Canadian Nuclear Safety Commission

Commission canadienne de sûreté nucléaire

# Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held Tuesday and Wednesday, August 14 and 15, 2012

Canada

Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held Tuesday, August 14 and Wednesday, August 15, 2012 beginning at 1:38 pm at the Public Hearing Room, 14th floor, 280 Slater Street, Ottawa, Ontario.

Present:

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

M. Leblanc, Secretary
J. Lavoie, Senior General Counsel

M. Young, Recording Secretary

**CNSC staff advisors were**: P. Elder, S. Faille, R. Jammal, G. Frappier, G .Rzentkowski, M. Couture, F. Rinfret, M. Santini, M. Rinker, P. Corcoran, B. Poulet, R. Lojk, P. Webster, A. Bouchard and R. Lane

**Other contributors were**:

- Cameco Corporation: C. Astles, L. Mooney and J. DeGraw
- Ontario Power Generation: F. Demarkar, L. Swami, R. McCalla, P. Tremblay and M. Elliott
- Bruce Power: F. Saunders and D. Hawthorne
- Hydro-Québec : M. Désilets and P. Desbiens
- New Brunswick Power: P. Pasquet, P. Thompson and B. Valpy
- Environment Canada: N. Ali
- Durham Emergency Management: I. Ciuciura
- Ontario Ministry of Labour: L. Doehler
- Natural Resources Canada: J. Adams
- Ministry of Emergency Management Ontario: T. Contra
- Health Canada: B. Ahier

Constitution

1. With the notice of meeting, CMD 12-M37, 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 June 21, 2012, Commission Member Documents CMD 12-M37 to CMD 12-M44 were distributed to Members. These documents are further detailed in Annex A of these minutes.

Adoption of the Agenda

3. The revised agenda, CMD 12-M38.A, was adopted as presented.

Chair and Secretary

4. The President chaired the meeting of the Commission, assisted by M. Leblanc, Secretary and M. Young, Recording Secretary.

Minutes of the CNSC Meeting Held June 21, 2012

5. The Commission Members approved the minutes of the June 21, 2012 Commission Meeting as presented in CMD 12-M39, with one minor change. The Commission modified paragraph 10 to also include a volume equivalent, in litres, for a mass of heavy water, which had been provided in kilograms.

STATUS REPORTS

Event Initial Report (EIR): Contamination incident at Cameco Corporation's (Cameco) Blind River Refinery

6. With reference to CMD 12-M43, CNSC staff presented information regarding a contamination incident at Cameco's Blind River Refinery (BRR). Cameco also presented information in CMD 12-M43.1. CNSC staff reported that on June 23, 2012, a Cameco employee inhaled uranium dust while opening a drum of uranium ore concentrate (yellowcake). CNSC staff explained that the drum in question had been unexpectedly pressurized, which caused about 26 kg of yellowcake to be expelled from the drum into an indoor work area when it was opened. CNSC staff reported that the employee was assisted by two nearby workers in carrying out the decontamination process, and that follow-up monitoring and dose analysis had found that the affected employee had received an internal radiation dose in the range of two to three millisieverts, which is well below the regulatory limit of 50 millisieverts per year (mSv/y). CNSC staff further reported that, due to the chemical toxicity of yellowcake, which can affect the kidneys, the affected employee was sent to a local hospital for blood and urine tests to ensure that the employee's kidneys were functioning normally. CNSC staff stated that there was no release of uranium to the external environment as a result of the event and that the affected employee, as well as the two other employees who participated in the clean-up, had been cleared by Cameco's BRR physician to return to work. CNSC staff noted that Cameco's root cause report would be submitted to the CNSC by August 24, 2012.

7. Cameco provided information regarding its investigation and follow-up corrective actions taken as a result of the event, including ensuring that the employee had received appropriate medical attention. Cameco noted that it had not recognized that the drums may have been pressurized and presented a safety significant hazard to workers opening these drums at the BRR. Cameco explained that the drum had been pressurized since being filled by the yellowcake supplier, Uranium One USA, and that a separate investigation by Uranium One USA was underway. Cameco reported that Uranium One USA's investigation would first be provided to the US Nuclear Regulatory Commission (US NRC) and that a copy of that report would also be provided to Cameco, since the barrel had been filled in the United States. Cameco further stated that it had implemented interim additional safety measures, such as personal protective equipment and respirators, and placed all of the yellowcake drums received from Uranium One USA in quarantine. Cameco noted that only the yellowcake produced by a hydrogen peroxide process has the potential to pressurize drums after being packed.

8. CNSC staff stated that Cameco's interim corrective actions to protect workers from the observed hazard are satisfactory until permanent measures are implemented by Cameco to prevent recurrence of this event. CNSC staff further stated that it had requested that the operators of Canadian uranium mills, Cameco and Areva Resources Inc., review their procedures to ensure that their yellowcake drums do not become pressurized. CNSC staff noted that it planned to conduct focussed inspections at the BRR in Ontario and uranium mills in Saskatoon before the end of 2012 to ensure that the lessons learned from this event have been implemented by Cameco.

9. The Commission enquired about the training required for the work associated with the event. A Cameco representative responded that Cameco has a systematic approach to training, which includes the task in question. The Cameco representative noted that the training includes the handing of the drums, and noted that drum inspection prior to opening was added to the workers' training as a result of the event.

10. The Commission asked for more information concerning the strength of the drums and the pressure build-up they could sustain. Cameco responded that it expected Uranium One USA's investigation would include this information. CNSC staff responded that the drums must meet the requirements of the *Packaging and Transport of Nuclear Substances Regulations*[1],

[1] Statutory Orders and Regulations (SOR) /2000-208.

although the drums are not supposed to be pressurized. CNSC staff stated that it would review the structural integrity of the drums as part of its follow-up review of the event.

11. The Commission asked for more information regarding the packaging of the yellowcake. A Cameco representative responded that the process for packaging yellowcake takes oxidization and temperature into consideration, and that a certain amount of time must elapse before the drums can be sealed after having been filled with yellowcake. The Cameco representative noted that the risk of pressurization had been known from a packaging standpoint, although it had previously never encountered a pressurized drum at the BRR.

