Canadian Nuclear Safety Commission

Commission canadienne de sûreté nucléaire

Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held Wednesday and Thursday, May 2 and 3, 2012

Canada

Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held Wednesday and Thursday, May 2 and 3, 2012 beginning at 14:07 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
R. Velshi

M. Leblanc, Secretary
J. Lavoie, Senior General Counsel
S. Gingras, Recording Secretary

CNSC staff advisors were: P. Elder, D. Howard, R. Stenson, M. Rinker, B.R. Ravishankar, J. LeClair, A. Erdman, M. Langdon, W. Stewart, L. Wallace, G. Rzentkowski, B. Lojk, F. Rinfret, R. Jammal, G. Frappier, C. Harwood, H. Khouaja, C, Morin, D. Newland, L. Sigouin, A. Thibert, G. Schwarz, S. Simic, P. Thompson, P. Webster, R. Awad, C. Moses, K. Heppell-Masys and J. Cameron

Other contributors were:

- Atomic Energy of Canada Limited : A. White
- Saskatchewan Research Council : G. Bihun, T. Moulding, J Muldoon, T. Yankovich and D. McCauley
- Saskatchewan Energy and Resources : C. Hughes
- Hydro-Québec : M. Désilets, P. Desbiens
- Public Safety of Canada : P. Trudel, C. Oldham
- Natural Resources of Canada : J. Adams
- Health Canada : B. Ahier, B. Pieterson, J.P. Auclair
- New Brunswick Emergency Measures Organization : G. MacCallum
- Ministère de la sécurité publique de la Mauricie et Centre-du-Québec : P. Racine
- Emergency Management Ontario : M. Morton, D. Nodwell and K. Bleyer
- NB Power : B. Kennedy

<u>Constitution</u>

1. With the notice of meeting, CMD 12-M20, 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 March 28-29, 2012, Commission Member Documents CMD 12-M20 to CMD 12-M29 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-M21.B, was adopted as presented.

Chair and Secretary

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

Minutes of the CNSC Meeting Held March 28-29, 2012

5. The Commission Members approved the minutes of the March 28 and 29, 2012 Commission Meeting as presented in CMD 12-M22.

STATUS REPORTS

Status Report on Power Reactors

6. With reference to CMD 12-M24, which includes the Status Report on Power Reactors, CNSC staff presented updates on the following:

   - Bruce A Unit 2 is currently at low power. Synchronization with the grid is scheduled for later in the week.
   - Bruce B Unit 5 has been derated to 78 percent and Unit 8 to 50 percent of full power to support Hydro One work on transmission lines. Return to full power was expected on May 3rd.
   - Pickering A Unit 1 is returning from a forced outage and is currently performing at 76 percent of full power.
   - Pickering B Unit 5 is at full power.
   - Pickering B Unit 6 is derated to 96 percent of full power due to low regional overpower margin following refuelling.
   - The process of refilling the primary heat transport system at the Point Lepreau NGS started on May 1st.

7. The Commission asked for an update on the seismic assessment for Point Lepreau. CNSC staff responded that the project plan has been received, and that the preliminary results of the assessment should be available by the end of the year 2012.

8. The Commission asked for more information on the status of Bruce A Unit 3. CNSC staff responded that the restart had not taken place yet as the unit is still undergoing routage work.

9. The Commission asked about the safety implications of the high tritium levels in the vault of Darlington Unit 3. CNSC staff explained the source of the tritium leak in the vault and stated that the issue has been resolved with no impact to the workers or the environment.

Early Notification Report

Atomic Energy of Canada Limited: Workplace Fatality Reported at AECL's Chalk River Laboratories

10. With reference to CMD 12-M27 regarding a workplace fatality at AECL's Chalk River Laboratories, CNSC staff reported that AECL has completed its internal investigation. The investigation included a review of the activities carried out by the employee during his shift to verify that he had not been exposed to dangerous substances or hazards, which was not the case. CNSC staff added that they had not seen any indication that the fatality was work-related. The investigation by Human Resources and Skills Development Canada (HRSDC) is still ongoing.

11. The Commission enquired on the type of work the employee was performing. The AECL representative responded that the employee was a firefighter who was doing walk-downs of some buildings during an overnight shift.

12. The Commission asked for more information on the coroner's report. The AECL representative explained that, to their knowledge, the report was not available yet and that, depending on the cause of death, the report may only be provided to family members and not to AECL.

Ontario Power Generation Inc.: Workplace fatality at OPG's Darlington Nuclear Generating Station

13. With reference to CMD 12-M28, CNSC staff reported the death of an OPG control technician while performing work on Darlington Unit 3. CNSC staff reported that the death was determined to be of natural causes and not work-related. The Ministry of Labour decided to close the investigation.

14. The Commission enquired on CPR training for the employees. CNSC staff responded that an emergency response team is always on standby at the site and that they used the defibrillator and performed CPR until the ambulance arrived. The employee was pronounced deceased at the hospital.

Hydro-Québec: Heavy Water Leak in the Reactor Building at Gentilly-2

15. With reference to CMD 12-M29, CNSC staff described a small heavy water leak in the heat transport circuit in the reactor building. Two workers received a very low dose of 0.02 and 0.03 mSv respectively. According to CNSC staff, there was a discharge to the environment well below the regulatory limits, and this event did not pose a threat to the public.

