Canadian Nuclear Safety Commission

Commission canadienne de sûreté nucléaire

# Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held on August 21 and 22, 2013

Canada

Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held Wednesday and Thursday, August 21 and 22, 2013 beginning at 9:00 a.m. and 9:05 a.m., respectively, 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
S. McEwan

M. Leblanc, Secretary
J. Lavoie, Senior General Counsel
T. Johnston/S. Dimitrijevic/B. Gerestein/S. Gingras, Recording Secretaries

CNSC staff advisors were:

R. Jammal, G. Rzentkowski, R. Lojk, B. Poulet, F. Rinfret, M. Santini, P. Corcoran, A. Bouchard, C. McDermott, C. Harwood, G. Frappier, D. Howard, A. Viktorov, D. Sims, C. Clement, P. Elder, L. Sigouin, T. Gibb, S. Hamlat, B. Howden, K. Lun, T. Jamieson, P. Thompson, M. Rickard, S. Faille, V. Khotylev, M. Hayward, A. Du Sautoy, T. Barr, D. Wismer, A. Régimbald, L. Simoneau, H. Rabski and D. Estan

Other contributors were:

**OPG**

- L. Swami, Vice President, Nuclear Services
- G. Jager, Senior Vice President, Pickering
- F. Dermarkar, Vice President, Engineering Strategy
- M. Elliott, Senior Vice President Nuclear Engineering and Chief Nuclear Engineer
- B. Duncan, Senior Vice President Darlington
- J. Coles, Director Emergency Management & Fire Protection
- K. Powers, Public Affairs

**NB Power**

- S. Granville, Site Vice President and Chief Nuclear Officer
- P. Thompson, Manager of Performance Improvement and Regulatory Affairs

**Hydro Québec**

- C. Gélinas, Plant Manager

**Bruce Power**

- D. Hawthorne, President and Chief Executive Officer
- F. Saunders, Vice-President, Nuclear Oversight and Regulatory Affairs

**CANDU Energy Inc.**

- A. Lee, Manager Physics, Licensing and Safety
- F. Yee, Chief Nuclear Engineer

**Les Laboratoires d'essais Mequaltech Inc.**

- R. Desaultels, President
- A. Côté, Radiation Safety Officer

**CSA Group**

- M. Cianchetti

**AECL**

- S. Cotnam, Chief Regulatory Officer/Chief Security Officer
- K. Lafreniere, Security Program Authority
- B. Mumford, Director, Emergency and Protection Services
- P. Graves,(Manager, CRL Security Operations & Training

Constitution

1. With the notice of meeting, CMD 13-M38, 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 May 15 and 16, 2013, Commission Member Documents CMD 13-M30, 13-M30.2 to 13-M30.3, 13-M32 to 13-M42, 13-M44, 13-M45.1, 13-M45.1A and 13-M46 were distributed to Members. These documents are further detailed in Annex A of these minutes.

Adoption of the Agenda

3. The revised agenda, CMD 13-M39.A, was adopted as presented.

Chair and Secretary

4. The President chaired the meeting of the Commission, assisted by M. Leblanc, Secretary and T. Johnston/S. Dimitrijevic/B. Gerestein/S. Gingras, Recording Secretaries.

Minutes of the CNSC Meeting Held May 15 and 16, 2013

5. The Commission Members approved the minutes of the May 15 and 16, 2013 Commission Meeting as presented in CMD 13-M40, with the

following change:

- In paragraph 82 of the Minutes, the word “model” is changed to “modal”.

Decision of the Commission

6. On July 10, 2013, a panel of the Commission approved CNSC staff’s recommendation to update CMD 13-M15, *Designated Officers*, to provide powers to Designated Officers to issue notices of violations related to administrative money penalties. CNSC staff’s recommendation was presented in CMD 13-M43. **DECISION**

STATUS REPORTS

Status Report on Power Reactors

*CNSC Staff Presentation*

7. With reference to CMD 13-M41, which includes the Status Report on Power Reactors, CNSC staff presented updates on the following items:

   - Pickering NGS Unit 8: the trip described in the status report refers to the turbine trip and not the reactor trip;
   - Point Lepreau NGS: nearly 50 % of the fuel channel closure plugs have been replaced, and the replacement continues with no impact on normal operation of the reactor; and
   - Bruce NGS B, Unit 5: the leak of heat transport system water had no impact on the environment or the safe operation of the facility, and bioassay samples taken from plant staff indicated exposure to radiation at far below the regulatory dose limits. CNSC staff will provide an update to the Commission after reviewing the root cause analysis. **ACTION** by December 2013

*Commission’s Questions*

8. The Commission asked about measures taken to reduce accumulation of zebra mussels and blockage of cooling water intake, which had caused lowering of power limits at Bruce A NGS Units 1 and 3. CNSC staff responded that the measures are restricted to mechanical removal of the mussels and that no chemical means were used. CNSC staff added that accumulation of mussels was limited to the water intake part and did not affect the interior of the cooling system.

9. A Bruce Power representative noted that they use a traveling screen to clean accumulated shells of zebra mussels off the bottom of the intake channel. Some of those shells get into condenser tubes forcing them to reduce steam production, which allows opening of the condenser and online cleaning. The Bruce Power representative explained that, since

the power reduction is not caused by the reactor but rather by the condenser, the power reduction results in smaller output but keeps the operation within the design parameters. CNSC staff stated that they were satisfied with the applied measures.

