitors. Asked about measures to automatically detect any leak to the environment, OPG representatives responded that their approach to the solution has been that, regardless of a pump failure or seal failure, the release to the environment should not have occurred.

48. The Commission further asked about the water level in the fuel bay and potential risk of the bay being drained to the fuel level. OPG representatives responded that the bay is 28 feet deep, and said that it could only be drained down several inches.

49. The Commission noted that the recent events in Japan have resulted in increased sensitivity of the public to all events related to nuclear industry, and urged all involved in related activities to increase their efforts to minimize the number of similar incidents and strive to eliminate them.

Bruce Power: Heavy Water Spill at Bruce A Nuclear Generating Station

50. With reference to CMD 11-M24.G, CNSC staff provided information on a small heat transport system leak that had caused elevated tritium levels in the station. The leak was quickly terminated and a station alert was declared to prevent workers from entering the spill area. CNSC staff noted that the event did not result in adverse effects to the environment or to the public. CNSC staff added that 16 workers had been affected by receiving small doses of radiation (the largest being 0.22 mSv (milliSieverts), compared to regulatory limit of 50 mSv/y).

51. CNSC staff further informed the Commission that the leak had occurred as a result of a valve package failure. CNSC staff added that Bruce Power had submitted a preliminary report on the event and that a detailed report would follow within 45 days.

52. Bruce Power representatives informed the Commission that they had declared the station alert as a proactive measure to protect workers from radiation exposure and noted that the small doses of radiation had been received mainly by the workers involved in the clean-up operation. Bruce Power representatives added that the rapid reaction and effective response had been triggered by their newly installed tritium alarm system.

53. The Commission sought more information about preventive maintenance. Bruce Power representatives responded that the valve in question had been checked a week before the event, and added that preventive maintenance is normal and a permanent activity at the station.

54. The Commission asked about the importance of such an event, with a small leak that had been quickly terminated. CNSC staff responded that this notification report has been triggered by the declared station alert, and because the radiological consequences were not known at the time the ENR was issued. Bruce Power representatives added that no matter how minor an event might be, they always conduct a root cause analysis and prescribe appropriate actions, based on the drawn conclusions.

55. The Commission further asked about reporting of such events to the public. CNSC staff responded that this kind of events is posted quarterly on the CNSC web report, which is accessible to the public.

Ontario Power Generation Inc.: Pickering Nuclear Generating Station A, Unit 1 Manual Reactor Trip from Lower Power

56. With reference to CMD 11-M24.H. CNSC staff informed the Commission that on returning Unit 1 to service after an earlier trip and a forced outage, a circuit breaker failure caused the isolation of one Class 4 bus, which is considered a partial loss of power. CNSC staff added that the reactor tripped and power was lost to the irradiated fuel bay lighting only. The unit had been restarted after this event.

57. The Commission noted that each of the reported events by itself did not seem to be a safety issue; however when all of them were put together, a concern might arise that there was a systemic issue. The Commission expressed its satisfaction that the licensees were reviewing all their procedures, particularly in light of recent events in Japan and heightened sensitivity regarding the nuclear industry and its activities.

Ontario Power Generation Inc.: Report on Security of Information at Pickering Nuclear Generating Stations A and B (in closed session)

58. With reference to CMD 11-M24.A and CMD 11-M24.1A, CNSC staff and representatives from OPG informed the Commission on security of information at Pickering Nuclear Generating Stations A and B. The Commission considered the presented information in a closed session.

Verbal Update by CNSC staff: Summary of the recent event of train derailment and evacuation near Port Hope, Ontario

59. CNSC staff informed the Commission on the March 27, 2011 train derailment in Hamilton Township, between Cobourg and Port Hope, two kilometres from the Cameco manufacturing facility and five kilometres from its Port Hope conversion facility. The train composition included two cars carrying jet fuel and one car containing propane.

60. CNSC staff reported that the accident resulted in a fuel leak and that the neighbouring population was evacuated as a precautionary measure. CNSC staff further reported that the Cameco facilities had not been affected by the accident and that their operations had continued without a break.

61. Cameco representatives confirmed that the train derailment did not have any impact on their operations, and that the train did not carry any products to or from Cameco facilities.

Verbal Update by CNSC staff: Cameco Corporation: Incident at sea involving a shipment of uranium concentrate

62. CNSC staff updated the Commission on actions taken in response to the incident with a shipment of uranium concentrate, yellow cake, on board the ship MCP *Altona*. The MCP *Altona*, carrying 24 sea containers with a total of 840 drums of yellow cake destined to China, had encountered very rough seas in the Pacific Ocean at the end of December 2010. As a result, several containers and drums were damaged and the ship sailed back to Vancouver where Cameco undertook remediation action. The incident was reported to the Commission on January 19, 2011, in CMD 11-M4.A.

63. CNSC staff reported that, since January, Cameco had examined the conditions of the sea containers and drums on board the MCP *Altona* and submitted to the CNSC a detailed plan to recover all the uranium shipment from the cargo hold of the MCP *Altona* and ship it back to their facility at Key Lake in Saskatchewan. CNSC staff added that, after reviewing this plan, they had authorized the beginning of the recovery operation.

64. CNSC staff further reported that the operation was safely completed on March 21, 2011, and that all containers and drums had been sent back to Key Lake. CNSC staff added that their inspectors, together with other authorities, including Transport Canada Marine Safety, Transport of Dangerous Goods, Health Canada, WorkSafeBC and Port Metro Vancouver had performed independent verifications of Cameco's work and dose measurements, in order to ensure that Cameco was in compliance with all regulatory requirements.

65. With respect to radiation and environmental effects of the operation, CNSC staff said that Cameco had taken all necessary precautions to protect the environment and that there had been no heath and safety related incidents during the operation. Rainwater within the cargo hold had been collected and shipped to Key Lake.