16. The Commission asked whether there was a preventive maintenance program for the defective water-level alarms. The Hydro-Québec representative responded that this program is in place. An investigation is under way to determine the cause of this event. The Hydro-Québec representative added that the operators received instructions to use a different means of monitoring water level. The Hydro-Québec representative indicated that they also plan to make changes to give operators an alternative means of measuring water level and thus avoid constant monitoring. CNSC staff noted that Hydro-Québec's report on the event is expected for June 2012.

17. The Commission inquired why the alarm for the second tank did not help prevent the leak. The Hydro-Québec representative explained that because the tank is small, it overflowed quickly. The Hydro-Québec representative considers that increased monitoring of the first tank will help prevent another event of this type.

INFORMATION ITEMS

Saskatchewan Research Council: Status Report on completion of Order and Progress on Environmental Assessment at the Gunnar Closed Mine Site, Northern Saskatchewan

18. With reference to CMD 12-M25, CMD 12-M25.1 and CMD 12-M25.1A, Saskatchewan Research Council (SRC) and CNSC staff presented updates on the work and progress related to the demolition of the site, as well as the environmental assessment work and other efforts to bring the Gunnar site under a CNSC licence.

19. CNSC staff considers that site safety has improved markedly with the removal of the many physical hazards under the order. The Gunnar site continues to have small, very localized impacts on the environment, and CNSC staff has no concerns regarding fish consumption from Lake Athabasca outside of Zeemal Bay.

20. CNSC staff reported that they have decided to move forward with a formal protocol between all key players for this project to ensure that the site is brought under a CNSC licence in a timely fashion.

21. The Commission enquired on the number of local people hired to do the work on site. The SRC representative responded that they have their own local Aboriginal liaison person, and that with the help of funding programs, training was delivered to local people, which led to having more than 50 percent of residents of the Athabasca region in the workforce for the project.

22. The Commission asked for more information on the airstrip. The SRC representative reported that the airstrip continues to be open and operated by an outfitter in the next bay. Access to the Gunnar site was not allowed. The SRC representative added that the airstrip will continue to be open in the short term and might also continue to be open in the long term. CNSC staff expressed its agreement on continuing to maintain tight access control to the site.

23. In response to a question from the Commission on environmental monitoring pre- and post- demolition, the SRC representative explained that monitoring stations have been increased to monitor the impacts of the demolition on the environment, and that the data resulting from this monitoring will be part of the environmental assessment.

24. The Commission enquired on the water quality and contaminant levels in fish in the area. CNSC staff noted that the water quality in the Langley Bay is good, therefore swimming is not a concern. CNSC staff added that the Gunnar site does have large releases of uranium in the environment and that remediation is necessary, but that the site is next to a large body of water and, therefore, the environmental footprint is fairly small and localized in the local bays.

25. The Commission asked for more information on the contamination levels of fish in the area and the impact on human health. CNSC staff explained that more contamination is found in small fish than in bigger fish, because the small fish do not move around as much. CNSC staff added that, as a precautionary measure, a fish advisory has been declared in the affected bays, even if the large fish have contaminant levels that are not of concern to human health and that small fish are not consumed by humans.

26. The Commission enquired on the environmental impact of the transport of hazardous materials on ice roads. The SRC representative explained that they chose not to use the ice road past March 31st (even if local residents typically use it past this date), since the Saskatchewan government always declares the road closed past this date. The SRC representative added that the hazardous waste was monitored for the whole trip. Any material found on the highway would be monitored and cleaned up. The SRC representative added that the hazardous materials are being kept in a safe place and regularly verified until it is possible to move them.

27. The Commission asked whether there was a schedule for characterization and remediation work. The SRC representative responded that a schedule for this work does exist. The SRC representative added that groundwater and hydrogeology characterization are ongoing and that research is being done at the SRC laboratories in Saskatoon to determine the best seed species to be used for revegetation in the area.

28. The Commission, noting CNSC staff's statement that licensing and EA processes are moving slowly, asked SRC for their level of confidence for meeting the current schedule. The SRC representative expressed confidence for meeting the schedule, noting the help from consultants in providing the necessary scientific information to the responsible agencies and the challenges posed by the remoteness of the site. CNSC staff commented that another challenge is the fact that there are two responsible authorities for the project, the CNSC and Natural Resources Canada (NRCan), the latter also taking into consideration the cost effectiveness of the remediation. CNSC staff also ensures that routine communication occurs between all parties and that SRC knows precisely the information needed in the EA.

29. The Commission enquired on the integration of traditional knowledge in the work activities. The SRC representative confirmed that local elders were interviewed and that information on the traditional use of the site was collected as part of the environmental assessment.

30. The Commission enquired on how the SRC ensures that all openings of mines are found. The SRC representative explained that they had walked the site thoroughly and stated that they were confident that all hazardous areas had been found, signed and fenced off. The SRC representative added that they plan on determining, with the help of an engineer, whether the cap over the main opening is acceptable.