12. The Commission asked for more information about the industry's understanding of the pressurized drums. The Cameco representative responded that the US NRC had identified the drum pressurization issue in 1999 and that Cameco had taken the NRC's recommendations into consideration to prevent a pressurization hazard at its Rabbit Lake Mill, which uses the hydrogen peroxide process that could result in a pressurized drum. The Cameco representative noted that adequate controls were in place at the Rabbit Lake Mill to mitigate the potential risks associated with the product. The Cameco representative acknowledged that because these risks were associated with the packaging of the drums, they had not been taken into account at the Blind River Refinery. The Cameco representative noted that the pressurization hazard was not included on the Uranium One USA's Materials Safety Data Sheet for the yellowcake.

13. The Commission asked for more information concerning the additional drums received from Uranium One USA and placed in quarantine. The Cameco representative responded that Cameco has approximately 360 drums of material from this particular producer in quarantine. The Cameco representative noted that Cameco had visually inspected the remaining drums from the producer and set aside those identified as having a potential risk of pressurization.

14. The Commission asked if all of the proper operating procedures had been followed to minimize the effect on the employees. The Cameco representative responded that while it had not yet completed its investigation, it appeared that they had. The Cameco representative noted that Cameco would be reviewing its procedures in light of the lessons learned from this event. The Cameco representative noted that the Workplace Safety and Insurance Board of Ontario had been notified of the incident. Regarding radiation protection, the Cameco representative stated that Cameco has Radiation Safety Officers at the Blind River Refinery, and health physicists at Cameco's Port Hope Conversion

Facility and at Cameco's corporate office in Saskatoon, Saskatchewan. CNSC staff confirmed that Cameco's radiation protection personnel are qualified to implement Cameco's Radiation Protection Program at the BRR.

15. The Commission sought clarification regarding the international transportation requirements for the drums, as they had originated in the United States. CNSC staff responded that the American transport regulations are harmonized with the Canadian regulations and noted that pressurized drums are not supposed to be shipped. A Cameco representative noted that within North America, the drums are transported by truck. The Commission also asked if Cameco would return the remaining pressurized drums to the Uranium One USA. A Cameco representative expressed the view that it would be safer to handle the drums at the BRR rather than transport them again. CNSC staff noted that any transport of these pressurized drums would have to be reviewed to ensure that there are no outstanding safety issues.

16. The Commission directs CNSC staff to provide an update to the Commission Secretariat regarding the root-cause analysis report to be provided by Cameco. CNSC staff should also inform the Secretariat of any new information that would warrant a future update to the Commission. — ACTION by Fall 2012

Sealed Source Incident in CNSC Headquarters

17. CNSC staff provided information concerning an incident that had occurred in June 2012 at the CNSC headquarters at 280 Slater Street, Ottawa, Ontario. CNSC staff explained that three check sources – small radioactive sources designed to be hand-held for the purpose of the operation of detectors – had been misplaced following an orientation session for summer students. CNSC staff stated that at no time was there any exposure or risk to the public. CNSC staff stated that a radiation protection specialist had responded expeditiously to safely remove the sources. CNSC staff noted that CNSC senior management had immediately established an independent internal review team to review the matter and that preliminary results had shown a need to improve administrative controls at the CNSC lab. CNSC staff noted that all lab work with these sources would cease until the new controls are in place.

18. The Commission sought clarification regarding the ceasing of lab operations. CNSC staff responded that all handling of the sources, including transferring the sources for training or for calibration purposes, would cease until the administrative controls have been improved to the satisfaction of the internal review team. CNSC staff noted that around 50 staff members, including site inspectors and those in the lab, were authorized to use the sources. CNSC staff stated that all other lab operations would continue.

19. The Commission asked for more information regarding the sources. CNSC staff responded that the sources were low-level Cesium-137 sources that are roughly the size of a quarter and are used for detector calibration and demonstration purposes. CNSC staff noted that due to the low level of radiation, the check sources are not required to be licensed, and that the health effects associated with the sources are negligible.

20. The Commission enquired about the management of these sources in the past. CNSC staff responded that no previous incidents had been reported and noted that it would have more information on this subject once it has completed its review. CNSC staff further noted that it was reconciling its inventory of sources over the past five years.

21. The Commission sought more information regarding the independence of the review team assigned to review the event. CNSC staff responded that the internal review team would consist of CNSC site inspectors who are not affiliated with the lab. CNSC staff noted that the team would be led by a member of staff trained in root-cause analysis and include a member of the CNSC Audit and Ethics Group. CNSC staff stated that the expectation is for the review to be as, or more, strict than the CNSC would require for a review of a licensee. CNSC staff further noted that it had applied for an International Standards Organization (ISO) certification for the lab, and as such, the lab's administrative controls would undergo a thorough third-party review as part of that process.

22. The Commission expressed its expectation that CNSC staff can learn from this event and improve internal procedures relating to sealed sources. The Commission noted that the CNSC, as the regulator, must be held to the highest safety standard.

Updates on items from previous Commission proceedings

23. CNSC staff orally presented an update regarding the Atomic Energy of Canada Limited (AECL) National Research Universal (NRU) reactor vessel inspections, which had been presented at the March 28 and 29, 2012 Commission meeting. CNSC staff stated that AECL had been successful in completing all the required inspections. CNSC staff noted that it was reviewing the results submitted by AECL and would provide an update to the Commission at the Annual Performance Report on Chalk River. CNSC staff further noted that it would submit an Event Incident Report if any of the results were inconsistent with what is expected.

24. The Commission asked what the timeframe for CNSC staff's review would be. CNSC staff responded that due to the technical nature of the analysis, the review is expected to take several weeks.

25. With reference to CMD 12-M42, CNSC staff presented the Fourth Progress Report on the CNSC Staff Review of a new Neutron Overpower Protection (NOP) Methodology. CNSC staff presented an update regarding its review of a new methodology proposed by Ontario Power Generation Inc. (OPG) and Bruce Power Nuclear (Bruce Power) to determine the shutdown system trip setpoints for a class of events involving an uncontrolled increase in reactor power[2]. OPG and Bruce Power's position was that the previous methodology was overly conservative and would have led to earlier than required NOP trip setpoint adjustments and eventual plant deratings (decrease the power output) as the nuclear generating stations age. CNSC staff noted that the previous progress updates were provided in February 2009, and at the April 2010 and March 2011 Commission meetings.

26. CNSC staff stated that OPG and Bruce Power had completed all major activities committed in their work plans and that they had submitted result reports. CNSC staff further stated that they had completed their review of the submissions and identified issues that required further discussion and resolution. As such, CNSC staff stated that the formulation of a regulatory technical position with recommendation for safety and licensing application of the new NOP methodology would be deferred to the first quarter of 2013.