Daily contamination checks performed by Cameco and monitored by CNSC staff had not shown any contamination outside of the cargo hold, where radiation levels had been within background levels.

66. CNSC staff noted that radiation doses to workers had been very low, about 0.2 percent of the annual dose limit for nuclear energy workers, and that all workers had been equipped with appropriate personal protective equipment.

67. CNSC staff added that they have sent to Cameco safety recommendations related to marine shipments of uranium concentrate with emphasis placed on regulatory requirements of the various laws, regulations and international conventions on marine transport safety. They said that similar recommendations had also been sent to AREVA, since that company is involved in similar shipments. CNSC staff committed to return to the Commission upon completion of their investigation with a full report on the causes and circumstances of the incident.

68. Representatives of Cameco confirmed that they had successfully completed the removal of the sea containers and said that they had put in a number of interim safeguards, based on preliminary recommendations from third-party experts and applying the recommendations of the CNSC, to minimize the risk of a similar event.

69. Representatives of Cameco informed the Commission that they were preparing a root cause investigation and added that the timing for the completion of the report could prove challenging, since the event was already subject to litigation proceedings and parties involved in the event have conflicting interests.

70. The Commission asked CNSC staff about the nature of the recommendations sent to Cameco and AREVA. CNSC staff responded that the notice with the recommendations had been developed with Transport Canada and through close collaboration with Marine Safety. The recommendations were mainly related to existing requirements with additional precautions regarding loads of uranium concentrate, which is considered to be a very heavy load.

71. The Commission asked if Cameco had any shipment or any kind of material involved in recent events in Japan. The representative of Cameco responded that they did not.

72. The Commission inquired into timing of the root cause investigation and involvement of CNSC staff, taking into account the litigation challenge. CNSC staff responded that the investigation is lead by Transport Canada, Marine Safety as the lead federal agency, and that CNSC staff provide information on the incident. CNSC staff estimated that the investigation could be completed by the fall of 2011.

73. The Commission expressed expectations to receive the results of the investigation and lessons learned as soon as possible. CNSC staff stated that they would review the interim safety precautions communicated to Cameco in order to add more safety changes to the marine shipments. **ACTION** by June 2011

Status Report on Power Reactors

74. With reference to CMD 11-M25, which includes the Status Report on Power Reactors, CNSC staff presented an oral update on the following items:

- Unit 1 of the Darlington Nuclear Generating Station (NGS): the unit entered its scheduled maintenance outage and is scheduled to return to service on May 24, 2011;

- Unit 5 of the Pickering A NGS: the unit was returned to service after a first outage for moderator pump seal repairs and was operating at its full power;

- With respect to the request by CNSC, issued on March 17, 2011, requiring all CANDU reactor licensees to re-examine safety cases related to external hazards, severe accidents and emergency preparedness, CNSC staff informed the Commission that all Canadian nuclear utilities have acknowledged receipt and committed to provide a progress update relating to the information requested in response to the situation that is occurring at the Fukushima site in Japan; and

- CNSC staff added that they had performed inspection of power reactor sites for external hazard protection. The results of this inspection had confirmed that, in general, all Canadian plants have systems to withstand external events, and procedures and qualified staff available at all times to respond to these events.

75. The Commission asked about a timeline for the licensees to provide the required progress updates on preparedness for external hazards. CNSC staff responded that most of the licensees would be reporting on short-term actions by April 8, 2011, and for long-term actions by June or July 2011, depending on the utility.

76. The Commission inquired about the number of the original staff that had remained at Point Lepreau, how many of them have left through attrition and whether there is a program in place for retraining of the new staff. Point Lepreau representatives responded that their complement of staff remained complete, with a full complement of staff that had been at the station prior to the commencement of the refurbishment and added that the staff had been enhanced prior to the refurbishment through regular hiring to support an expected attrition of some of their longer-term employees.

77. With respect to training, Point Lepreau representatives stated that they have training programs in place for the operations staff to expose them to all of the systems and equipment that have been installed in the station during the refurbishment. They added that they had engaged about one hundred additional temporary staff, who were trained and have an opportunity to become permanent in future years, as some of the more senior staff chooses to leave on retirement.

Updates on items from previous Commission proceedings

Tracerco Radioactive Diagnostic Services (Tracerco):Update on Overexposure of a Member of the Public

78. With reference to CMD 11-M17, CNSC staff and representatives from Tracerco presented information regarding the incident involving an overexposure of a member of the public working in an office adjacent to Tracerco's office without sufficient shielding and provided an update of actions taken following the discovery. Tracerco representatives also presented an overview of the Tracerco organization, future considerations, and lessons learned.

79. The Commission inquired on industry follow-up of this incident and asked if the incident will trigger changes to rules, standards or procedures currently in place. CNSC staff responded that information about the event was relayed to licensees that store neutron sources in a notice issued on the CNSC website and that some licensees requested further information regarding the incident and measures they should apply to avoid such an occurrence.

CNSC staff added that they will continue to actively assess public dose restrictions during routine compliance inspections and that information about this event will be included in future licence assessments to ensure extra consideration is given for neutron source storage.

80. In response to a question from the Commission asking if the affected individual received the required assistance following the discovery of the overexposure, Tracerco representatives said that they, along with a CNSC staff and a third party consultant, had provided the individual and their management with the required information and assistance. CNSC staff stated that the individual had been notified in writing and provided with contact information to further assist. CNSC staff added that they had not heard from the individual since the notification.

81. The Commission asked Tracerco representatives to elaborate on the root cause of the incident and to explain why the neutron survey meter had been found out of calibration and without batteries at the time of the CNSC inspection. Tracerco representatives explained that only gamma doses had been measured during their routine surveys. Tracerco representatives also explained that the neutron survey meter had been seldom used, and admitted that the absence of batteries was an oversight.