31. The Commission asked for the budget for remediation and the amount of money spent to date. NRCan and Government of Saskatchewan representatives stated that the planned budget was $24.6M shared equally between the Governments of Saskatchewan and Canada. However, the Saskatchewan Government has spent more than $40M so far, and plans to reach $50M by the end of the year 2012. This spending has been associated with the satisfaction of the order and the buildings take-down. So far, the Saskatchewan Government has received $1.1M from the federal government.

32. In response to a question from the Commission on the perceived lack of communication with the local residents, the SRC representative stressed having worked very hard in establishing and maintaining a good working relationship with the local residents. CNSC staff stated that they consider SRC's communication activities to be acceptable.

33. The Commission asked for more information on institutional control. The SRC representative explained that they expect the site to meet the criteria for institutional control in 10 to 15 years following remediation. The Saskatchewan Environment representative noted that, in due time, they will write a letter to the Saskatchewan Ministry of Energy and Resources stating that the decommissioning work has been completed and recommending institutional control. An exemption from CNSC licensing would also be required for the

provincial institutional control program. CNSC staff commented that they will request to see the results of the monitoring program before considering institutional control.

Performance of Canadian Uranium Fuel Cycle Facilities: 2010

34. With reference to CMD 12-M26, CNSC staff presented its report on the performance of Canadian Uranium Fuel Cycle Facilities in 2010. CNSC staff explained the structure of the report and described the performance of the uranium mines and mills and uranium processing facilities. CNSC staff considers the performance of these facilities to be acceptable. CNSC staff plans on including the Chalk River Laboratories and the nuclear substance and processing facilities in the 2011 Report. Other groups such as waste management facilities and decommissioning projects will be included in future reports.

35. CNSC staff intends on including more comparisons between uranium mines and other mines and other industrial sectors, as well as more information on each mining facility to better understand the differences in releases between these facilities. The Commission commented that these comparisons would be useful.

36. The Commission asked for more information on the spills at the McArthur River facility. CNSC staff responded that the spills were cleaned up to the applicable site criteria and that there were no residual impacts to the environment. CNSC staff added that corrective actions were identified and found acceptable.

37. The Commission made several suggestions of information to include in the next report, as well as editorial suggestions, including benchmarking against Canadian or mines located in other countries, indicating the average background radiation levels for each facility, and use colour-coding to differentiate between federal and provincial limits, and action levels. CNSC staff responded that they intended on including this information.

38. The Commission asked for reasons why the GE-Hitachi facility had a fully satisfactory rating despite being the only facility that had a lost-time incident. CNSC staff explained that the way a company responds to an event and the robustness of the programs are also taken into account in determining a rating.

Actions required by the CNSC, licensees and affected stakeholders to address the Task Force recommendations and outcome of the public consultation on the CNSC Fukushima Task Force Report and CNSC Management Response

39. With reference to CMD 12-M23, CNSC staff presented its report on actions required to address the task force recommendations, and the results of the consultation activities. CNSC staff reported that the *CNSC Staff Action Plan on the CNSC Fukushima Task Force Recommendations* (CNSC staff action plan) describes specific actions

to be implemented by licensees, CNSC staff, and affected federal and provincial authorities to strengthen the defence in depth, emergency preparedness and regulatory oversight of nuclear power plants in Canada. The draft CNSC Staff action plan took into consideration all comments from the public review of the *CNSC Fukushima Task Force Report* and *CNSC Management Response*. CNSC staff added that the CNSC Staff Action Plan will be implemented by licensees through existing regulatory oversight programs for initiatives that pertain to design and operational enhancements, and by the CNSC under Harmonized Plan initiatives for those actions that fall under regulatory framework improvements.

40. The Commission asked for a comparison of the Canadian report with the ones from other countries. CNSC staff explained that the review criteria were somewhat more comprehensive in Canada. The international community focused more on identifying key effects (or mitigation measures), while Canada decided to focus more on the examination of design basis to determine if anything in the design can be improved, and then implement severe accident management guidelines. CNSC staff noted that the conclusions of Canadian and international reviews were identical. The Commission requested a table summarizing the differences between reports produced in Canada and in other countries. CNSC staff committed to provide such a table.

ACTION
By October 2012

41. The Commission asked for more information on the use of cost-benefit analyses. CNSC staff explained that licensees may use cost-benefit analyses to determine the best option to meet the objectives defined by the regulator. CNSC staff emphasized to the Commission that the licensees are required to meet those objectives, regardless of the cost.

42. The Commission, referring to CNSC staff's recommendation to include the requirement for licensees to submit off-site emergency plans, asked CNSC staff to comment on whether these plans are under the jurisdiction of the CNSC. CNSC staff explained that off-site emergency plans do not fall within the jurisdiction of the CNSC, but that within the regulatory oversight and jurisdiction of the CNSC, there is a requirement from the licensee to support off-site authorities in preparing and planning for emergencies. CNSC staff added that leadership and coordination of activities between the licensee and provincial authorities can be done if they not consider the plan acceptable. CNSC staff also noted that it intends on recommending to the Commission to amend its Regulations to include a requirement from licensees to have an emergency management plan that will meet federal, provincial and municipal requirements, in order to protect the public or the environment.