10. The Commission asked for more information regarding the issues with accumulation of zebra mussels at the NPPs located on Lake Ontario. The OPG representative responded that the other nuclear generating stations have the same issue and that programs are in place to monitor the accumulation of zebra mussels. They use both the mechanical removal and chlorination to ensure that the pipe network remains free of zebra mussels. OPG regularly removes zebra mussels on the intake channel at the Darlington site and has started a dredging program at the Pickering site.

11. The Commission enquired about the level of chlorination. The OPG representative responded that water is chlorinated during certain periods of the year and that they also use de-chlorination before the water is returned to the lake, so that the released water quality meets the requirements of the Ontario Ministry of Environment.

12. The Commission asked if the use of chlorine had any effects on cooling systems. The OPG representative added that the use of chlorine inhibits the fouling of heat exchangers.

13. The Commission sought more details regarding heat transport leak at Bruce B NGS Unit 5 and workers' potential exposure to tritium. The Bruce Power representative responded that the workers in protective gears who were repairing the leak had received a maximum dose of 0.46 mSv (millisieverts), well below regulatory limits.

14. The Commission asked whether the refuelling at Point Lepreau NGS has returned to normal. CNSC staff responded that the station had been derated due to the fuelling problem related to fuel channel closure plug issues. Currently, as a result of the proposed solution to modify closure plugs, the refuelling of the reactor follows a normal timeline and there is no impact on normal operation of the station.

15. The Commission asked whether the defueling of the reactor was completed. CNSC staff responded that the completion was expected by the end of August.

*Presentation by Ontario Power Generation Inc. on Black Deposits on Fuel at Pickering NPP Unit 1*

16. The Commission also heard from the Ontario Power Generation Inc. (OPG) representatives, who presented the update on the current status of their activities regarding the formation of black deposits on reactor fuel bundles in Unit 1 of the Pickering NPP (CMD 13-M41.1). The OPG

representative informed the Commission that the deposits were noticed in 2005 following Unit 1 return to service and that the largest amount of deposit was observed in 2012 on one specific fuel bundle. The OPG representative noted that a formation of light deposits is expected under normal operation, and that they had adjusted acidity in the heat transfer system to minimize formation of the deposit. The OPG representative explained that these porous, easily removable deposits were composed primarily of iron oxide and that they originate from the corrosion of carbon-steel components of the heat transport system. The deposits did not cause deformation of fuel bundles and there was no indication of corrosion of fuel sheath.

17. With respect to observation of heavier deposits, the OPG representative further informed the Commission that OPG had initiated a technical operability evaluation (TOE) and performed safety assessment to determine potential impact of the deposits on the heat transfer from fuel to coolant, and to evaluate the safety of continued operation of Unit 1. For analysis purposes, the surface of the fuel bundle was assumed to be entirely covered by the deposit, and the estimated impact on the heat transfer capability was less than three percent. The results of all these analyses have shown that Unit 1 could continue to safely operate at full power. Following additional inspections at the Chalk River Laboratories, a number of corrective actions were implemented. These actions included further lowering of acidity in the heat transfer system to prevent corrosion, improved filtration and removal of black deposits, and tighter controls of ion exchange columns and filter changes. In addition, a trip point penalty of 1.5% was applied, and CNSC staff imposed a 97% full power limit on Unit 1.

18. The OPG representative stated that the applied measures have resulted in a noticeable reduction in deposits and that further improvement was expected to occur slowly, due to the large chemical inertia of the system. The OPG representative concluded that their corrective actions were effective, and noted that OPG will submit a request to the CNSC to remove the full power penalty with clear monitoring requirements and control points.

*Commission's Questions regarding Black Deposits*

19. The Commission enquired if the corrective actions would result in returning to the amount of deposits typical for the period before 2008, and, if so, how long would the process take. The OPG representative responded that they are confident that the situation will return to normal. Due to the low flow and inertia of the system, it would take time for the corrective actions to take effect, and a full recovery might take years. However, OPG will soon request an approval to return to full power since there is no impact on normal full power operation and there is an adequate safety margin even with a very conservative and unlikely assumption that the bundle might be entirely coated with the deposits.

20. CNSC staff responded that they were satisfied with the steps implemented by OPG and with the positive trends in reducing formation of the deposits. CNSC staff added that they were awaiting a written request to return the unit to full power operation. CNSC staff expects an implementation of stringent inspections and acceptance criteria that would enable them to judge the acceptability of the size of the deposits from a safety standpoint. CNSC staff expressed their opinion that the formation of the deposits is related to aging and could not be completely eliminated.

21. The Commission enquired about the reason that larger deposits have been observed only on Unit 1. The OPG representative confirmed that the other units did not experience similar deposition and responded that Unit 1 had different shutdown history, shutdown chemistry control and different ageing of ion exchanging columns, all of which contributed to iron oxide formation.

22. The Commission asked for how long the lowered trip point will stay in effect. The OPG representative responded that the lower trip point will stay in effect until the black deposits at Unit 1 become normal and of the same size as in all the other units.

23. The Commission enquired about the potential downsides, risks and limits associated with lowering coolant acidity (by increasing its pH), and how big these changes in acidity are. The OPG representative responded that the undertaken adjustments were very small so that there was no downside, and no negative effects or risks associated. The changes in pH values were between 10.1 and 10.4. The OPG representative added that they have observed a slow decrease in deposits following careful, step-by-step pH adjustments, and that the deposits did not move or spread to other bundles. CNSC staff commented that the flow distribution around the bundle might play a role in formation of the deposits and noted that some kind of flow visualisation studies might prove helpful in shedding more light into the process.