27. CNSC staff noted that in November 2009, OPG and Bruce Power were granted authorization for interim use of the new methodology provided adequate compensatory measures were in place to ensure that sufficient safety margins would be maintained. CNSC staff stated that, in light of the CNSC staff review results to-date and given OPG and Bruce Power's commitment to apply compensatory measures, the basis for the November 2009 authorization remains sufficient.

28. A representative from OPG described the work that OPG had undertaken since 2007 regarding the new methodology and stated that the current NOP trip set points were adequate for safe operation. OPG expressed a preference for this methodology rather than having to derate the nuclear generating station as the effects of aging begin to affect operation. A representative from Bruce Power concurred with OPG.

[2] The shutdown systems will be activated if the NOP detector reaches a pre-established value called a trip setpoint. The trip setpoint is determined through analysis to ensure that the shutdown systems will be activated in time to maintain fuel cooling.

29. The Commission asked for more information regarding the compensatory measures in place to ensure that sufficient safety margins are being maintained. CNSC staff responded that the interim approach allowed the use of the aspects of the new NOP methodology that could be agreed upon, but did not allow full utilization, as detailed analyses remained to be completed. CNSC staff stated that the compensatory measures include a two per cent correction to the trip setpoint, which was a recommendation of an expert panel, as well as continuous monitoring and adjustments to ensure that the trip setpoint remains valid.

30. CNSC staff stated that the new methodology with the compensatory measures in place has an equivalent safety margin to the old methodology, which was still in use at non-OPG and Bruce Power nuclear generating stations in Canada. CNSC staff stated that there was sufficient conservatism in the safety margins. CNSC staff explained that there are a number of defence-in-depth safety systems in addition to the NOP trip setpoint to ensure that the reactors can safely shut down in the event of an uncontrolled increase in reactor power. CNSC staff further stated that the trip setpoint is established for each nuclear generating station, and each shutdown system has an independent system of detectors.

31. The Commission asked for more information concerning the timing for the CNSC review of the new NOP methodology. CNSC staff stated that in 2009, the expectation was that the review would be complete by early 2012, but because CNSC staff encountered some complex issues that require resolution, the completion date had been deferred to early 2013. CNSC staff noted that the date depends on when these issues are resolved.

32. The Commission sought clarification regarding the work used to validate the new NOP methodology. CNSC staff responded that experiments were performed in laboratories, such as AECL's Chalk River Laboratories, and analytical experiments were carried out on computers. CNSC staff noted that the operating reactors and systems were not used for experimental purposes. CNSC staff explained that the statistical framework used by OPG and Bruce Power to develop the new NOP trip setpoint was determined to be mathematically correct, but CNSC staff were requesting that additional statistical frameworks be used to compare and confirm the results.

33. The Commission asked for more information regarding the benefit of the new NOP methodology. CNSC staff responded that the new methodology would more accurately reflect the behaviour of the reactor and noted that a higher trip setpoint would allow for fewer trips while still providing an adequate safety margin in ensuring that the fuel does not dry out in the reactor.

34. The Commission asked for more information concerning the approval process for the new NOP methodology. CNSC staff responded that the approval would be made by CNSC staff, under the delegation of authority from the Commission. CNSC staff noted that it would present a final progress report to the Commission at that time. The Commission disagreed with this proposal, stating that, given the complex subject matter and the fact that there have been several progress reports to the Commission, the final approval should be made by the Commission.

ACTION
by
Spring 2013

Status Report on Power Reactors

35. With reference to CMD 12-M41, which includes the Status Report on Power Reactors, CNSC staff presented updates on the following:
    - Darlington NGS, Unit 2 is operating at 94% of full power, derated to reduce the likelihood of a spurious trip;
    - Gentilly-2 is in a guaranteed shutdown state for an outage until August 30, 2012; and
    - Pickering NGS B, Unit 6 is operating at 90% of full power after having been shut down on August 11 and re-started on August 12.

36. CNSC staff also provided further details regarding the strike action by Candu Energy Inc. at all Ontario nuclear generating stations. CNSC staff reported that there were no safety concerns as a result of the strike and that the minimum shift complement was being maintained at all nuclear generating stations.

37. The Commission asked for more information concerning the strike action by Candu Energy Inc. CNSC staff responded that the strike action is partially blocking access to the sites, which is slowing the traffic onto the site. CNSC staff noted that there were no safety concerns to date, but the issue would have safety significance if the operators were unable to maintain the minimum shift complement.

38. The Commission asked for more information regarding the work being done during the outage at Gentilly-2. CNSC staff responded that work is being done to repair a pump leak in the moderator system. CNSC staff explained that the leak was contained within the collection system and that there was no risk to workers or the public as a result of the leak. CNSC staff noted that it is normal for leaks to develop in the moderator system during operation. A representative from Hydro-Québec stated that Hydro-Québec had decided to address the issue in the outage, and that it would be completing other maintenance work during the outage.

39. The Commission enquired about the algae issue at the Pickering NGS B, which had caused all units to derate. CNSC staff responded that the algae issue is a common issue that happens almost every year and can range from a few hours to a few days. CNSC staff explained that there was a build-up of algae on the net used to reduce fish impingement, which resulted in a lower flow of water through the net. CNSC staff further explained that OPG derated to 60% of full power because the lower flow could affect the performance of the turbines in the NGS. CNSC staff noted that a similar issue arises at the Gentilly-2 NGS. A representative from OPG stated that algae are a known phenomenon and that OPG has procedures in place to ensure that there is no impact on nuclear safety.

40. The Commission asked for an update regarding New Brunswick Power Nuclear's (NB Power) Point Lepreau NGS. CNSC staff responded that the reactor was operating with power below 0.1% of full power. CNSC staff noted that there are hold points on the Point Lepreau operating licence that must be released before NB Power can increase the power beyond 0.1%: one CNSC hold point at 0.1% of full power and one final CNSC hold point at 35% of full power.

41. The Commission asked for more information concerning Bruce NGS B, Unit 2, which had a delay in its return to service due to a manufacturing defect with the generator. A representative from Bruce Power responded that Bruce Power was planning to use the generator from Unit 4, which was scheduled for an extended maintenance outage, in its place. The Bruce Power representative noted that a replacement generator had been ordered from the manufacturer and that would later be installed in Unit 4. The Bruce Power representative further noted that Unit 2 and Unit 4 were expected to return to service around the end of September.