43. The Commission asked for information on the risks of increased mortality caused by the Fukushima events. CNSC staff responded that this information is still incomplete. CNSC staff added that the CNSC is cooperating with the United Nations Scientific Committee on the Effects of Atomic Radiation, which established a working group to assess the effects of the Fukushima events. The report is planned to be submitted to the General Assembly of the United Nations in 2013. CNSC staff noted that the information available to date shows that the level of radiation the public was exposed to is below the level where health effects are seen.

44. The Commission asked for details of the timelines for the safety analyses and the implementation of the action plan. CNSC staff explained that timelines will vary but, typically, December 2013 is the timeline for finishing safety analyses and December 2015 is the expected time for the completion of the implementation phase (specific to each nuclear generating station). CNSC staff noted that they will inform the Commission of any failures to meet these deadlines.

45. In response to a question from the Commission on this topic, CNSC staff confirmed that the industry has been consulted on the actions and the timelines included in the action plan.

46. The Commission asked whether the planned changes had been taken into account in refurbishment projects. CNSC staff responded that they had during the Point Lepreau refurbishment, which brought the facility to all applicable international standards, including the installation of hydrogen recombiners.

47. The Commission asked whether the issue of fuel in dry fuel storage was considered. CNSC staff responded that fuel is transferred in dry storage after approximately seven years in spent fuel pools, and, therefore, the requirements for cooling in dry storage are significantly less important and very low compared to light-water reactors' spent fuel.

48. The Commission enquired on reasons why CNSC staff was of the view that the *Radiation Protection Regulations* need to be amended. CNSC staff explained that two dose limits are mentioned in these *Regulations*: one for normal operations (50 mSv per year, 100 mSv over 5 years), and one for emergency situations (500 mSv per year). CNSC staff considers preferable, in light of the Fukushima events, to better describe how this emergency limit applies. This recommendation aligns with international recommendations made in 2011.

49. The Commission asked how these recommendations would apply to new reactors. CNSC staff explained that they are revising Regulatory Document RD-337, *Design of New Nuclear Power Plants* to include all lessons learned from the Fukushima events, and that an applicant would need to refer to this document in order to build a new nuclear power plant.

50. The Commission asked for the frequency of reporting to the Commission on the activities related to the action plan. CNSC staff explained that they recommend a yearly update as part of the annual report on nuclear power plants in August of each year. CNSC staff noted that updates could also be provided during relicensing hearings.

51. The Commission enquired on the inclusion of recommendations from the external advisory committee on communication into the overall CNSC staff action plan. CNSC staff responded that this report was received only recently and that there was not enough time to implement these actions, but that they would be integrated in the CNSC staff action plan and an update to the Commission would also be provided.

52. With reference to CMD 12-M23.1 and CMD 12-M23.1A, the Canadian Standards Association (CSA) presented its activities in response to the Fukushima events and the approach used in developing a framework for an emergency management standard.

53. The Commission asked CSA for more information on future projects. The CSA representative explained that three primary areas have been identified, emergency management being the top priority, before the definition of multi-unit events and extreme events, and severe accident management guidelines. The definition of beyond design basis accidents, severe accident management guidelines and source term calculations has also been identified as areas where standards need to be produced.

54. The Commission asked for more information on the link between the standards and the regulations. CNSC staff responded that the standards are consensus standards, and that CNSC staff reviews the standards and determines if they should or not go into its regulatory framework. The operating licences can be amended if required to reference the new standards, in whole or in part. If the standards do not meet the Commission’s requirements, regulatory documents can be developed.

55. The Commission asked about benchmarking with other countries. The CSA representative explained that benchmarking with other countries is done, and that existing standards elsewhere in the world and those developed in Canada for other industries are used where possible.

56. The Commission enquired how the United States and the First Nations will be involved in making regulations for emergency management. CNSC staff explained that it is a challenge logistically. CNSC staff agreed that First Nations need to be consulted. CNSC staff confirmed that documents related to emergency management are subject to public review.

57. At the request of the Commission, representatives from Public Safety Canada and Health Canada explained the current plans, structures and governance for emergency planning in Canada.

58. The Emergency Management Ontario (EMO) representative explained this organization's involvement in the development of the CSA standards and expressed EMO's interest in participating in discussions related to the development of a standard for offsite nuclear emergency management and response.

59. With reference to CMD 12-M23.2, Marchhurst Technologies Corporation explained its involvement in the development and installation of public warning systems, and expressed the view that the action plan needs to focus more on public warning.

60. The Commission asked for CNSC staff's opinion on the composite warning system. CNSC staff explained that this falls within provincial jurisdiction. The EMO representative explained that the province of Ontario has specific requirements regarding public alerting around nuclear facilities. Every nuclear facility is responsible to fund the implementation and maintenance of public alerting systems, with which, EMO reports, all of the nuclear facilities comply to. The EMO representative added that it is the designated municipality's responsibility for selecting a public warning system, as well as for implementing and maintaining it.