82. The Commission sought more information on Tracerco's neutron survey meter and monitoring device verification program, and inquired about the requirements regarding the frequency of radiation monitoring. Tracerco representatives responded that, since the event, they have developed and implemented a procedure for performing monthly radiation surveys that measures both neutron and gamma doses. The procedure includes the verification of the survey meters prior to use, record keeping of the doses measured, and changing the monitoring device in the public area. With regards to the required frequency of radiation monitoring, CNSC staff stated that there is no specific requirement, but that CNSC staff reviews Tracerco's annual compliance report, which contains radiation monitoring information, to ensure they are meeting their obligations. CNSC staff added that there are no requirements for records to be submitted to CNSC staff, but they must be retained on-site.

83. The Commission also inquired about the frequency of CNSC inspections at this facility and questioned the reason why this public exposure was not detected during a previous inspection. CNSC staff responded that inspections for this type of licensee are performed annually and that the public exposure had not been

detected due to an unavailability of neutron measurement device during the inspection. CNSC staff explained they now have more portable neutron measurement instruments available to all inspectors.

84. The Commission asked if verification checklists are used during inspections to assure the public is protected. CNSC staff confirmed the use of checklists and added that inspectors have been informed of this incident and have been asked to be extra diligent in similar settings.

85. The Commission inquired about the requirements related to the design of the source storage area and the criteria defining restricted and unrestricted areas. Tracerco representatives and CNSC staff explained that the criteria for the design of the source storage area are defined by the regulations and the licence conditions. CNSC staff added that the source storage design is evaluated by the Licensing Specialist during the assessment of the application for the operating licence. CNSC staff also stated that the design submitted at the time of the application for the operating licence showed that the source storage arrangement and wall had provided sufficient shielding, but noted that Tracerco had been required to regularly evaluate the dose rates around the source to demonstrate adequate shielding.

86. The Commission inquired about the design and construction of the storage enclosure for the neutron source. Tracerco representatives and CNSC staff explained that, although the third party recommendation called for a high-density concrete and polyethylene block storage enclosure, concrete was not used since there was already adequate gamma shielding. The Commission asked if there is an occupational hazard associated with the new neutron storage enclosure for the source. Tracerco representatives and CNSC staff both confirmed that they do not foresee any occupational risks associated with the new neutron storage enclosure (polyethylene blocks).

87. The Commission inquired on emissions from neutron sources at Tracerco's Sarnia plant. Tracerco representatives responded that CNSC inspectors had performed a follow-up inspection at the Sarnia facility and had not detected neutron radiation on the other side of the shop wall. Tracerco representatives also stated that they have different storage means for neutron sources at their Sarnia location, which provides better shielding.

Progress Report on the CNSC Staff Review of a New Neutron Overpower Protection (NOP) Methodology

88. With reference to CMD 11-M20, CNSC staff presented an update regarding their review of the new Neutron Overpower Protection (NOP) methodology. CNSC staff discussed key concepts in the proposed NOP methodology, the progress reports and their interim position. CNSC staff also discussed OPG's and Bruce Power's compliance with conditions that were defined for this interim period, looked at their current review and discussed some of their conclusions.

89. The Commission requested more information about the method that will be used to perform independent numeric benchmarking. CNSC staff explained that the benchmarking will occur in two parts: for the first part, an independent researcher has been contracted to contrast the results provided by the extreme value statistic (EVS) mathematical framework against other statistical techniques, and for the second part, reduced models of the new NOP methodology will be verified against expected results.

90. The Commission inquired about the reason the design calculation EVS-2010 was not used in the original design of the OPG and Bruce Power reactors, since it does not change over time. CNSC staff responded that the original design was based on conservative analysis using conservative assumptions and that through experience these calculations were being refined to move from conservative calculations to best estimates.

91. The Commission asked for assurance that the current NOP trip setpoints are adequate for the safe operation of OPG and Bruce Power's nuclear generating stations. CNSC staff said that the licensees have shown that they are confident the current NOP trip setpoints ensure that the reactor is safe and that it will shut down in time. CNSC staff explained that they agree with the licensees position and have confirmed that the basis for the November 2009 authorization is still valid.

92. The Commission inquired about the independence of the vertically operated neutron absorbing devices in CANDU reactors and about the functioning of the shutdown systems in an absolute loss of power. CNSC staff explained the basic functioning of the independent neutron absorbing devices and that the shutdown systems actuate in the event of a system failure to immediately shutdown the reactor.

93. The Commission asked if shutdown system (SDS) 1 and SDS 2 can be initiated independently and if they, once initiated, could be maintained continuously to ensure there is no reaction in the reactor. CNSC staff explained that both systems are independent by design with very similar setpoints, which would result in an initiation of both systems during a Loss of Regulation (LOR) event. CNSC staff further explained that upon actuation of the shutdown systems, the reactor is in a so called analysed state to ensure it remains in a state where a nuclear reaction is not sustained anymore.

94. The Commission requested a clarification on the statement made in the presentation indicating that the design frequency of LOR event is less than one event in 100 years. CNSC staff explained that the design frequency of a LOR event is a design target used by statisticians to demonstrate adequate protection. While infrequent, these types of events do occur.

95. Responding to the Commission's question about aging in the Pickering reactors, CNSC staff and OPG representatives said that the Pickering reactors were operated under different conditions than the Darlington and Bruce reactors, which led to a lower rate of aging in the pressure tubes, and therefore adjustment of the installed NOP trip setpoints is not likely to be required over the assumed design life of the reactors. OPG representatives added that the difference between the NOP trip setpoints for Pickering A and B units is due to a number of factors stemming from differences in design of the two units.