24. The Commission sought more information regarding annual trends of formation of the black deposits at Unit 1, noting rapid changes in deposition rate in 2009 and 2012. The OPG representative responded that the unit had been returned to service in 2005 and went through substantial outages during which the outage chemistry and the online chemistry control were not sufficient to prevent increased formation of the deposits. The OPG representative mentioned again that, due to slow processes, it takes time to arrest and reverse any trend in formation of the deposits.

Event Initial Report (EIR)

Ontario Power Generation Inc.: Manual Shutdown at Pickering Units 1 and 4 on June 1, 2013

*CNSC Staff Presentation*

25. With reference to CMD 13-M42, CNSC staff presented information regarding the shutdown of units 1 and 4 at the Pickering nuclear generating station (NGS). During a System Engineering Environmental Qualifications (EQ) walk-down, conducted by Ontario Power Generation Inc. (OPG) on June 1, 2013, a number of EQ electrical connectors were found misaligned. OPG initiated a technical operability evaluation (TOE) in order to ensure proper alignment of the connectors throughout the station. During this evaluation, 461 connectors were inspected across all eight units of the NPP. Three connectors on Unit 1 and two on Unit 4 were found misaligned. OPG conservatively decided to shut down the units and took appropriate measures in order to protect the public, workers and the environment. Units 1 and 4 were manually taken off-line on June 5, 2013, following an established procedure, to complete repairs and inspect connectors in all inaccessible areas, and no connectors were found misaligned. A total of 559 connectors were inspected. Unit 5, which was in an outage at the time, was also inspected and no connectors were found misaligned.

26. CNSC staff reported that, during the shutdown of units 1 and 4, OPG had performed the EQ inspections and completed all required repairs. CNSC staff added that, although the safety significance of this event is low, the deficiencies of the program sustainability were taken very seriously by CNSC and OPG staff. Consequently, OPG initiated a root cause investigation on the event.

27. CNSC staff further reported that OPG plans to implement corrective actions and that CNSC staff has been monitoring OPG's progress through meetings and routine updates. CNSC staff will review the root cause investigation report and final technical operability evaluation.

28. CNSC staff noted that the members of the public and workers had not been affected by the event.

*Commission's Questions*

29. The Commission enquired about the nature of the misalignment. An OPG representative demonstrated the connector and showed how its two parts have to be assembled to align two red dots in order to ensure that connectors meet the environmental qualification capability. The OPG representative added that the connectors were electrically performing their function during normal operation, but the misalignment was indicating that they were not air tight nor protected

against potential ingress of steam or water under accident conditions.

30. The OPG representative added that the event had been taken seriously in terms of the quality of maintenance performed. Preliminary findings indicated an inadequate verification. An independent verification and necessary training requirements have been included in the procedure to assure that connectors are properly aligned and to prevent similar errors being made in the future by the maintenance personnel.

31. The Commission asked about connectors used in other NPPs. CNSC staff responded that exactly the same connectors were used, and that an EQ program is a generic one that applies to the entire industry. CNSC staff added that similar issues had not been noticed during routine inspections at other facilities, and that no similar events had been reported. The OPG representative added that they had inspected connectors installed in the Darlington NPP and found no misalignments. The OPG representative noted that Darlington has a procedural difference, so that a concurrent verification is included in the procedure to make sure that connectors are aligned.

32. The Commission asked about the frequency of walk-downs, and whether the misaligned connectors were in inaccessible areas. The OPG representative responded that the walk-downs take place on a regular basis during unit outages as part of engineer system health walk-downs in conjunction with maintenance. The connectors are not disturbed during these walk-downs. The connectors would only be disturbed when calibration of transmitters is required, which is normally done in intervals of two to three years. The misaligned connectors were in the accessible areas.

33. The Commission enquired about potential safety effects of improper operation of the connectors. The OPG representative responded that there was no direct safety impact as a result of these connectors being misaligned since they are redundant to other pieces of equipment. However, the issue of them not being fully aligned was that during accident conditions there was no assurance that they would perform correctly in cases of steam or water ingress.

34. The Commission asked about colour blindness testing and qualification of engaged employees. The OPG representative responded that the highest qualification, which includes testing for colour blindness, is a requirement for shutdown system qualified control maintainers, since they are involved in terminating cables and wires in a colour sequence.

<u>Les Laboratoires d’essais Mequaltech Inc.: Overexposure of a Member of the Public</u>

*CNSC Staff Presentation*

35. CNSC staff reported on an incident that occurred May 2, 2013 involving Les laboratoires d'essais Mequaltech Inc., Montreal, Quebec, (Mequaltech) where a worker received a radiation dose of approximately 7 mSv (millisieverts), which exceeds the CNSC regulatory dose limit of 1 mSv per year for a member of the public.

36. CNSC staff noted that the worker who received the dose was not a Nuclear Energy Worker (NEW), therefore the dose limit for a member of the public is applicable. In addition, since radiography operations present greater radiological risks in comparison with other CNSC regulated activities, regulatory dose limits are set at 0.1 mSv per week and 0.5 mSv per year for members of the public who are near radiography operations.

37. CNSC staff summarized for the Commission the timeline of events relating to the incident:
    - May 2, 2013: overexposure event occurred at H.C. Vidal Limited facility
    - Event reported to CNSC staff by Mequaltech immediately, as required
    - CNSC staff confirmed overexposure
    - Report submitted by Mequaltech within 21 days of the event, as required
    - June 18: Meeting held between CNSC Laval office staff and Mequaltech president. CNSC staff clearly outlined expectations to prevent recurrence
    - June 21: Mequaltech submitted corrective action plan to the CNSC
    - July 31: CNSC staff conducted an inspection at Mequaltech to verify implementation of corrective actions.