61. The Commission asked Public Safety Canada for its activities regarding public alerting. The Public Safety Canada representative explained that, in 2009, the CRTC approved Pelmorex Communications Inc.'s application for the mandatory distribution of English and French weather network channels on basic cable accompanied with national public alerting network. He added that Environment Canada is currently the only federal department currently participating as the alert issuer, but that all provinces and territories have agreed to sign on the agreement. He expects that, within the next few months, initial operating capability will be reached.

62. With reference to CMD 12-M23.5 and CMD 12-M23.5A, OPG presented, on behalf of the industry, lessons learned from the Fukushima nuclear accident. OPG also stated that the CNSC action plan is sound and aligned with both the CNSC Fukushima task force report and similar studies performed internationally.

63. The Commission asked for an estimate of the extent and scope of the work done and to be done. The OPG representative noted that work has been classified according to its urgency, and that the cost involved was significant.

64. The OPG representative confirmed that they intend for the automated radiation monitors to be seismically qualified. CNSC staff commented that OPG is leading the way in assessing the feasibility of installing this equipment, and that other licensees are finishing their own assessment.

65. The Commission commented that more efforts could be made by CNSC staff and the industry to dispel some of the myths related to the Fukushima events. CNSC staff agreed with that statement and committed to work with the CNSC's communication group to improve this situation and try to explain technical jargon in more layperson terms.

66. The Commission asked for more information about emergency mitigating equipment. The OPG representative explained that equipment necessary to assist, if needed, in the cooling of the fuel will be in place for each nuclear power plant, but that backup equipment and supplies will be kept in a regional centre.

67. In response to more details requested from the Commission on this topic, the OPG representative explained that, in OPG's opinion, actions that provide a quick substantive improvement in safety should have a higher priority. CNSC staff commented that they could elaborate on this topic in the action plan.

68. The Commission enquired on the availability of studies about tornadoes. The OPG representative explained that a preliminary assessment of the robustness of the plants against tornadoes was done, and that Bruce Power and OPG are collaborating on developing a methodology for performing a more detailed assessment. OPG plans on completing the first study (for the Pickering B NGS) by the end of the year 2012. OPG confirmed that a severe weather procedure is in place where, depending upon impending severe weather, increasingly defensive measures can be taken (which could include a shutdown of the plant).

69. The Commission asked for information on the seismic activities around nuclear power plants. A Natural Resources Canada representative explained that Canadian nuclear power plants are located in areas of low seismic activity. CNSC staff commented that safety systems of nuclear power plants in Canada are seismically qualified, therefore the reactors will safely shut down after an earthquake.

70. The Commission asked for more information on full-scale emergency exercises. The Health Canada representative responded that the last full-scale exercise took place in 1999, and that another one is planned for the year 2013. The Health Canada representative added that several emergency exercises have been conducted at other levels.

71. With reference to CMD 12-M23.12, Hydro-Québec presented, in French, a summary of the initiatives brought by the nuclear industry after the Fukushima events.

72. The Commission asked for activities done at Hydro-Québec in response to the Fukushima events. The Hydro-Québec representative explained that hydrogen recombiners have been installed in the reactor building during the last annual shutdown. This activity was planned to be done during refurbishment but was done earlier because of the Fukushima events. The Hydro-Québec representative added that improvements that were identified as necessary in light of these events were already planned to be implemented during refurbishment and, therefore, no supplementary costs are expected as a result of the CNSC action plan.

73. The Commission asked for Hydro-Québec's comments on OPG's presentation stating that implementation of the guidelines for severe accident management had been delayed at the Gentilly-2 NGS. The Hydro-Québec representative explained that the industry has developed strategies to react to severe accidents a few years ago, and that every NGS had to develop plans to implement these strategies. The Hydro-Québec representative added that this work was done for the Gentilly-2 NGS, and that all activities related to this plan are expected to be done during refurbishment, or before refurbishment activities if the Quebec government decision on this project is delayed.

74. The Commission asked for the opinion of the representative from the Quebec Ministère de la sécurité publique (Ministry of Public Safety) on the CNSC staff action plan. This representative commented that they have no issues with CNSC staff's proposed actions. Regarding the proposed full-scale emergency exercises, the representative explained that, while they are not opposed to the idea, they will wait until a decision has been made regarding the refurbishment of the Gentilly-2 NGS and for an estimate of the costs involved. The representative confirmed the existence of an external nuclear emergency plan in the Bécancour areas and the surrounding municipalities.

75. With reference to CMD 12-M23.7 and CMD 12-M23.7A, an intervenor expressed concerns regarding the probability of a core meltdown for a reactor in Canada and the probability of a major earthquake. This intervenor also expressed the view that not enough attention is paid to details of accident preventions, but noted that he was impressed by the efforts made in CNSC staff's report regarding mitigation of severe events.

76. This intervenor complained that not all scientific information is disseminated by the CNSC, as per the *Nuclear Safety and Control Act*. The Commission commented that all information is released if possible, and that information that is not released is related to security concerns.

77. The Commission asked for CNSC staff's opinion on this intervenor's statement that the chances of a severe nuclear incident are now estimated to be 10 times higher than before the Fukushima events. CNSC staff responded that they disagree with this statement, stating that the intervenor made improper statistical calculations. CNSC staff added that a very sophisticated approach is used for determining the risks of accident in a nuclear power plant.