96. The Commission asked how performance of the shutdown system will be measured, once the new trip setpoints are implemented. CNSC staff responded that performance will be measured by the shutdown system response times upon actuation. Representatives from OPG and Bruce Power added that performance will also be measured by monitoring the NOP detectors during fuelling and by inspecting the fuel to ensure that it does not sustain damage due to dryout that might occur during reactor trips.

Ontario Power Generation Inc., Pickering A and B Nuclear Generating Stations: Update on the installation and testing of sirens in the Durham Region

97. With reference to CMD 11-M22.1 and CMD 11-M22.2, representatives from Emergency Management Ontario (EMO) and representatives from the Durham Emergency Management Office (DEMO) presented an update on the Durham Region public alerting sirens. Representatives from EMO presented an overview

of emergency public alerting systems and emergency management in Ontario. Representatives from DEMO presented an overview of nuclear emergency preparedness in the Durham Region.

98. The Commission asked why the radios purchased in 2004 have not yet been distributed to the public. DEMO representatives explained that the radios are stored until the sirens are fully installed.

99. The Commission asked how the public is alerted during a power outage should telephones not be operational, and how DEMO ensures their telephone number database is accurate and updated. DEMO representatives responded that telephone alerts are one of a number of methods used to alert the public in the event of a nuclear emergency. DEMO representatives also expressed that obtaining updated telephone data is challenging but that they are working with OPG to try and rectify this issue.

100. The Commission inquired about non-compliant municipalities, as presented by EMO. EMO representatives explained that municipalities noted as non-compliant are non-compliant with the current Provincial Nuclear Emergency Response Plan (PNERP). EMO representatives said that they are working with the municipalities to make them compliant with the current standard. CNSC staff explained the non-conformities of non-compliant municipalities and stated that the municipalities are aware and have been briefed internally on the status of the non-conformances. DEMO representatives added that they are working on addressing the non-conformances in their region by devising a plan to distribute the tone-alert radios once the sirens are installed and by proving that they can effectively reach the surrounding population within a 15-minute timeframe. The Commission stressed the importance of municipalities being compliant with the PNERP.

101. In response to a question from the Commission regarding the disposal of contaminated water used to clean vehicles during a nuclear emergency, DEMO representatives said that the water is disposed of in the sewage system but that the contamination is likely to be small and would have minimal effects on the public. CNSC staff indicated that it is difficult to indicate what the effects of the contaminated water on the environment would be without relating it to specific situations.

102. The Commission asked if a plan is in place to respond to an evacuation of an 80 kilometre zone. EMO representatives said that they have estimated the time required to evacuate the population in the contiguous zone, in a three kilometre zone, in a 10 kilometre zone, and for the entire primary zone. EMO representatives added

that they have considered the evacuation of the secondary zone but have not yet simulated it.

103. The Commission asked if there is clarity of responsibilities in the event of a major nuclear accident and as to who declares the severity of the event. EMO representatives explained that accountability and responsibility are clearly defined. EMO representatives also defined the process that would be used to declare a nuclear emergency.

Ontario Power Generation Inc., Pickering A and B Nuclear Generating Stations: Status Update on Fish Impingement

104. With reference to CMD 11-M23.1, representatives from Ontario Power Generation Inc. (OPG) presented an update on the progress for meeting the fish impingement reduction targets established for the Pickering Nuclear Generating Station. OPG discussed the results from the 2010 sampling program, the project milestones, the final solution, fish habitat restoration, and lessons learned.

105. The Commission inquired about components that would be installed to reduce submergence of the net due to algae loading. OPG representatives explained that they plan on extending the net by adding 10 additional feet of skirting on the top to prevent fish from passing over during algae loading. OPG representatives also said that they are adding additional floats on the top of the net and adding depth loggers to identify when the net starts to sink.

106. The Commission asked if these changes have been reviewed by CNSC staff. CNSC staff confirmed that they were reviewing the submitted plan. OPG representatives stated that they have committed to provide a full report to the Commission in September on the effectiveness of the net and should complete implementing the changes by the end of the summer.

ACTION
due September 2011

107. The Commission asked if OPG had developed a contingency plan in case the proposed changes are not successful in reducing fish impingement. OPG representatives responded that they do not have a contingency plan since they are confident the proposed changes will prevent fish from going through the barrier and that the effectiveness of the net is achievable from the data they have gathered to date. CNSC staff expressed their concerns that, since the net is not in place for four months per year, OPG would not be able to meet the 80% efficiency target. A representative from the Department of Fisheries and Ocean (DFO) indicated that they too are concerned that the current set up may not be sufficient to reach the desired impingement reduction targets

and would like to see OPG entertain other options.

108. Responding to the Commission's question on why the net is not installed year-round, OPG said that the net cannot be installed during the winter due to safety considerations for the dive crew required for the maintenance of the net.

109. Environment Canada (EC) representatives expressed their concerns with thermal effects of the Pickering station on round whitefish, indicating that studies have shown multiple thermal exceedances at the Pickering site, and that they feel there is potential non-compliance with the *Fisheries Act*. CNSC staff and OPG representatives responded that they could not comment further on this matter since they have not had the chance to meet to discuss OPG's study that was completed recently. The Commission stressed the importance of cooperation between DFO, EC and OPG in the resolution of these issues and requested to revisit the issue of thermal effects on round whitefish.

ACTION
due by
September
2011

110. The Commission inquired about the precision of the data presented and asked why the data is still considered preliminary. OPG representatives responded that, because of the variability in the lake and in order to truly assess the effectiveness of the net, more data is required. OPG representatives added that they are looking at sonar data to complement the data they have gathered to date. OPG representatives also explained that there was a large amount of data to process and that statisticians would review the data before the final report is submitted to the CNSC.