38. CNSC staff indicated that they are satisfied that appropriate corrective actions have been taken by Mequaltech and noted that further unannounced inspections will be undertaken to verify compliance with corrective actions. CNSC staff added that a recommendation to decertify the Certified Exposure Device Operator (CEDO) involved in the incident has been forwarded to the Personnel Certification Division at the CNSC.

39. The Mequaltech representative, the company's Radiation Safety Officer (RSO), stated that Mequaltech is an industrial radiography company licensed by the CNSC to conduct radiographic exposures for metal fabrication clients. The Mequaltech representative indicated that the company has existed for 25 years and has 90 employees in Montreal, Quebec and Bécancour, Quebec – of which 42 are NEWs.

40. The Mequaltech representative outlined the procedures used in the work and provided details of the overexposure incident.

41. The Mequaltech representative stated that on May 2, 2013, the CEDO was at a client's workplace, H.C. Vidal Limited, and made preparations to conduct radiography work on a large diameter pipe. The CEDO knew that a worker was inside the pipe and informed the worker that the test would take place. The CEDO erected a security perimeter but did not visually verify that the worker had left the interior of the pipe prior to conducting the radiography. When the CEDO went to retrieve the film inside the pipe, he saw that the worker was still inside. The CEDO realized that the worker had been exposed to a dose of radiation, informed the worker of this, and contacted the radiation safety officer at Mequaltech, who in turn immediately notified the CNSC.

42. The Mequaltech representative indicated that the radiation exposure was limited by the short duration of the exposure (two minutes), the shielding provided by the pipe wall (12.7 mm), and the distance from the worker to the exposure device (approx. 70 cm).

43. The Mequaltech representative informed the Commission that the company issued a verbal warning to the CEDO and filed a report with the CNSC immediately. The company also contacted the exposed worker to discuss the event and to let the worker know that there would likely be no health effects resulting from the incident.

44. The Mequaltech representative outlined steps he has taken as a result of the incident. The representative stated that he brought together all the company's CEDOs and informed them of the incident and their roles and responsibilities, he conducted a number of unannounced audits on the shop floor – four on the operator involved in the incident, and conducted awareness sessions with Mequaltech workers and clients regarding radiation hazards.

*General Questions*

45. The Commission asked how the dose of 7 mSv was calculated. CNSC staff responded that this dose was calculated using information provided by the licensee on the radiation characteristics of the source, its activity level, the distance away from the worker and the wall thickness of the pipe.

46. The Commission asked to see a photo of the subject pipe and was informed by the Mequaltech representative that this is proprietary information that would not be shared by the company that owned the pipe. CNSC staff indicated that, according to the information provided by the licensee, the pipe was 3 feet, 9 inches in diameter.

47. The Commission sought information on what the employee was doing inside the pipe. The Mequaltech representative indicated that the employee was marking the interior of the pipe for future work. With respect to the incident, the Mequaltech representative indicated that the

CEDO claimed to have yelled a warning to ensure that everyone was clear but the worker inside the pipe apparently did not hear. The Mequaltech representative also indicated that the CEDO walked around the perimeter of the pipe to verify that work could commence but did not go inside, and this was the key mistake.

48. The Commission asked about where inside the pipe the worker was at the time of the radiography. The Mequaltech representative indicated that the worker was about 16 inches away from the film inside the pipe.

49. The Commission sought clarification on whether the type of work involved in the present event is common. The Mequaltech representative indicated that the company often does this type of work. The Mequaltech representative clarified that there are 46 employees in the company's nuclear sector, but that only 18 work as CEDOs conducting the type of work discussed.

50. The Commission enquired about the training for CEDOs. CNSC staff indicated that prior to granting a licence, CNSC staff conducts an assessment of the licence application to determine that the applicant has an adequate training program in place to ensure that the workers are competent to undertake the work to be conducted under the licence. Workers who wish to become CEDOs need to pass an exam administered by Natural Resources Canada before they can apply to the CNSC to be certified as CEDOs. The designated officer at the CNSC responsible for CEDO certification will take into consideration all the information on the person's training and the results of the examination to determine if the person is qualified. If so, the designated officer certifies the person as a CEDO.

51. The Commission asked about CNSC follow-up to ensure that training is maintained. CNSC staff indicated that, during inspections, CNSC inspectors verify training documentation and observe the workers performing their work on site to ascertain that they follow established procedures as per the licence.

52. The Commission enquired about the number of CNSC inspections that have been carried out at Mequaltech. CNSC staff responded that since 2008, about 15 had been conducted. CNSC staff noted that no non-compliances had been noticed regarding training of workers.

53. The Commission sought clarification on the comment from the Mequaltech representative that some people pass under protective barriers erected to separate an area where radiography is to occur from the rest of the workplace. The Mequaltech representative indicated that some people at the client's facilities still do not take the barriers seriously and will cross a barrier, in spite of the danger, for minor reasons such as to retrieve a piece of equipment.

54. As a follow-up, the Commission asked if there was a means in place to ensure that employees would not bypass a protective barrier. The Mequaltech representative remarked that he holds many staff meeting on the subject of following safety rules regarding barriers and that, in the future, employees who do not comply will be discharged. The representative added that Mequaltech takes this issue seriously and that safety briefings are also conducted for clients' employees and the public.

55. The Commission enquired if a report had been filed with the *Commission de la santé et de la securité du travail du Québec* (CSST). The Mequaltech representative stated that to his knowledge such a report was not filed. The Commission encouraged reporting since a follow-up would then be put in place on the employer.