42. The Commission enquired about Bruce B Unit 6, which was derated to prevent governor valve oscillation. A representative from Bruce Power responded that the derating was a temporary measure to address the issue until it can be corrected during an outage. The Bruce Power representative noted that there was no safety concern associated with the issue.

Updates on items from previous Commission proceedings

*Ontario Power Generation Inc. (OPG): Update on the progress for meeting the fish impingement reduction targets at the Pickering A and B Nuclear Generating Stations*

43. With reference to CMD 12-M44 regarding the updates to items from previous Commission proceedings, OPG presented information regarding the progress for meeting the fish impingement reduction targets at the Pickering A and B Nuclear Generating Stations. OPG submitted a video presentation demonstrating the operation and maintenance of the net used to reduce impingement. OPG stated that it had achieved its target of 80% reduction in impingement. OPG further stated that while it had not reduced entrainment by 60%, it had implemented measures, such as habitat creation and restocking Atlantic salmon, to offset the losses due to entrainment. In addition, OPG stated that it was working with Environment Canada and CNSC staff to assess and agree on mitigation measures to offset the effects of the thermal plume from the NGS. OPG proposed that this be the last update, in the forum of Commission meetings, on this matter.

44. The Commission sought the view of Environment Canada and CNSC staff. A representative from Environment Canada stated that Environment Canada was working with the CNSC and OPG in order to develop compliance criteria for the thermal plume. CNSC staff stated that while OPG had resolved the issues related to impingement and the thermal plume, it still had to address entrainment. CNSC staff noted that OPG would be working with Fisheries and Oceans Canada and the Toronto Region Conservation Authority to further determine compensatory measures to offset fish losses due to entrainment.

45. The Commission asked for more information concerning the maintenance of the net. An OPG representative responded that divers enter the water four times a week to remove algae and make repairs if any small holes are found. The OPG representative noted that the holes were due to normal wear and tear.

46. The Commission asked for more information regarding OPG's request to not return before the Commission for future updates. CNSC staff responded that the next update would be provided to the Commission at the time of the licence renewal for Pickering NGS A and B. CNSC staff further noted that it would provide annual updates to the Commission as part of its annual compliance report and that the issue would be covered as part of the CNSC's normal regulatory oversight to ensure compliance.

47. The Commission, noting that the information presented by OPG seemed to indicate that the net was only achieving a 78% reduction in impingement compared to the pre-net baseline values, asked for clarification on this matter. An OPG representative responded that it uses two methods to assess performance of the net: a physical count of the mass of fish impinged each year and a sonar analysis

to compare the number of fish on either side of the net. The OPG representative explained that, based on the sonar analysis, the net is 98% effective when it is in place. The OPG representative noted that the net is removed in the winter, which results in the physical mass impinged being higher for the annual results. CNSC staff stated that it was satisfied with the performance of the net and with the annual results.

48. The Commission asked if the technology implemented at the Pickering NGS would be implemented at other generating stations. CNSC staff noted that the implementation of a specific technology may not be required at all stations and that the requirements for mitigation would depend on the risk associated with each particular facility. An OPG representative responded that OPG used its experience from other generating stations and criteria from the United States to implement the measures at the Pickering NGS. The OPG representative noted that OPG works closely with Fisheries and Oceans Canada to ensure that it meets requirements for all of its generating stations.

49. The Commission enquired about the impact of the net on reactor operation, taking into consideration the build-up of algae. An OPG representative responded that the net was designed so as to not negatively impact operations and to ensure that there is a continuous flow of water to the plant. The OPG representative noted that the net can act as a barrier for algae, but when there is a large influx of algae, measures are taken to ensure that nuclear safety is not compromised. CNSC staff noted that the net prevents the build-up of algae within the cooling system of the reactor.

50. The Commission noted that the design life of the Pickering NGS is only expected to be another eight years and stressed the need to implement mitigation measures for entrainment and the thermal plume as expeditiously as possible.

## INFORMATION ITEMS

### CNSC Staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report)

51. With reference to CMD 12-M40, CNSC staff presented its annual report on the safety performance of the Canadian nuclear power industry for 2011. CNSC staff presented performance highlights of each nuclear power plant, including Bruce A and B, Darlington, Pickering A and B, Gentilly-2 and Point Lepreau. CNSC staff explained that, as part of its assessment, CNSC staff evaluated how well licensees are meeting regulatory requirements and expectations for the performance of programs in 14 safety and

control areas, including management system, human performance management, operating performance, safety analysis, physical design, fitness for service, radiation protection, conventional health and safety, environmental protection, emergency management and fire protection, waste management, security, safeguards, and packaging and transport. CNSC staff stated that, for 2011, all licensees, including Bruce Power, OPG, Hydro-Québec and NB Power, achieved ratings of "satisfactory" or "fully satisfactory" in all safety and control areas.

52. CNSC staff concluded that Canada's nuclear power plants operated safely during 2011, based on the following observations:
    - there were no serious process failures;
    - no member of the public received a radiation dose that exceeded the regulatory limit of 1 mSv/year;
    - no worker at any nuclear power plant received a radiation dose that exceeded the regulatory limits of 50 mSv/year or 100 mSv over 5 years;
    - the frequency and severity of injuries/accidents involving workers were minimal;
    - no radiological releases from the stations exceeded the regulatory limits; and
    - licensees complied with their licence conditions concerning Canada's international obligations.

53. CNSC staff also provided information concerning the CNSC's response to the Fukushima nuclear accident, which occurred in March 2011. CNSC staff stated that the licensees complied with the CNSC's regulatory requests issued following the accident that directed licensees to review the lessons learned and re-examine the safety cases of the nuclear power plants to ensure that sufficient defence-in-depth margins were available, with a focus on:
    - external hazards such as seismic events, flooding, fire and extreme weather events;
    - measures for prevention and mitigation of severe accidents; and
    - emergency preparedness.

54. CNSC staff noted that the CNSC Fukushima Task Force raised 36 action items applicable to nuclear power plants that licensees must address by December 2015 or earlier. CNSC staff noted that, when implemented, these actions would further enhance the safety of nuclear power in Canada and reduce the associated risk to as low as reasonably practicable.

55. The Commission also heard from the Ontario Ministry of Labour (MOL), who presented CMD 12-H40.13. The representative from the MOL discussed the MOL's mandate, roles and responsibilities, as well as its Memorandum of Understanding with the CNSC. The representative from the MOL stated that its health and safety

statistics and environmental radiation monitoring measurements indicated that the nuclear industry operated safely in Ontario in 2011.