Ontario Power Generation Inc., Pickering B Nuclear Generating Station: Regulatory Plan for Continued Operation and End-of-Life

111. With reference to CMD 11-M21, CNSC staff presented a high-level regulatory oversight plan for the Pickering B units, which included the following:

- background information;
- OPG's strategic plan for Pickering B end of commercial operation and the proposed CNSC regulatory oversight plan;
- a high-level overview of OPG's strategic plan for Pickering A and B end-of-life and the proposed CNSC regulatory oversight plan;
- a brief summary of staff's regulatory expectations and reviews of OPG's continued operation plan; and
- a discussion of short-term work commitments.

112. In response to a question from the Commission regarding the new operating life of Pickering A, units 1 and 4 reactors, CNSC staff and OPG representatives explained that the re-tubing of both these units in the mid 1990s has extended their operating life to 2020, but that an economical decision was made to shutdown these units along with the Pickering B units.

113. The Commission asked if the period allowed beyond the design life of 30 000 hours could be surpassed under some conditions, and what those conditions would be. CNSC staff responded that the period past design life could fluctuate depending on the aging of pressure tubes. OPG representatives added that they are carrying out a fuel channel life management project with the objective of determining the length of time the pressure tubes can be safely operated.

114. The Commission asked why the reactors were being allowed to operate past the design life and what the safety implication of extending their operation is. CNSC staff explained that there are no safety implications with extending the operating life past the design life. CNSC staff added that the design life is assumed at during the initial licensing of the plant and that the operating life really depends on how the unit is operated and maintained. CNSC staff further explained that the design life is a regulatory trigger to revisit the condition of the critical components and decide whether or not the life can be extended. CNSC staff noted that if the reactor operating parameters are not well controlled, then the design life can be shortened and that periodic in-service inspections are conducted to ensure the reactor can operate safely throughout its design life.

115. The Commission inquired about the employees' reactions and comments regarding the news of the impending shutdown of the Pickering A and B reactor units. OPG representatives responded that, following the announcement of the shutdown of the units, they communicated to their employees that the end-of-life date may come sooner than 2020 if the units are not operated safely and reliably; it is therefore in the employees' best interest to continue the safe and reliable operation of the units. OPG representatives also said that they discussed with employees anticipated work once the units are shutdown and work associated with the Darlington refurbishment.

116. Responding to a question from the Commission regarding retirement of employees, OPG representatives said that the average age of the workforce is in the middle to low forties and that they communicate with younger employees to ensure they are aware of OPG's future opportunities. OPG representatives also said that they have determined that OPG is still viewed as an employer of choice from the large number of applications received during a recent recruitment. When asked if OPG has a high turnover rate, OPG representatives responded that they do not.

117. The Commission inquired about the regulatory process for extending the licences past the design life and the basis for Pickering B licence renewal in 2013. CNSC staff explained that the regulatory approach used here is similar to that for other power reactor operating licences and that hold points will be used to ensure the pressure tubes in the Pickering units are fit for continued service until 2020. CNSC staff also explained that the basis for the licence renewal in 2013 would be the same as for current operation, but also ensuring that the critical components are fit for service for the duration of the proposed licence. CNSC staff added that they have prepared a protocol, which was signed with the industry, to regulate research and development activities related to aging issues, which pertain to the extended operation of CANDU reactors.

118. The Commission inquired about the consolidation of the Pickering A and B licences in 2013. OPG representatives provided an update on the consolidation process, explaining that they were predominantly in the study phase and that they would have an integrated plan in 2013.

119. The Commission commented on the CNSC report that indicates that the human performance assessment of the plant has not been meeting CNSC expectations. CNSC staff explained that the human performance rating has been below expectations for several years because of minimum complement issues. Both CNSC staff and OPG representatives indicated that these issues were being resolved and that OPG's revised minimum complement document was being reviewed by CNSC staff.

INFORMATION ITEMS

Commission update with regard to seismic qualification of the Nuclear Power Plants: Presentation from Natural Resources Canada and CNSC Staff on Events at the Fukushima Nuclear Power Plant in Japan

120. Representatives of the Natural Resources Canada (NRCan) gave a presentation to the Commission on earthquakes in Canada, and CNSC staff presented an update on Fukushima Daiichi Nuclear Power Plant in Japan.

121. The presentation by NRCan included an explanation of basic notions of seismology, faults in the earth crust, mechanics of propagation of seismic waves and types of earthquakes. NRCan representatives explained that most earthquakes occur in well defined zones of seismic activity and that the largest ones are expected in the zones near the lines of contact between continental plates. Presenting the history of earthquakes in eastern Canada, NRCan representatives said that the region around Lake Ontario, which is not located at the edge of a continental plate, lies in the zone of low-to-moderate seismicity, and that the resulting tremors could cause minor damage. In the Canadian Shield, earthquakes are even more rare.

122. CNSC staff communicated to the Commission the CNSC response to the event by the activation of the Emergency Operation Centre (EOC) and Japanese Executive team (JET), and explained daily activities related to information exchange and coordination with numerous international and Canadian agencies and government departments.

123. CNSC staff informed the Commission that the logistics team had ensured that all the supporting infrastructure had been in place to enable a continuous operation for an extended period of time, and noted that their main goals included the following:

- To provide analysis and advice in support of the protection of Canadians in Japan, including the Canadian Embassy staff in Tokyo;
- To provide analysis and advice in support of the protection of Canadians in Canada, and the protection of the Canadian environment; and
- To continuously provide Canadians with a complete and clear flow of information on the situation in Fukushima.

124. CNSC staff further presented to the Commission technical details related to the event and explained differences between boiling water reactors used at Fukushima and CANDU reactors.