56. The Commission asked about dosimetry for Mequaltech workers. The Mequaltech representative indicated that the goal is to keep exposures to NEWs under 1.6 mSv per month or 0.4 mSv per week, and that this is sometimes difficult because of the nature of the work.

57. The Commission sought clarification on the decertification of the CEDO at Mequaltech. CNSC staff responded that the CEDO has not yet been decertified because the process is still underway. The CEDO has been given an opportunity to be heard by the CNSC designated officer, which was planned for the last week of August. The designated officer will render his decision afterwards[1]. CNSC staff added that decertified persons could go through the CNSC certification process again if they wish to be certified again as CEDOs.

58. The Commission asked if this file could now be closed. CNSC staff stated that the file can be closed since CNSC staff is satisfied with the corrective measures taken and those currently in place at Mequaltech. CNSC staff added that if further issues arise, the matter would be addressed and the Commission would be informed as needed.

Atomic Energy of Canada Limited
*Spill of Heavy Water at Chalk River Nuclear Laboratories*

59. CNSC staff provided an update for the Commission on a spill of heavy water at Atomic Energy of Canada Limited's (AECL) National Research Universal (NRU) reactor located at the Chalk River Laboratories, Chalk River, Ontario.

60. CNSC staff indicated that a spill of heavy water occurred on August 20, 2013, from a fuel rod flask at the storage block area within the NRU. CNSC staff explained that the fuel rod flask is equipment used for

[1] CNSC staff confirmed in November 2013 that the CEDO was provided with corrective training. An exam was given to this employee to verify the effectiveness of the training. This exam was being corrected and the DO will render his decision on possible decertification after the results of this exam have been received.

fuelling the reactor. CNSC staff reported that the majority of the heavy water was contained inside the reactor building but that approximately 11 litres was captured in the ventilation system and released from the NRU stack. AECL reported to CNSC staff that tritium releases were well below administrative or action levels. CNSC staff stated that AECL took immediate action to contain the leak and immediately reported the incident to the CNSC. CNSC on-site inspectors verified that appropriate actions were taken to protect workers and the environment and CNSC staff will continue to monitor the situation at the facility.

61. CNSC staff stated that the event will be posted on the AECL website as well as on the CNSC website for public information and that this verbal update would be complemented by a written report once more information is obtained.

62. The Commission enquired if the leak was related to past corrosion at the facility. CNSC staff indicated that the leak was not from corrosion but from the fuelling machine itself.

63. The Commission sought information about the root cause of the event. CNSC staff indicated that they do not yet have this information and will ask for a root cause analysis if needed. CNSC staff indicated that a written update would be provided to the Commission.

**ACTION**
by
February
2014

Atomic Energy of Canada Limited
*Reporting of Dose Records to the National Dose Registry*

64. CNSC staff gave the Commission an update to their May 15, 2013, presentation to the Commission on the discovery of dose records that had not been reported to the National Dose Registry (NDR) by Atomic Energy of Canada Limited's (AECL) Dosimetry Service.

65. CNSC staff noted that, on May 8, 2013, AECL submitted the final report to the Commission indicating that 1,650 dose records had not been reported to the NDR. CNSC staff reported that, since then, all doses have been submitted to the NDR.

66. The AECL report identified three corrective actions: one has been completed and the remaining two will be completed on September 30, 2013. CNSC staff added that they accepted AECL's proposed corrective actions and will be conducting an inspection of AECL's dosimetry services in November 2013 to confirm completion of the action items.

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67. The Commission enquired about record-keeping at Health Canada (HC). CNSC staff reported that, under a Memorandum of Understanding with HC, quarterly meetings are held regarding the dose registry. CNSC staff added that they have full access to the National Dose Registry records but owing to privacy issues, access is not currently available online. The

current process is that CNSC staff submits a request and HC provides the information in a timely fashion. CNSC staff added that, as a consequence of recent changes to the database system, there is extensive quality assurance and quality control that is being performed of the records by HC on the new system and the receipt of the doses into the system.

68. AECL has committed to assess the effectiveness of their corrective measures within six months of their implementation. CNSC staff will review the report and take further action if necessary. CNSC staff intends on submitting a final report to the Commission when all actions have been completed. **ACTION** by February 2014

INFORMATION ITEMS

CNSC Staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2012

*CNSC Staff Presentation*

69. With reference to CMD 13-M30, CNSC staff presented their annual report "*CNSC Staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2012*" (2012 NPP Report). The report encompasses the results of CNSC staff's analysis of safety performance of the Canadian nuclear power industry as a whole, as well as performances of each NPP, including Bruce A and B, Darlington, Pickering A and B, Gentilly-2 and Point Lepreau.

70. CNSC staff reported that the year 2012 started with 17 and ended with 19 operational reactor units, and noted that Bruce A Units 1 and 2 have restarted after undergoing refurbishment, as well as Point Lepreau, which was relicensed during the past year. CNSC staff added that the Gentilly-2 NPP was operational throughout 2012, and had been shut down and ended its commercial operation in December 2012.

71. CNSC staff evaluated how well, during the past year, the NPPs were meeting regulatory requirements and expectations for the performance of programs in the following 14 safety and control areas (SCA):
    - 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.

72. Based on their inspections, reviews and assessments, CNSC staff concluded that the NPPs operated safely during the year 2012. CNSC staff reported the following observations to support this conclusion:
    - there were no serious process failures at the NPPs;
    - no member of the public received a radiation dose that exceeded the regulatory limit of 1 mSv/y (millisievert per year);
    - no worker at any NPP received a radiation dose that exceeded the regulatory limits of 50 mSv/y or 100 mSv over 5 years;
    - the frequency and severity of non-radiological injuries to workers was minimal;
    - no radiological releases from the NPPs exceeded the regulatory limits; and
    - NPPs had complied with their licence conditions concerning Canada's international obligations.