56. The Commission sought the views of the licensees on the report by CNSC staff. A representative from OPG presented a video regarding OPG's response to the Fukushima accident and concurred with CNSC staff's assessment, noting that safe and reliable operation are OPG's main priority. The OPG representative highlighted the operating performance of the Darlington and Pickering NGS and commented on plans for future improvements.

57. The representative from Bruce Power commented on the importance of the regulatory framework in Canada in the response to the Fukushima accident and noted the improvements Bruce Power had made, and would continue to make, to its radiation protection program as a result of the Alpha Event that occurred in 2009. The Bruce Power representative also provided an update on the status of the restart of Bruce A Units 1 and 2.

58. The representative from Hydro-Québec commented on the work put in to achieve "satisfactory" ratings in all areas. The Hydro-Québec representative also noted that Hydro-Québec was progressing in its implementation of the action plan resulting from the CNSC Fukushima Task Force report.

59. The representative from New Brunswick Power also commented on the work to achieve a "satisfactory" rating, as well as its response to the Fukushima accident. The NB Power representative further commented on the seismic hazard assessment that was required by the Commission as part of the licence renewal in 2012, noting that preliminary results would be available by the end of 2012. The NB Power representative also noted the improvements to the Point Lepreau NGS as a result of refurbishment.

60. The Commission sought clarification regarding CNSC staff's rating system, as "satisfactory" ratings were achieved despite there having been numerous operational occurrences, such as trips and reportable events, throughout the year. CNSC staff responded that its ratings were based on more than 1500 observations over the year, including inspections, and noted that operational events are normal. CNSC staff explained that not all reportable events have safety significance. The representative from Bruce Power stated that this demonstrates that the reactors are operating and responding as designed and that the licensees have open and transparent reporting.

61. The Commission asked for more information concerning CNSC staff's rating methodology. CNSC staff explained that the methodology was developed by the CNSC and has not been validated by another organization, although the risk significance of every finding is based on International Atomic Energy Agency guidelines. CNSC staff noted that, as part of its methodology, engineering judgement is applied as a final verification of the results, to ensure that the methodology was accurate.

62. The Commission noted that each licensee has its own requirements for employee fitness for duty and asked if there were any plans to standardize these requirements. CNSC staff responded that it was in the early stages of developing requirements and noted that it had published a "discussion paper" to receive input from stakeholders on the matter.

63. The Commission enquired about the results of unplanned capability loss factor for Gentilly-2 and Pickering, which were higher than for the other stations. CNSC staff responded that these results were due to aging and equipment reliability. A representative from Hydro-Québec stated that Hydro-Québec has undertaken to have longer outages to correct issues that lead to unplanned capability loss. A representative from OPG stated that OPG has enhanced its reliability and preventative maintenance plans in order to improve its performance in this area.

64. The Commission enquired about the CANDU safety issues, about which CNSC staff stated that 13 out of 21 remain to be reassessed and four of which were related to large loss of coolant accidents. CNSC staff responded that the safety issues do not question the safety case of operating reactors but present opportunities for improvement going forward.

65. The Commission asked the MOL for more information concerning critical injuries. The MOL representative responded that a critical injury is defined in Ontario Regulations pertaining to the *Occupational Health and Safety Act*[3], and noted that the number of critical injuries for the nuclear power plants was substantially below the overall workplace average for Ontario.

66. The Commission sought more information concerning the early notification reports made during 2011, particularly for Pickering, which had a greater number than the other stations. CNSC staff responded that there are criteria for early notification reports that are not directly related to safe operation, including public and media interest. CNSC staff noted that most of the early notification

[3] R.S.O. 1990, c. O.1.

reports for Pickering were due to media interest. A representative from OPG concurred with CNSC staff, noting that the events had low safety implications but would attract media attention.

67. The Commission sought further information on the environmental qualification of equipment, noting that an environmental qualification program has been fully implemented at all plants but Gentilly-2 and Bruce A Units 1 and 2. CNSC staff responded that equipment qualification pertains to the installation and maintenance of equipment that has a finite operational life, such as pumps, motors and electrical equipment. CNSC staff responded that Bruce A Units 1 and 2 had not yet been qualified because they had been undergoing refurbishment. The representative from Bruce Power confirmed that Bruce Power would address the issue as part of the restart of those reactors. CNSC staff further stated that the environmental qualification had not yet been completed at Gentilly-2 because Hydro-Québec was waiting for a possible refurbishment. The representative from Hydro-Québec stated that it would address the issue should Gentilly-2 be refurbished.

68. The Commission questioned whether "satisfactory" was an acceptable benchmark for licensees. A representative from OPG stated that the nuclear industry strives for continuous improvement because regulatory requirements and best practices change over time. The OPG representative noted that what is "satisfactory" one year may not be the next. A representative from Bruce Power concurred with OPG, noting that while the CNSC requires compliance with regulations, operators want to perform above the minimum requirements. The Bruce Power representative further noted that there are other measurements of performance, such as from the World Association of Nuclear Operators (WANO).

69. The Commission noted that it would like to see more comparisons in future reports, including worker dose, amount of waste generated and comparisons with other types of electricity generation. CNSC staff responded that it was in the process of revising its performance indicators, which would be incorporated in CNSC Regulatory Guide Document 99.1. CNSC staff noted that these performance indicators would provide benchmarking data for future annual reports.

70. The Commission asked why worker accident frequencies had decreased in the past year. CNSC staff responded that the number of accidents was dependent on the types of work activities being performed. The representative from OPG stressed that worker safety was its first priority and noted that it has many safety programs to prevent accidents. The representative from Bruce Power noted that the industry shares its operating experience and lessons learned to improve its overall performance.
71. With reference to CMDs 12-M40.1 to 12-M40.12, the Commission

considered written comments from intervenors on the subject of the 2011 NPP Report. The Commission remarked that several comments pertained to past licensing decisions made by the Commission, and noted that it would not reconsider or re-discuss certain issues that had been dealt with in previous hearings or meetings.

72. Regarding CMD 12-M40.1, the Commission asked about the possibility of the CNSC developing policy objectives for safety goals for future nuclear reactors. CNSC staff responded that it has a draft policy on the implementation of probabilistic safety goals in the Canadian regulatory framework, noting that safety goals are provided in CNSC Regulatory Document RD-337[4], which defines the design requirements for new nuclear power plants. CNSC staff noted that the safety goals for existing nuclear plants would not be the same as for new plants and that its safety goals are consistent with international practice.