125. CNSC staff also informed the Commission about their actions taken to verify the effectiveness of the *defence in depth* strategy, underlying the design and operation of CANDU plants to ensure that these plants are safe when subjected to extreme external hazards. CNSC staff stated that they had required specific actions to be taken by all major nuclear facilities in Canada, including all nuclear power plants and AECL's Chalk River Laboratories. CNSC staff added that all Canadian nuclear utilities have committed to provide a progress update relating to the information requested.

126. CNSC staff reported that they had inspected capabilities of all plants to mitigate blackout conditions and verified emergency preparedness measures as well as other elements of protection against external hazards. CNSC staff also reported that they had inspected irradiated spent fuel pools. These inspections and verifications have confirmed that all Canadian plants have systems to withstand seismic events and procedure and qualified staff available at all times to respond to these events.

127. Representatives of nuclear power stations confirmed their commitment to closely collaborate with CNSC, and evaluate credible threats, re-examine defence procedures and re-evaluate functioning of all systems in place.

128. The Commission asked about how long nuclear power plants had been down during the grid failure in Ontario in 2003. CNSC staff responded that the loss of grid had lasted for about five and a half hours, and that all units of the Pickering station had been affected so that they had to be cooled on thermo siphoning, while the Darlington and Bruce units had not been affected. The power to the water cooling pumps for steam generators had been restored immediately. CNSC staff added that a program had been introduced to improve the service water system and add the auxiliary power supplies that would permit uninterrupted cooling of the units. OPG representatives added that the most significant issue of the blackout had been the grid restoration time and confirmed that the major project resulting from the event had been the construction of the auxiliary power supply, which was completed several years ago.

129. The Commission sought more information about the storage of spent fuel in Canadian nuclear power plants. CNSC staff responded that, unlike fuel from the Fukushima Daiichi plant, spent fuel in Canadian nuclear power plants is stored for a period of six to ten years in seismically qualified bays built in the ground outside of reactor buildings. After that period, the fuel is removed to dry storage, while the overall capacity of the spent fuel pools at Fukushima plant had been designed to keep the fuel for the entire life of the plant. CNSC staff noted that, since CANDU reactors are refuelled on-line by equivalent of only two channels per day, heat load brought to the storage bays is not as large as for other reactors.

130. The Commission asked about elevation above sea level of the Fukushima plant. CNSC staff responded that the elevation of the station is six to eight meters above the sea level with backup generators located between ten and twelve metres above sea level. CNSC staff said that the height of the tsunami wave at Fukushima site had reached 14 metres.

131. Asked if there is a possibility for several metres high waves as a result of an earthquake in Lake Ontario or Lake Huron, representatives from NRCan responded that such possibility was not credible because of the size of earthquakes that are possible in such an interplate environment. They added that there is no geological evidence that a submarine slump had occurred in the past. For the region of Charlevoix, with more intensive seismic activity, NRCan representatives said that slumps were evidenced at the bottom of the Saint Lawrence River, but that there had been no records or reports that an earthquake had induced waves of this kind.

132. The Commission inquired on scientific basis, including statistics and modelling, for predictions and forecasts that are made in seismology. NRCan representatives responded that for earthquakes of large scale, e.g. of magnitude of 8 or 9 on the Richter scale, it is fairly certain that they are restricted to subduction zones. Predictions for the sites in interplate zones, such as Darlington and the rest of Eastern Canada, and preparation of seismic hazard maps that are used in the National Building Code, are based on a probabilistic approach, but also on historical records. CNSC staff explained other important physical parameters, such as ground acceleration, duration, wave frequencies and characteristics of affected structure. CNSC staff explained how these parameters were used for establishing design conditions and restraints for the construction of a new nuclear power plant. CNSC staff noted that all potential reactor designs for the Darlington new facility surpass these requirements by some 40 percent.

133. The Commission sought more information on anticipating limits and how to approach events that go beyond design. CNSC staff responded that the conditions beyond design-based earthquakes were also analysed as part of so-called severe accident scenario. The main purpose of this analysis is to ensure that the facility remains safe, which means that the reactor could be shut down, cooling would continue and that containment should still be available so that any radiological release would be minimised and controlled.

134. The Commission inquired on differences between fuel for boiling water reactors and CANDU reactors, and asked about potential impact of this difference on the cooling rate of the spent fuel. CNSC staff responded that CANDU reactors use natural uranium while the boiling water reactors of Fukushima use lightly enriched uranium, and added that natural uranium generates less heat and is much easier to store in the spent fuel pools.

DECISION ITEMS – REGULATORY DOCUMENTS

RD-308 – Deterministic Safety Analysis for Small Reactor Facilities and RD-367 – Design of Small Reactor Facilities

135. With reference to CMD 11-M19, CNSC staff presented the following:
- information on the purpose of the regulatory documents;
- the legal basis and international standards for each regulatory document;
- descriptions of the regulatory documents;
- a summary of the key comments received during each public consultation; and
- CNSC's response to the comments received during each public consultation; and
- information on the publication implementation by the CNSC staff for a path forward.

136. In response to a question from the Commission asking how many small reactor facilities exist and are expected to be built in the near future, CNSC staff said that research facilities and some industries have expressed their interest in small reactors. CNSC staff explained that they wanted to ensure modern requirements are available should demand for small reactors increase. CNSC staff also enumerated the small reactors operating in Canada.

137. The Commission inquired about the levels of defence-in-depth in the deterministic safety analysis objectives. CNSC staff described all five levels of defence-in-depth and explained that licensees must demonstrate that all five levels are implemented at facility. The Commission then asked how the potential consequence of an event influences the need for a safety analysis. CNSC staff explained that the defence-in-depth methodology that is in place ensures the consequences of events have been taken into account in the safety objectives for the overall design.