73. CNSC staff reported that none of the licensees received ratings of "below expectations" or "unacceptable", neither for integrated plant ratings (IPR) nor for any specific SCA rating. CNSC staff further reported that the IPRs in 2012 were "fully satisfactory" for the Darlington NPP and "satisfactory" for all other NPPs. CNSC staff noted that most of the licensees received "fully satisfactory" ratings for their performance in the "conventional health and safety" SCA. CNSC staff provided a detailed performance evaluation for each NPP and resulting ratings by each SCA, and concluded that the nuclear power industry continues to make improvements in their operations.

74. CNSC staff further reported that 12 CANDU safety issues, out of the original 21, were pending by the end of 2012, and that it was expected that most of the remaining issues would be resolved by the end of 2013. With respect to the impact of ageing on the safe operation of CANDU reactors, CNSC staff reported that Bruce Power and OPG had completed all major activities regarding neutron overpower protection methodology and affirmed that the current trip set points are adequate. In addition, the industry had initiated the full channel life management project to investigate the possibility to use the pressure tubes beyond their design life.

75. CNSC staff informed the Commission about the challenges that are addressed by the industry and which stem from their operating experience and lessons learned. These challenges include implementation of long-term radiation protection program improvements through alpha monitoring enhancements, monitoring of ageing structures, systems and components, and the industry's response to the Fukushima Daiichi accident.

76. CNSC staff included in their report performance comparisons between Canadian licensees and other national and international organizations. The comparisons were based on the following performance indicators:
    - number of unplanned reactor trips;
    - unplanned capability loss factor;
    - accident frequency;
    - estimated annual dose to the public; and
    - effective dose to workers.

    CNSC staff concluded that the Canadian nuclear industry continues to remain a safe industry in terms of workplace safety, as well as in protecting the public and the environment from radiological releases.

*Comments by Licensees' Representatives*

77. The Commission sought the views of the licensees on the 2012 NPP Report. The representative from Bruce Power stated that this annual industry report is a useful and transparent way of rating and comparing the performance of the facilities, and underlined benefits of international benchmarking.

78. A representative from OPG stated that OPG considers the report to be an excellent opportunity for the CNSC to demonstrate and document the safety of Canadian NGS facilities, and talked about some of the significant regulatory activities that are on their way or had been completed by OPG.

79. The representative from Hydro-Québec expressed their satisfaction with the report as a tool for continuous improvement of their activities and emphasized a constructive role of CNSC staff in transition of the Gentilly-2 NGS from full power operation to safe shutdown state.

80. The representative from New Brunswick Power (NB Power) also expressed satisfaction with the report and noted that, in 2012, they had completed the station refurbishment project, obtained the renewal of the operating licence and returned the station to commercial operation.

*General Questions*

81. The Commission enquired on CNSC staff's rating methodology and asked how appropriate is a comparison of performance and safety of operation between a NGS with eight operational units and a NGS having just one or four units. CNSC staff responded that the assessment is based on several hundreds of inspection findings, desktop reviews and additional assessments. Since the number of findings is very similar on a per unit basis, the process represents well the performance of a single-unit station versus multi-unit stations.

82. The Commission sought more details regarding quantitative values of rating parameters and asked about the nuance between "satisfactory" and "fully satisfactory" ratings. CNSC staff explained that the currently applied rating process had been developed and implemented about five years ago and includes quantitative ratings of results obtained through inspections, reviews and assessments categorized in 14 SCAs. The obtained results are then included in calculations to yield a numerical mark, in the percentage form, for each SCA. The "satisfactory" rating thus corresponds to a result between 60% and 80% and the "fully satisfactory" would correspond to a result above 80%. To obtain 60%, a licensee should meet all applicable regulatory requirements, while 80% means meeting most of the guidance imposed by the CNSC, in addition to the regulatory requirements.

83. Commenting on comparison between NPPs, the Commission asked for the reason why some data, such as average dose, accident frequency or waste management, had not included the same comparators for international benchmarking in the 2012 NPP report. CNSC staff responded that their approach to the use of performance indicators is evolving, and will include more international performance indicators in the future so that the international comparison would expand significantly.

84. The Commission asked whether the same criteria have been used for comparison of reactor performances (such as unplanned reactor trips) throughout international community represented by World Association of Nuclear Operators (WANO) members. CNSC staff responded that the safety criteria are the same, but the specific set-points could be different, depending on the type of reactor. On this respect, the principle of an automatic safety system and the comparison criteria are independent of technology, reactor type or age.

85. The Commission asked about the method for estimation of radiation doses to the public and degree of confidence that CNSC staff have regarding the obtained values. CNSC staff responded that the basis for estimation is an amount of radio-nuclide that would be released to the environment to cause 1mSv dose[2] to a person having a lifestyle leading to the maximum exposure. To estimate an actual dose, the used models encompass the source of the radio-nuclide, how it was released to the environment, the behaviour of that radio-nuclide in the environment, and knowledge on propagation of the radionuclide through the atmosphere, the soil and the vegetation to eventually reach and expose people. The needed information is obtained through the licensees' monitoring programs based on the CSA standards. These monitoring programs are reviewed and accepted by the CNSC. The contribution of radio-nuclides which are released in such low levels that are not detectable in the environment is conservatively estimated from the

[2] One millisievert is the regulatory dose limit for a member of the public.

levels measured at the stack. CNSC staff also verify and inspect monitoring programs and their implementation, as well as measurement results to ensure that they are accurate and representative.