73. Regarding CMD 12-M40.2, the Commission, noting a concern of the intervenor, asked for more information concerning an industrial facility adjacent to Gentilly-2. CNSC staff responded that the industrial facility was at least 1.7 kilometres from Gentilly-2 and noted that that the risks and hazards of this facility have been incorporated in emergency plans for Gentilly-2 and for the municipality of Bécancour, Québec. A representative for Hydro-Québec stated that its fire hazard analysis and environmental studies associated with the potential refurbishment of Gentilly-2 took the industrial facility into consideration.

74. Regarding CMD 12-M40.3, the Commission asked for clarification regarding the intervenor's assertion that "the statement from CNSC that 'all Canadian NPP's are located far from tectonic plate boundaries and that the threat of a major earthquake at a Canadian NPP is negligible' is not just questionable--it's a scientific falsehood." A representative from Natural Resources Canada (NRCan) responded that a major earthquake would be one such as the magnitude 9 earthquake that resulted in the Fukushima nuclear accident. The NRCan representative explained that the chance of an earthquake of that magnitude happening in eastern Canada is extremely low because it could only occur on a tectonic plate boundary and eastern Canada is a long way from any tectonic plate boundaries. The NRCan representative noted that the Point Lepreau NGS is over 2,000 kilometres from the mid-Atlantic ridge, which is not expected to generate earthquakes larger than magnitude 8. The NRCan representative further noted that the reactors in Ontario are over 2,000 kilometres from the Puerto Rico trench, which is the other closest tectonic plate boundary capable

[4] CNSC Regulatory Document RD-337, "Design of New Nuclear Power Plants", November 2008.

of a magnitude 8 or 9 earthquake. CNSC staff noted that its statement was based on geological studies and reports written for the sites at which power plants are constructed.

75. The Commission asked CNSC staff to describe a worst-case accident scenario. CNSC staff responded that in a situation similar to the earthquake and tsunami in Japan, and where there is no operator intervention, the worst consequences would be an unfiltered but controlled release of radiation from the reactor containment after four or five days. CNSC staff noted that in an earthquake, the reactors would shut down safely. CNSC staff further stated that, as a result of the lessons learned from the Fukushima accident, licensees are required to have equipment and mitigation measures in place to maintain cooling and containment in the reactor. A representative from OPG concurred, noting that OPG has emergency equipment on-site, as well as back-up equipment off-site, in order to control the reactor in an accident scenario.

76. The Commission sought further information concerning fault lines near nuclear power plants. The representative from NRCan stated that NRCan models and maps geological faults, but that given the large number of faults, earthquakes are assumed to occur in random areas rather than areas associated with particular faults. The NRCan representative explained that there is no evidence that any one fault is more dangerous than another. The NRCan representative noted that earthquakes associated with faults would be several magnitudes below those associated with tectonic plate boundaries.

77. The Commission enquired about the installation of emergency sirens in the Durham Region. The representative from the Durham Emergency Management Office (DEMO) stated that it was expecting a report from a third-party company on the locations for sirens in the Pickering area. The representative from DEMO noted that the report was delayed due to a discrepancy with the volume of the sirens, which had a low output compared to their design specifications. The DEMO representative noted that it would provide more information in October 2012, when it is scheduled to provide an update to the Commission.

78. Regarding CMD 12-M40.4, the Commission enquired about the use of the precautionary principle in the CNSC's regulatory oversight. CNSC staff responded that it does follow the precautionary principle, and noted that it has taken many lessons learned from the Fukushima accident and other nuclear accidents. CNSC staff noted that even if a licensee receives a "satisfactory" rating in a particular area, ir does not mean that the licensee will not be required to continuously improve. CNSC staff further noted

that the requirement to have multiple, independent, redundant safety systems, i.e., defence in depth, is a part of the use of the precautionary principle.

79. The Commission suggested that there may be an issue regarding communication with the public and providing clear information. The representative from Hydro-Québec noted that Hydro-Québec provides information, including its response to the Fukushima accident, on its Web site.

80. Regarding CMD 12-M40.5, the Commission enquired about the issue of asbestos raised by the intervenor. A representative from OPG responded that asbestos had been used as insulation when the Pickering A NGS was built and noted that asbestos would remain and have to be dealt with during decommissioning due to the difficulties in removing it from some areas while the station is operating. The OPG representative stated that OPG has a program to address asbestos and worker safety, and that it is working on several improvement initiatives. CNSC staff stated that it is working with the MOL in order to ensure that OPG meets requirements for worker health and safety.

81. Regarding CMD 12-M40.6, the Commission sought clarification regarding the results of the German KiKK health study, cited by the intervenor, that found an increased risk of developing childhood leukemia the closer children were to a nuclear power plant. CNSC staff responded that a review of that study[5] found that there was no evidence that the rates of childhood leukemia were related to the radiation exposures from those nuclear power plants. CNSC staff noted that three similar studies conducted in Britain, France and in Switzerland did not have the same findings as the KiKK study. Furthermore, CNSC staff stated that there is no evidence of increased childhood cancers around Canadian nuclear power plants.

82. Regarding CMD 12-M40.7, the Commission enquired about an issue raised by the intervenor concerning the death of an employee at the Darlington NGS. A representative from OPG responded that a proper investigation had been conducted and it was determined that the death was not work-related.

[5] Following the meeting, the Commission Secretariat confirmed with CNSC staff that the review was conducted by the German Commission on Radiological Protection (SSK): *Assessment of the "Epidemiological Study on Childhood Cancer in the Vicinity of Nuclear Power Plants" (KiKK Study): Position of the Commission on Radiological Protection (SSK)*, (2008).

83. The Commission, noting the intervenor's concerns about a shortage in minimum shift complement at the Bruce Power site, asked for more information in this regard. A Bruce Power representative responded that the issue raised by the intervenor was not associated with the certified operational staff but with the emergency response organization on the site. The Bruce Power representative noted that there were occasions when the number of emergency response personnel was lower for a short period of time due to shift changes.

84. The Commission sought further information regarding the issue of hydrazine releases at the Bruce Power site. The Bruce Power representative noted that it was under an investigation from the Ontario Ministry of the Environment concerning hydrazine releases. CNSC staff responded that Bruce Power had taken corrective actions to minimize the recurrence of such events and that CNSC staff was satisfied with the action taken by the licensee to date.