138. The Commission inquired about the periodicity of the review of the deterministic safety analysis. CNSC staff responded that they have not fixed a periodicity for the review since changes to safety analyses depend on material changes, new discovery and findings, which vary by facility.

139. Regarding the definition of a small reactor facility, the Commission asked how much additional power is allowed above the 200 MW limit, since the definition uses the term approximately. CNSC staff explained that, for licensees wanting to be considered as having a small reactor, an assessment of the amount of thermal energy in excess of the 200 MW limit and the design of the reactor itself would be completed by the CNSC and a graded approach would be used to ensure the reactor is in line with the nuclear power plant requirements of RD-337. The Commission commented that a definition describing the difference between thermal and electrical energy should be included in the document to prevent ambiguities.

140. The Commission asked if the changes made to the confinement and containment definitions in the glossary of RD-367 satisfactorily addressed the commenter's concerns. CNSC staff stated that the commenter saw the changes and did not comment further.

141. The Commission asked what the "human machine interface" encompasses. CNSC staff explained that the human machine interface is the interaction of humans with hardware, software and electrical components.

142. The Commission noted a few inconsistencies and ambiguities in the text between the English and French versions of the documents. CNSC staff noted the comments and will make appropriate changes.

143. Regarding section 7.1.3 of RD-367, the Commission commented that monitoring should not be limited to routinely occupied locations. The Commission inquired about the monitoring equipment. CNSC staff explained that monitors are available in every room or every entry door and operators have regular access to the monitors.

144. The Commission expressed its concerns with publishing regulatory documents before publishing the associated guidance documents.

145. After considering the recommendations submitted by CNSC staff, the Commission approves Regulatory Document RD-308, *Deterministic Safety Analysis for Small Reactor Facilities*, and Regulatory Document RD-367, *Design of Small Reactor Facilities*, for publication and use. DECISION

RD-334 – Aging Management for Nuclear Power Plants

146. With reference to CMD 11-M18, CNSC staff presented the following:

- information on the purpose of the regulatory documents;
- the legal basis and international standards for each regulatory document;
- descriptions of the regulatory documents;
- a summary of the key comments received during each public consultation;
- CNSC's response to the comments received during each public consultation; and
- information on the publication implementation by the CNSC staff for a path forward.

147. The Commission asked how the CNSC plans to ensure that the suppliers and contractors chosen by the licensees adequately address aging in their work. CNSC staff responded that requirements are included in RD-334 to inform licensees on how to address issues regarding aging and details will be included in a guidance document.

148. The Commission asked CNSC staff to elaborate on the collection of aging management reference baseline data. CNSC staff explained that the reference baseline gathered by the licensees will be reviewed by CNSC staff to evaluate the aging of systems and components. CNSC staff added that nuclear operators have had

aging management programs in place for a number of years and that this regulatory document brings all existing programs together to provide confidence to the regulator and to the public that aging is managed properly.

149. The Commission inquired about the reason for keeping the metal fatigue calculation in the definition of "time-limited assumptions" in the glossary of RD-334, considering the latter is a high-level document. CNSC staff responded that the metal fatigue calculation is only one example cited for the purpose of providing guidance.

150. The Commission inquired about whether the CNSC has chosen to establish continual review of aging management programs as opposed to periodic reviews (every 10 years). CNSC staff answered that, unless the licensees change the program, there is no need to review the program itself more frequently than the periodic safety review, since the program had been reviewed upon implementation. CNSC staff added that the performance of the program will be assessed during periodic inspections, which will be more frequent.

151. The Commission asked if the licensees understand that RD-334 does not replace requirements of other regulations but instead groups requirements on aging management. CNSC staff responded that licensees are aware of the purpose of the document and that CNSC staff will continue to monitor the implementation of this document over the next few years to ensure the purpose of this document is well understood.

152. In response to a question from the Commission asking whether older facilities will be able to manage aging as effectively as new facilities, CNSC staff said that, for aging reactors, safety measures must be modernised and that design modifications will allow the plants to harmonize with regulatory requirements and standards. CNSC staff added that they will continue to work with aging facilities to reduce the gap between their design and current standards.

153. The Commission noted a few inconsistencies in the text between the English and French versions of the document. CNSC staff noted the inconsistencies and will make appropriate changes.

154. The Commission inquired about organizations providing services in aging management, asked if many of these organizations exist, and asked if there is a requirement for licensees to employ such an organization. CNSC staff responded that these organizations are specialized and recognized by the CNSC, and are employed by

licensees depending on the inspection needed and the requirements listed in the applicable standards. Regarding research, CNSC staff said that the requirements in RD-334 allows for licensees to select, based on their research needs, technical services provided by organizations of their choice.

155. The Commission asked about the publication date of the guidance document, GD-334, which will complement RD-334. CNSC staff explained that they expect the guidance document to be ready by the end of the summer, with a six-month period to review and address comments. CNSC staff added that they want to give licensees the opportunity to implement RD-334 and have exchanges with the CNSC prior to publishing the guidance document. The Commission expressed its concerns with publishing a regulatory document before the guidance document.

156. The Commission also asked if the S-98 document will remain in place upon publishing RD-334. CNSC staff confirmed that it will remain in use, even after the guidance document is published.