86. The Power Workers' Union, in their intervention, suggested that CNSC staff include in the 2012 NPP Report a paragraph recognizing the union's contribution to radiological and conventional safety at Bruce Power and OPG sites. The paragraph should state that the union have negotiated provisions that exceed the regulatory requirements such as the unilateral right of certified Joint Health and Safety Committee (JHSC) members to shut down unsafe work. The Commission asked OPG and Bruce Power to comment on this statement. The OPG representative confirmed the statement and noted that OPG sees that as an important part of employees' right to safe work. The OPG representative added that the company would take appropriate management response to identified safety issues. The Bruce Power representative noted that, under the *Ontario Health and Safety Act*[3], any employee has the ability to refuse work on grounds of safety. The Bruce Power representative recognized the role of JHSC and added that this note deals with management of safety principles, policies and arrangements that affect the whole site.

87. The Commission sought more information about CNSC staff's expectations or requirements regarding safety culture self-assessments. CNSC staff pointed out that they are not trying to enforce a proper safety culture, but rather to promote it by developing certain guidelines for the self-assessment of the safety culture. The expectations had been shared with the licensees in 2004, and currently CNSC staff receive self-assessment results and analyze and review them as part of regulatory oversight functions. CNSC staff stated that they were preparing a regulatory document (REGDOC) on safety culture and discussing appropriate indicators that would formalize their expectations into regulatory requirements. In parallel with the REGDOC development, CNSC staff is working on developing an oversight strategy at the CNSC to better understand the licensees' own perception of their organizations and actions related to safety culture.

88. The Commission enquired whether the ongoing discussions related to probabilistic safety assessment (PSA) would be concluded before the hearings in 2014 for licence renewals for Darlington and Bruce NGSs. CNSC staff responded that the discussion should be finished by that time and noted that the only challenge related to PSA that existed at the time of finalization of the 2012 NPP Report had been to make sure that Pickering A will complete the PSA by December 2013.

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[3] Revised Statute of Ontario, RSO. 1990, c o.1

89. The Commission sought more information from the licensees regarding their non-fuel radioactive waste management programs. The Hydro-Québec representative responded that they have adequate storage capacity on site for the waste that would be produced during the following years, until the end of dry safe storage period. The OPG representative stated that the waste generated throughout the refurbishment is either stored at OPG facilities or transferred to OPG's nuclear waste management facility at Kincardine. OPG intends to transfer low and intermediate-level waste that could be generated during decommissioning, to the low and intermediate-level waste deep geologic repository that is currently going through the regulatory approval process. The NB Power representative informed the Commission that their low and intermediate wastes are currently stored at NB Power's on-site solid radioactive waste management facility and that the low-level waste goes through a volume reduction process.

90. The Commission sought clarification regarding licensees' research and development programs and asked if any of these programs were related to or triggered by safety issues. CNSC staff responded that there were no safety issues involved and that the research programs were initiated to investigate opportunities for improvements and opportunities to reconfirm that existing safety margins are still adequate.

*Commission's Questions regarding the Bruce NPP*

91. The Commission enquired about the safety performance of Bruce Power and their maintenance backlog, the place of maintenance backlogs in the overall picture and how important these are for the fitness for service of an NPP. CNSC staff responded that maintenance is one of the parameters that show how a plant operates. From a safety perspective, priority on maintenance is given to essential issues. CNSC staff stated that, in the case of Bruce Power, the maintenance backlog does not include any critical issue. CNSC staff added that Canadian NPPs are using guidelines similar to those used internationally, so that observations by WANO are similar to the findings of CNSC staff. The Bruce Power representative pointed out that the industry uses a parameter called the equipment reliability index as a good indicator for reliable operation of a plant, and noted that this index might be one benchmark that would prove good for comparison.

92. Referring to the mentioned challenges related to qualification of sufficient number of licensed operators and the number of certified positions, the Commission asked if the requirements regarding the minimum staff complement were too low. The Bruce Power representative responded that the requirements were not too low, and that the recruitment was not a problem. However, the qualification process is difficult and long, and prospective candidates could enter it only after two years of serving as plant operator. CNSC staff explained that the minimum complement is based on normal function, normal

operation and also on event response. CNSC staff added that the number of certified staff at a site is often higher than the minimum shift complement requirements due to a need for extra coverage, and noted that the minimum shift complement is also composed of some other work groups such as maintainers and emergency response people.

93. The Commission asked if Bruce Power had tried to hire some of Gentilly-2 employees that might become available. The Bruce Power representative responded that they had spoken to Hydro Québec and had already recruited a few of their employees, but one of the challenges had been the need for re-certifying these operators at the Bruce Power site.

94. The Commission enquired about hours of work limits being surpassed at the Bruce NGS. The Bruce Power representative responded that the case was related to the Bruce A operation, and had been caused by the increased number of operational reactors on site and length of training procedure for certified operators. The issue was not related to scheduling people to work extra hours, but rather to unexpected events.

95. The Commission asked whether the limit of hours of work was a federal law. The Bruce Power representative responded that the rotating 12-hour shifts, with precisely defined time off between shifts, was a CNSC requirement. The Bruce Power representative noted that there are provincial requirements on hours of work, but not as precise.