85. The Commission, noting the intervenor's comment about fires associated with waste management, asked for more information in this regard. CNSC staff responded that there had been three small fires that were immediately addressed by Bruce Power's emergency response unit. CNSC staff noted that although Bruce Power was required to report these fires, the safety significance was low.

86. With regards to CMD 12-M40.8 and CMD 12-M40.8A, the Commission asked CNSC staff to clarify the process for making changes to the licence conditions handbooks for the Canadian nuclear generating stations. CNSC staff responded that the licence conditions handbook documents compliance verification criteria and the basis for licensing a facility, including requirements of the *Nuclear Safety and Control Act*[6] and its associated Regulations, the operating licence, the licence application provided by the applicant and supporting regulatory documents. CNSC staff noted that the licence conditions handbooks presented to the Commission in support of regulatory recommendations for decisions are draft documents because the licence conditions handbooks can be only finalized once the operating licence has been approved or issued by the Commission. CNSC staff explained that the process for revising the licence conditions handbook is described in the CNSC's internal procedures, with the authority to make any changes to the licence conditions handbook delegated to the Director General of Directorate of Power Reactor Regulation, as long as those changes do not affect the licensing basis of the facility, as approved by the Commission. CNSC staff noted that

[6] Statutes of Canada (S.C.) 1997, c. 9.

any changes to the licence conditions handbook that affect the licensing basis of the facility must go to the Commission for final approval.

87. The Commission sought clarification regarding CNSC staff's rating of emergency management and fire protection for the Point Lepreau NGS, noting the intervenor's assertion that the "satisfactory" rating was not achieved until May 2012. CNSC staff responded that it had a protocol with NB Power outlining the requirements of the emergency management and fire protection program, and that the "satisfactory" rating was given after NB Power had achieved 90% of the requirements by the end of 2011. CNSC staff noted that NB Power reached 100% completion in the spring of 2012.

88. The Commission noted that the intervenor had submitted a list of questions related to the CNSC's Fukushima Action Plan and asked if these questions had been addressed by CNSC staff. CNSC staff responded that it would respond to the intervenor's questions in writing and post the response on the CNSC Web site. CNSC staff noted that some of the questions had been answered and the intervenor's comments had been taken into consideration in CNSC staff's update to the Fukushima Action Plan attached to CMD 12-M40.A.

89. Regarding CMD 12-M40.9, the Commission asked for more information concerning the intervenor's question about the steam generators for the Gentilly-2 NGS. CNSC staff responded that the steam generators were in good working order and met requirements. CNSC staff further stated that it would respond to the intervenor's questions in writing and post the response on the CNSC Web site.

90. Regarding CMD 12-M40.10, the Commission enquired about CNSC staff keeping the Fukushima Action Plan updated on an ongoing basis. CNSC staff responded that the CNSC Action Plan would be revised and updated on an ongoing basis. CNSC staff explained that it would continue to review and assess international reports providing lessons learned from the Fukushima accident and address any gaps in the CNSC Action Plan. A more comprehensive update on the CNSC Fukushima Action Plan will be presented at the October 2012 Commission meeting.

91. The Commission, noting the intervenor's concern about the relationship between the Japanese regulator and nuclear industry contributing to the Fukushima accident, asked CNSC staff to comment on the regulatory process in Canada. CNSC staff responded that there is a different regulatory philosophy in Canada based on continuous safety improvement, including the

implementation of new standards and regulatory documents, as well as design upgrades. CNSC staff noted that the CNSC also shares information in an open and transparent manner.

92. Regarding CMD 12-M40.11, the Commission, noting the intervenor's concern regarding the availability of public information in the event of a major accident at the Gentilly-2 NGS, asked for more information in this regard. A representative from Hydro-Québec responded that public alerting is a responsibility of the municipality, and that Hydro-Québec has worked with the municipality of Bécancour to develop a telephone alerting system.

93. Regarding CMD 12-M40.12, the Commission asked for an update regarding the intervenor's request for documentation. CNSC staff responded that the information had been provided, noting that there was a delay due to there being proprietary information in the requested documents.

94. The Commission noted the intervenor's comment that 13 CANDU safety issues remained to be resolved for Gentilly-2 and asked for more information in this regard. A representative from Hydro-Québec stated that Hydro-Québec was working to address these issues as part of its normal operations and noted that they were not associated with the possible refurbishment of the reactor.

95. The Commission asked for more information concerning the planned cessation of operations of the Gentilly-2 reactor on December 31, 2012. CNSC staff responded that, in accordance with Hydro-Québec's operating licence, the reactor would not be permitted to operate past that date. CNSC staff explained that the reactor would be placed in a guaranteed shutdown state and that Hydro-Québec would remove the fuel from the reactor. CNSC staff noted that the nature of the future work would depend on whether a decision had been made to refurbish the reactor.

96. The Commission also heard from representatives from Emergency Management Ontario (EMO) and Health Canada. The representative from EMO provided an update regarding the implementation of emergency measures in Ontario. The EMO representative explained that it was working with Bruce Power to hold a large-scale exercise in October, incorporating several government agencies, including the CNSC, Health Canada and provincial ministries. The EMO representative noted that it would provide a more detailed update at the November Commission meeting.

97. The representative from Health Canada provided an update regarding the Federal Nuclear Emergency Plan. The Health Canada representative noted that it planned to have a full-scale exercise of the Federal Nuclear Emergency Plan within two years. The Health Canada representative also noted the work being done regarding the CNSC's Fukushima Action Plan, including federal-provincial government workshops.

98. The Commission enquired about Bruce Power's management of slightly enriched uranium. CNSC staff responded that Bruce Power has a criticality safety program that follows the CNSC regulatory document on criticality safety.

99. The Commission, noting that housekeeping, such as cleaning and the management of materials and hazards, was an issue at the Pickering NGSs, asked for more information in this regard. A representative from OPG responded that OPG has a plan to address this issue within the year and noted that the amalgamation of Pickering A and B would help the matter.

100. The Commission noted that there were several areas where the performance of the Pickering NGS appeared to be below those of the other plants and asked for OPG to comment on the matter. An OPG representative acknowledged that OPG was working on improvement of system reliability. The OPG representative stated that a mid-term short-term planned outage had been introduced for Pickering A in order to make these improvements.

101. The Commission asked for an update regarding environmental monitoring of fish at the Point Lepreau NGS. CNSC staff responded that it was working with Environment Canada and Fisheries and Oceans Canada to better establish the regulatory expectations for the Point Lepreau NGS. A representative from NB Power concurred with CNSC staff. CNSC staff noted that there would be an update in the next annual report.