78. The Commission asked for comments from the Natural Resources Canada representative on this intervenor's statement on the probability of a destructive Peak Ground Acceleration (PGA) of 0.6 G being 0.5% over 50 years. The Natural Resources Canada representative explained that there has been a big improvement in those ground motion prediction equations, which led to a decrease of the estimate of shaking at a given distance from an earthquake. This is the position that was put forward by Hydro-Québec. CNSC staff commented that the methods used by Hydro-Québec for estimating the impacts of an earthquake are much more conservative than what is required under the National Building Code. CNSC staff stated that the reactor will shutdown safely should an earthquake happen in the Bécancour area.

79. At the request of the Commission, CNSC staff explained the sequence of events following a hypothetical major incident at a Canadian nuclear power plant. CNSC staff noted that, even if the primary heat transport system overheats, molten fuel will be cooled in the moderator and therefore will not leave the calandria vessel. Vapour resulting from overheating of the moderator can be released from the containment through emergency passive filters and containment envelope can therefore be maintained, greatly limiting releases to the environment. CNSC staff added that international peer review concluded that more than adequate coverage is provided in Canada for the cooling of nuclear reactors.

80. The Commission requested from CNSC staff a flowchart that readily demonstrates the sequence of events during and immediately following an accident. CNSC staff responded that they could produce such a flowchart, based on the information provided in the task force report.

ACTION
By August 2012

81. With reference to CMD 12-M23.6 and 12-M23.6A, CANDU Energy Inc. provided information on CANDU design features and the robustness of the CANDU reactor design.

82. The Commission asked for differences between safety reviews done for nuclear power plants in Europe (also called stress tests) and in Canada. CNSC staff explained that the approach used in Canada was to start with an evaluation of all external hazards to determine beyond design basis accidents and the limiting accident scenario, while the European approach was to determine the existence of any cliff-edge effects (a small difference in the initial parameters that can result in catastrophic accidents) in order to identify the most critical gaps and close them as quickly as possible. CNSC staff noted that, while different approaches have been used in Canada and in Europe, the conclusions of the analyses were the same.

83. The Commission asked for more information on the enhancement of CANDU plants. The CANDU Energy representative responded that, while physical changes are limited for existing plants, enhancements can be made for new plants at the design stage, which is being done for the enhanced CANDU 6.

84. The Commission enquired for similarities between the CNSC staff's action plan and the one for Romanian CANDU reactors. The CANDU Energy representative responded that both action plans are similar, since the conclusions from assessments done for both reactors were comparable. CNSC staff concurred with this statement.

85. With reference to CMD 12-M23.8 and CMD 12-M23.8A, Greenpeace expressed the view that there should be a clearer separation between the industry and the CNSC, that communications with the public regarding the nuclear industry should be improved and that there should be more transparency emanating from the CNSC.

86. The Commission asked Greenpeace to provide more information on how public participation can be improved. The Greenpeace representative explained that the scope of consultations should be widened, for example adding the consideration of catastrophic events in environmental assessments. The Greenpeace representative also stated that the industry had already been consulted on regulatory documents when they are open for public comments, which leaves the feeling of an accomplished fact. CNSC staff commented that a rigorous and transparent process is in place regarding regulatory documents. When a new policy direction is considered, discussion papers will be issued, inviting comments from all stakeholders. CNSC staff added that all comments that are received on regulatory documents are considered.

87. The Commission asked for comments from CNSC staff on this intervenor's concerns regarding the probability of a severe accident. CSNC staff commented that a probabilistic safety assessment is done for every nuclear power plant to quantify the risks of an accident.

Deterministic safety assessments are also done to ensure the safety of a nuclear power plant under any circumstances. These analyses also help to determine the consequences of potential accidents.

88. The Greenpeace representative stated that, according to a report issued by Greenpeace, there is a difference between the calculated probability of accidents and their real frequency. The Commission commented that, while there are risks inherent with any nuclear reactor design, the main objective is to mitigate against these risks to ensure that limited damage occurs after a nuclear accident. CNSC staff noted that, in the CNSC staff report, analyses were done to determine the consequences if the mitigation measures fail, which resulted to upgrades that were, or will be, implemented in the nuclear power plants.

89. This intervenor also expressed the view that the leading cause of accidents is institutional failures. The Commission asked for CNSC staff's comments on these statements. CNSC staff stated that, while the Greenpeace report has good points, CNSC staff disagreed with the perceived similarities between the Japanese and Canadian nuclear regulators.

90. With reference to CMD 12-M23.10 and CMD 12-M23.10A, CCNB Action, Saint John Fundy Chapter (CCNB) expressed concerns on the consequences of a nuclear accident and on their perception that the same issues that led to the Fukushima accident are present in the nuclear industry in Canada. This intervenor also criticised the absence of discussion on safety culture in the CNSC staff's report, as well as the seismic assessments done in the Point Lepreau area.

91. The Commission asked for comments on the seismic assessment at Point Lepreau. CNSC staff confirmed that NB Power was requested to conduct a seismic assessment, with preliminary results being available by the end of the year 2012. The NB Power representative concurred with CNSC staff's statement.