157. After considering the recommendations submitted by CNSC staff, the Commission approves Regulatory Document RD-334, *Aging Management for Nuclear Power Plants*, for publication and use. DECISION

Closure of the Public Meeting

158. The public portion of the meeting closed on Thursday, March 31, 2011 at 3:12 p.m.

Recording Secretary — 20 June 2011 — Date

Recording Secretary — 2011-06-20 — Date

Secretary — 21-06-11 — Date

APPENDIX A

CMD	DATE	Edocs

11-M12 2011-02-28 (3684875)
Notice of Meeting of March 30 and 31, 2011

11-M13 2011-03-17 (3694365)
Agenda of the meeting of the Canadian Nuclear Safety Commission to be held on Wednesday, March 30 and, Thursday, March 31, 2011, at 280 Slater Street, Ottawa, Ontario

11-M13.A 2011-03-25 (3698424)
Updated agenda of the meeting of the Canadian Nuclear Safety Commission to be held on Wednesday, March 30 and, Thursday, March 31, 2011, at 280 Slater Street, Ottawa, Ontario

11-M13.B 2011-03-29 (3699862)
Updated agenda of the meeting of the Canadian Nuclear Safety Commission to be held on Wednesday, March 30 and, Thursday, March 31, 2011, at 280 Slater Street, Ottawa, Ontario

11-M14 2011-03-24 (3679014)
Approval of Minutes of Commission Meeting held January 19 and 20, 2011

11-M15 2011-03-28
Commission update with regard to seismic qualification of the Nuclear Power Plants; and presentation from Natural Resources Canada and CNSC Staff on Events at the Fukushima Nuclear Plant in Japan – Oral presentation by CNSC staff

11-M15.1 2011-03-28 (3699231)
Commission update with regard to seismic qualification of the Nuclear Power Plants; and presentation from Natural Resources Canada and CNSC Staff on Events at the Fukushima Nuclear Plant in Japan – Oral presentation by Natural Resources Canada

11-M17 2011-03-15 (3649008)
Tracerco Radioactive Diagnostic Services: Update on Overexposure of a Member of the Public – Written submission from CNSC staff

11-M17.1 2011-03-23 (3697169)
Tracerco Radioactive Diagnostic Services: Update on Overexposure of a Member of the Public – Oral presentation by Tracerco Radioactive Diagnostic Services

11-M18 2011-03-14 (3686269)
RD-224 Aging Management for Nuclear Power Plants – Oral presentation by CNSC staff

11-M19 2011-03-10 (3662970)
RD-308 Deterministic Safetyy Analysis for Small Reactor Facilities; and RD-367 Design of Small Reactor Facilities – Oral presentation by CNSC staff

11-M20 2011-03-30 (3695275)
Third Progress Report on the CNSC Staff Review of a new Neutron Overpower Protection (NOP) Methodology – Oral presentation by CNSC staff

11-M21 2011-03-16 (3669120)
Ontario Power Generation Inc., Pickering B Nuclear Generating Station: Regulatory Plan for Continued Operation and End-of-Life – Oral presentation by CNSC staff

11-M22.1 2011-03-28 (3698204)
Ontario Power Generation Inc., Pickering A and B Nuclear Generating Stations: Update on the installation and testing of sirens in the Durham Region – Oral presentation by Emergency Management Ontario

11-M22.2 2011-03-23 (3697175)
Ontario Power Generation Inc., Pickering A and B Nuclear Generating Stations: Update on the installation and testing of sirens in the Durham Region – Oral presentation by Durham Emergency Management Office

11-M23.1 2011-03-15 (3693270)
Ontario Power Generation Inc., Pickering A and B Nuclear Generating Stations: Status Update on Fish Impingement – Oral presentation by Ontario Power Generation Inc.

11-M24 2011-02-21 (3686314)
Early Notification Reports – Cameco Corporation: Injured Miner at McArthur River – Written submission from CNSC staff

11-M24.1 2011-03-23 (3697171)
Early Notification Reports – Cameco Corporation: Injured Miner at McArthur River – Written submission by Cameco Corporation

11-M24.B 2011-02-25 (3685074)
Early Notification Reports – Ontario Power Generation Inc., Pickering Nuclear Generating Station B: P-2010-01123 – Unit 5 Shutdown System #2 (SDS2) Tripped in Spurious Signal

11-M24.C 2011-03-04 (3690457)
Early Notification Reports – Cameco Corporation – Indoor spill of electrolyte (potassium fluoride and hydrogen fluoride) inside Cameco Corporation’s Uranium Conversion Plant in Port Hope, Ontario – Written submission from CNSC staff

11-M24.C1 2011-03-23 (3697173)
Early Notification Reports – Cameco Corporation – Indoor spill of electrolyte (potassium fluoride and hydrogen fluoride) inside Cameco Corporation’s Uranium Conversion Plant in Port Hope, Ontario – Oral presentation by Cameco Corporation

11-M24.D 2011-03-07 (3690514)
Early Notification Reports – Ontario Power Generation Inc., Pickering Nuclear Generating Station A: Pickering Nuclear Generating Station A, Unit 4 Outage and Moderator Spill

11-M24.E 2011-03-17 (3693913)
Early Notification Reports – Ontario Power Generation Inc., Pickering Nuclear Generating Station A: Pickering Unit 1 Manual Reactor Trip from Full Power -

11-M24.F 2011-03-17 (3693915)
Early Notification Reports – Ontario Power Generation Inc., Pickering Nuclear Generating Station A: Release of Demineralized Water at Pickering A Nuclear Generating Station

11-M24.G 2011-03-17 (3693920)
Early Notification Reports – Bruce Power: Heavy Water (D20) Spill at Bruce A Nuclear Generating Station – Written submission from CNSC staff

11-M24.A 2011-02-17 (3684118)
Early Notification Reports – Ontario Power Generation Inc.: Report on Security of Information at Pickering Nuclear Generating Stations A and B – Written submission from CNSC staff – Contains prescribed security information and is not publicly available)

11-M24.A1 2011-03-14 (3692683)
Early Notification Reports – Ontario Power Generation Inc.: Report on Security of Information at Pickering Nuclear Generating Stations A and B – Written submission from Ontario Power Generation Inc. – Contains prescribed security information and is not publicly available)

11-M25 2011-03-23 (3696610)
Status Report on Power Reactors Units as of March 23, 2011