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August 2013

102. The Commission asked about CNSC staff's expectations regarding the CANDU safety issue of void reactivity coefficient. CNSC staff responded that it is expecting the industry to produce a report in mid-2013 addressing this issue, and that CNSC staff would review the report at this time.

103. The Commission asked for more information concerning the regulatory oversight of the tritium removal facility at the Darlington NGS. CNSC staff responded that CNSC staff inspects the tritium removal facility on a regular basis.

104. The Commission sought clarification regarding the CNSC staff update on Generic Action Items. CNSC staff explained that there were four generic action items remaining at the end of 2011. CNSC staff noted that the remaining four were resolved in 2012 and that the final two that were closed in 2012 would continue to be tracked under CANDU safety issues.

105. The Commission asked for an update regarding the 2012 Point Lepreau emergency exercise. CNSC staff responded that it would be finalizing a report on this matter that would be made public. CNSC staff noted that the results of the exercise were positive.

106. The Commission enquired about the issue of pressure tube design life for the Pickering reactors. CNSC staff responded that it was making progress in its analysis to determine whether the design life of the pressure tubes could be extended, and that it expected to complete its review in 2012.

107. The Commission noted that the preventative maintenance backlog for Bruce B was 74%, which was below the industry average of 85%, and asked for more information in this regard. CNSC staff responded that while Bruce Power had not yet reached the industry average, it had been making progress in addressing this issue. A Bruce Power representative responded that it had reached 84%, and stated that Bruce Power was focussed on maintaining reliability.

108. The Commission similarly noted that Hydro-Québec was at 73% and asked how Hydro-Québec planned to address this matter. The representative for Hydro-Québec stated that it had undertaken a rigorous process to make the necessary improvements in this area.

109. The Commission asked why Hydro-Québec had a higher rate of accident severity and frequency. The representative from Hydro-Québec responded that the majority of lost-time was due to one injury that resulted in an extended absence from work.

110. The Commission noted that several different versions of the same CSA standard are used by different licensees and asked what the process would be for licensees to use the latest standard. CNSC staff responded that there is a two-step process, which includes defining an implementation plan for the standards and then revising the licence conditions handbook to include the new standard. CNSC staff noted that the new standards are typically implemented at the time of licence renewal.

111. The Commission enquired about the industry's plan to develop and use a modified 37-element fuel bundle to improve performance in aging reactors. A representative from OPG responded that, following a successful demonstration irradiation of the fuel, it had received CNSC staff's approval to implement a full core fuel load.

Closure of the Public Meeting

112. The meeting closed at 4:51 p.m.

Recording Secretary — September 19, 2012
Date

Secretary — 19/9/12
Date

APPENDIX A

| CMD | DATE | FILE NO |
|---|---|---|

12-M37 2012-07-17 Edocs # 3971894
Notice of Meeting of August 14 and 15, 2012

12-M38 2012-08-01 Edocs # 3980238
Public Meeting Agenda of August 14 and 15, 2012

12-M38.A 2012-08-09 Edocs # 3982317
Public Meeting Updated Agenda of August 14 and 15, 2012

12-M39 2012-08-13 Edocs # 3988659
Draft Minutes of Commission Meeting held June 21, 2012

12-M40 2012-06-19 Edocs # 3943689
CNSC staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report) – Oral Presentation by CNSC staff

12-M40.A 2012-07-31 Edocs # 3963500
CNSC staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report) – Oral Presentation by CNSC staff

12-M40.1 2012-07-10 Edocs # 3974835
CNSC staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report) – Written submission from Jim Ronback

12-M40.2 2012-07-22 Edocs # 3975435
CNSC staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report) – Written submission from François A. Lachapelle

12-M40.2A 2012-08-03 Edocs # 3975745
CNSC staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report) – Written submission from François A. Lachapelle – Supplementary Information

12-M40.3 2012-07-23 Edocs # 3975441
CNSC staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report) – Written submission from Sierra Club of Canada, Atlantic Canada Chapter

12-M40.4 2012-07-24 Edocs # 3975862
CNSC staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report) – Written submission from Monique Meunier

12-M40.5 2012-07-24 Edocs # 3976217
CNSC staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report) – Written submission from the Power Workers' Union

12-M40.6 2012-07-24 Edocs # 3976226
CNSC staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report) – Written submission from Les Artistes pour la Paix

12-M40.7 2012-07-24 Edocs # 3976320
CNSC staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report) – Written submission from the Bruce Peninsula Environment Group

12-M40.8 2012-07-24 Edocs # 3976373
CNSC staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report) – Written submission from the CCNB Action, Saint John Fundy Chapter

12-M40.8A 2012-08-08 Edocs # 3985960
CNSC staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report) – Written submission from the CCNB Action, Saint John Fundy Chapter – Supplementary Information

12-M40.9 2012-07-24 Edocs # 3976406
CNSC staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report) – Written submission from Philippe Giroul

12-M40.10 2012-07-24 Edocs # 3976423
CNSC staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report) – Written submission from Mary Lou Harley

12-M40.11 2012-07-24 Edocs # 3976439
CNSC staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report) – Written submission from Robert Duchesne

12-M40.12 2012-07-24 Edocs # 3976454
CNSC staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report) – Written submission from Michel A. Duguay

12-M40.13 2012-08-08 Edocs # 3986899
CNSC staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report) – Oral Presentation by the Ontario Ministry of Labour

12-M40.13A 2012-08-14 Edocs # 3989817
CNSC staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2011 (2011 NPP Report) – Oral Presentation by the Ontario Ministry of Labour

12-M41 2012-08-08 Edocs # 3982678
Status Report on Power Reactor units as of August 8, 2012

12-M42 2012-07-31 Edocs # 3979702
Fourth Progress Report of a new Neutron Overpower Protection (NOP) Methodology

12-M43 2012-07-16 Edocs # 3971784
Event Initial Report on Cameco Corporation: Contamination Incident at Blind River Refinery

12-M43.1 2012-08-08 Edocs # 3986558
Event Initial Report on Cameco Corporation: Contamination Incident at Blind River Refinery – Oral presentation by Cameco Corporation

12-M44 2012-08-08 Edocs # 3986338
Ontario Power Generation, Pickering A and B Nuclear Generating Stations: Update on the progress for meeting the fish impingement reduction targets – Oral presentation by Ontario Power Generation