92. The Commission asked for comments about safety culture at Point Lepreau. The NB Power representative explained that safety culture is taken very seriously. CNSC staff commented that the CNSC requires licensees to have management systems in place, and, therefore, safety culture is a primary concern. CNSC staff added that safety culture evaluations done at nuclear facilities, including nuclear power plants, showed that safety culture characteristics were present at all facilities, and that safety is a clearly recognized value in the organizations.

93. The Bruce Power representative later commented that, after the Chernobyl accident, all nuclear power plants in the world were asked to perform a human factors' assessment. The Bruce Power representative also noted that the International Atomic Energy Agency (IAEA) produced a safety culture guide after the Chernobyl accident that has been widely used by the industry.

94. The Commission asked for comments on the emergency planning measures around the Point Lepreau nuclear power plant. The New Brunswick Emergency Measures Organization (NB EMO) stated that a very robust public alerting system is in place, and provided details on this system. The NB EMO representative also detailed the exercises held jointly with NB Power and the federal government. The NB EMO representative also provided information on the distribution of potassium iodide pills.

95. The Commission asked for comments about the intervenor's statement that earthquakes in eastern Canada and the United States are becoming more frequent and severe. The Natural Resources Canada representative explained that a presentation made at the Seismological Society of Canada demonstrated that the rates of moderate sized earthquakes (3 to 4 on the Richter scale) are becoming more frequent, which is believed to be caused not by hydrofracking, but by disposal wells. Areas not close to disposal wells show no evidence of an increase of earthquake frequencies. The Point Lepreau NGS is not close to a disposal well.

96. With reference to CMD 12-M23.3 and CMD 12-M23.3A, the University of Ontario Institute of Technology (UOIT) expressed its support for the CNSC staff action plan and stated having been impressed by the response of CNSC staff and the industry. This intervenor suggested that the recommendations from the external advisory group regarding organizational elements be incorporated into the CNSC action plan.

97. In response to a question from the Commission on ways to prevent institutional failures, the UOIT representative explained that a number of elements can be used to minimize this risk, including the continued use of external review, strong competency in regulatory and industry staff and lessons learned from other events.

98. With reference to CMD 12-M23.11, the Canadian Coalition for Nuclear Responsibility expressed the view that the consequences of severe nuclear accidents have not been addressed, that contacts with the general public are too limited. This intervenor also discussed issues with the use of mathematical and statistical models and safety culture.

99. The Commission asked for comments on the intervenor's statements on consequences of nuclear accidents, more particularly contaminated water. CNSC staff explained that this potential problem was discussed with the industry during the task force review, and that the CANDU design has provision for collecting water in the sumps and recirculating the water back into the station. Screens installed on the sumps filter the water to eliminate debris.

100. The intervenor expressed the view that CANDU reactors have a lack of adequate heat sink and therefore would not be capable to properly evacuate heat during an accident. CNSC staff added that CANDU reactors have a large body of water in the station, contrary to boiling water reactors such as the ones in Fukushima, and that heat exchangers are in the recirculation path to cool down the water. External water supplies can also be brought in.

101. In response to a question from the Commission on emergency measures during a catastrophic event, CSNC staff explained that the provincial Emergency plan has provisions for movement of the population and decontamination. CNSC staff added that the Province of Ontario is reviewing its emergency response plan in light of the Fukushima events. The Emergency Management Ontario representative confirmed CNSC staff's statement and provided details on the provincial emergency plan. The Health Canada representative noted that, prior to the Fukushima events, they had launched the process to update the Federal Nuclear Emergency Plan and integrate it with a coordinated Federal national response to any type of emergency. The Health Canada representative added that they will be working closely with the province of Ontario and with the CNSC.

102. In response to concerns expressed by the intervenor on spent fuel being uncovered, CNSC staff explained that fuel bays accidents are analyzed and part of the safety report for all nuclear power plants. CNSC staff added that, following a loss of cooling, it would take days to fuel to start being exposed to air, leaving enough time for an operator to intervene. Sudden loss of water in the pool is not considered credible since the pools are in ground.

103. With reference to CMD 12-M23.4 and CMD 12-M23.4A, Bruce Power presented its view of the lessons learned and consequences of the Fukushima events, emergency equipment, emergency management and response, and regulatory and government interfaces.

104. The Commission asked for Bruce Power's time lines for responding to the event. The Bruce Power representative explained that several actions were taken shortly after the event, including organizational restructuring, the installation of additional equipment and the preparation of severe accident management guidelines for the Bruce B nuclear reactor.

105. The Commission asked for comments on communication activities immediately following the Fukushima events. The Bruce Power representative, who was serving as the World Association of Nuclear Operators Chairman at the time, noted that he made great efforts at disseminating information as quickly and accurately as possible. CNSC staff noted that some of its personnel appeared on national television a few times, and that the CNSC website was frequently updated. CNSC staff added that the CNSC was in contact with the media in the first few weeks after the accident to provide relevant and accurate information. The President also noted that a lesson learned from the Fukushima events is to try to explain the risks related to the nuclear industry in more layperson language. The Bruce Power representative commented that communications could have been improved to reassure the public in the first few days of the event.

106. The Commission asked for comments on institutional factors as contributors to the Fukushima events. The Bruce Power representative commended the CNSC for its actions following the Fukushima events. He added that the licensees also acted promptly after the events. The Bruce Power representative added that Canada's regulatory approach, being one of continuous improvement, is serving well.

107. The Commission accepts the recommendations detailed in CNSC staff's action plan. **DECISION**

108. The Commission requests an update on CNSC staff's action plan during CNSC staff's annual report on power reactors, presented in August of each year. **ACTION**

Closure of the Public Meeting

109. The public meeting closed at 7:28 p.m.

For Recording Secretary — Date: 27/6/12

Secretary — Date: 27/6/12

Appendix A

CMD **DATE** **FILE NO**

12-M20 2012-04-11 Edocs # 3916565
Notice of Meeting of May 2 and 3, 2012

12-M20.A 2012-04-26 Edocs # 3924703
Revised Notice of Meeting of May 2 and 3, 2012

12-M21 2012-04-18 Edocs # 3920402
Meeting Agenda of May 2 and 3, 2012

12-M21.A 2012-04-26 Edocs # 3925823
Meeting Agenda Update of May 2 and 3, 2012

12-M21.B 2012-05-01 Edocs # 3927617
Meeting Agenda Update of May 2 and 3, 2012

12-M22 2012-04-30 Edocs # 3926852
Draft Minutes of Commission Meeting held March 28 and 29, 2012

12-M23 2012-03-02 Edocs # 3928387
Oral presentation by CNSC Staff: Actions required by the CNSC, Licensees and affected stakeholders to address the Task Force recommendations and outcome of the public consultation on the *CNSC Fukushima Task Force Report and CNSC Management Response*

12-M23.A 2012-04-25 Edocs # 3927346
Written submission from CMC Staff regarding security on the *CNSC Fukushima Task Force Report and CNSC Management Response*

12-M23.B 2012-04-25 Edocs # 3924889
Supplementary submission by CNSC Staff: Required Measures from CNSC, licensees and affected stakeholders to address the Task Force recommendations and outcome of the public consultation on the *CNSC Fukushima Task Force Report and CNSC Management Response*

12-M24 2012-04-25 Edocs # 3923896
Status Report on Power Reactors dated April 25, 2012

CMD	DATE	FILE NO

12-M25.1 2012-04-13 Edocs # 3919578
Saskatchewan Research Council: Status report on completion of Order and progress on Environmental Assessment at the Gunnar Closed Mine Site, Northern Saskatchewan

12-M25.1A 2012-04-25 Edocs # 3924481
Oral presentation by Saskatchewan Research Council regarding the Gunnar Closed Mine Site

12-M25 2012-05-02 Edocs # 3924040
Oral presentation by CNSC Staff: Status report on completion of Order and progress on Environmental Assessment at the Gunnar Closed Mine Site, Northern Saskatchewan

12-M26 2012-04-18 Edocs # 3901173
Oral presentation by CNSC Staff: Performance of Canadian Uranium Fuel Cycle Facilities: 2010

12-M27 2012-04-19 Edocs # 3921539
Early Notification Report on Atomic Energy of Canada Limited: Workplace Fatality Reported at AECL's Chalk River Laboratories

12-M28 2012-04-26 Edocs # 3925368
Early Notification Report on Ontario Power Generation Inc.: Workplace Fatality Reported at OPG's Darlington Nuclear Generating Station

12-M29 2012-05-01 Edocs # 3927615
Early Notification Report on Hydro-Québec: Heavy Water Leak in the Reactor Building at Gentilly-2

See Appendix B for list of contributors concerning *CNSC Fukushima Task Force Report and CNSC Management Response*

Appendix B – Contributors

Contributors	CMD No
Canadian Standards Association (CSA Group), represented by D. Morton, M. Cianchetti and J. Froats	CMD 12-M23.1 CMD 12-M23.1A
Marchhurst Technologies Corporation, represented by D. Perley	CMD 12-M23.2
University of Ontario Institute of Technology, represented by J. Froats	CMD 12-M23.3 CMD 12-M23.3A
Bruce Power, represented by D. Hawthorne	CMD 12-M23.4 CMD 12-M23.4A
Ontario Power Generation, represented by M. Elliott, P. Tremblay and F. Dermarkar	CMD 12-M23.5 CMD 12-M23.5A
Candu Energy Inc., represented by B. Pilkington, F. Yee, A. Lee, F. Guy and R. Zemdegs	CMD 12-M23.6 CMD 12-M23.6A
Michel A. Duguay	CMD 12-M23.7 CMD 12-M23.7A
Greenpeace, represented by S.P. Stensil	CMD 12-M23.8 CMD 12-M23.8A
Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	CMD 12-M23.9
CCNB Action, Saint John Fundy Chapter, represented by S. Murphy and C. Rouse	CMD 12-M23.10 CMD 12-M23.10A
Canadian Coalition for Nuclear Responsibility represented by G. Edwards	CMD 12-M23.11
Hydro-Québec represented by M. Désilets and P. Desbiens	CMD 12-M23.12