*Commission's Questions regarding the Point Lepreau NPP*

96. The Commission asked whether the number of shift supervisors at Point Lepreau NGS provides for a sufficient margin for safe operation. The NB Power representative responded that the minimum required number is six supervisors while they currently have seven of them. Three trainees are expected to be certified in early spring 2014.

97. The Commission sought clarification regarding CNSC staffs' statement on NB Power continuing to progress on the transition to compliance with the safety analysis requirements and Regulatory Document RD-310, *Safety Analysis for Nuclear Power Plants*. CNSC staff explained that RD-310 is the new regulatory document which is establishing safety assessment requirements for CANDU reactors to be consistent with international practice. The safety analysis would have to be revised in order to meet RD-310 and, as a starting point, a gap analysis should be done. CNSC staff noted that there were no specific issues related to the safety of the operation of CANDU reactors other than consistency with international practice. CNSC staff introduced this document in order to create a consistent approach for operating reactors and those which will be licensed in the future. The NB Power representative added that, as part of a plant refurbishment, they have performed a gap assessment. RD-310 is the next generation of safety analysis standards

and it is not yet a licence requirement.

98. The Commission enquired whether this job could have been completed during the refurbishment. CNSC staff stated that the deterministic safety analysis has been revised during the refurbishment project to account for all new design features and procedure improvements, and that, in the case of NB Power, this document is only referenced in the Licence Condition Handbook as an expectation. CNSC staff added that no physical changes are required and that this is the assessment of existing design feature using new criteria. NB Power concurred with this explanation.

99. The Commission asked if the Point Lepreau NGS has encountered problems related to saltwater mussels in the Bay of Fundy. The NB Power representative responded that they carry out a regular cleaning program for their condenser cooling water, the condensers, as well as for the raw service water. They also periodically inspect the intake bay and do cleaning as needed.

*Commission's Questions regarding the Pickering NPP*

100. The Commission asked how the single licence for Pickering NGS would be reflected in the future reporting and historical comparison of the facility's performance. CNSC staff responded that the future reports would have only one rating for the entire Pickering site, and that, for comparison purposes, the averaging of previously reported ratings would be sufficient to establish trends.

101. The Commission enquired about reliability issues with the fuelling machine at Pickering A and B, and asked how significant the issue was and when would the performance improve. A representative from Pickering NGS responded that the loss of fuelling capability on either the B units or the A units results in derating and contributes to unplanned capability loss factor. They have estimated this effect to be about two percent. The Pickering representative added that a reliability improvement of the fuelling machines was already noticeable on Units 1 and 4, and that the same improvement program has been applied recently on Units 5 and 8.

*Commission's Questions regarding the Gentilly-2 NPP*

102. The Commission enquired about the reasons for the annual doses to the workers at Gentilly-2 NPP being higher than at the other nuclear generating stations. The representative from Hydro-Québec responded that they used new software in 2012 to establish annual doses, and stated that, according to their results, the increased doses originated mainly from emissions of tritium and carbon isotope $C^{14}$. The 10 % increase in tritium emission was from a large leak of moderator in 2012, which has been resolved.

103. The Commission asked whether Hydro-Québec intends to withdraw from the CANDU related research and development programs financially supported by Hydro-Québec, NB Power, Bruce Power and OPG. The representative from Hydro-Québec responded that, since the Gentilly-2 NGS will be closed, the company will withdraw itself from most of the research and development programs. However, the company will maintain relationships with the industry and will participate in programs important for their decommissioning activities, such as pools for storage of fuel bundles.

104. The Commission asked about the timeline for submission of the decommissioning plan and revised financial guarantees for the Gentilly-2 NGS. The Hydro-Québec representative responded that the documents would be finalized and financial guarantees secured by the beginning of 2015.

105. The Commission sought clarification of CNSC staff's statement that they had not conducted any inspection of fire emergency preparedness and response in Gentilly-2 NGS because of the decision to end commercial operations and transition to safe shutdown. CNSC staff explained that the risk still exists and a fire protection program has to be fully effective. However, the risk has been lowered by the fact that the station is not operating anymore and is in the process of defueling. The Hydro-Québec representative stated that there had been some organizational changes and the training program related to the fire protection and emergency response had been adapted to the new operational status of the facility where the potential consequences are much smaller than previous.

106. The Commission enquired about the monitoring of the concrete structure of the Gentilly-2 containment. CNSC staff responded that they were discussing the maintenance program and noted that the requirements in the future would be different from the current licence requirements. The Hydro-Québec representative added that the reactor building would no longer be underpressurized, since there will be no reactor fuel in its interior, and within a year it would not contain volatile radioactive products any more. Consequently, the requirements for maintenance would be changed and focused to the structural integrity of the building.

107. The Commission further enquired about the ageing management program in Gentilly-2 NGS. CNSC staff responded that the program would be reduced to systems that would remain functional.

108. The Commission asked about measures that Hydro-Québec intends to apply in order to reduce accident frequency in the Gentilly-2 NGS, which is higher than in the other NGSs. The Hydro-Québec representative informed the Commission about numerous measures that

they have already introduced in 2012, and noted that these measures have resulted in visible improvement and reduction in the number of injuries in the second part of 2012. The improvement trend has continued in 2013 with 115 days without lost time accidents.

*CNSC Staff Presentation on the Industry's Response to the Fukushima Accident*

109. In its oral presentation, CNSC staff provided information concerning the industry's response to the Fukushima accident, and stated that all licensees had made satisfactory progress in implementing the Fukushima action items (FAIs). The FAIs had been established to address the recommendations of the CNSC Fukushima Task Force regarding improvements and enhancements to Canadian NPPs in response to the Fukushima accident. These enhancements are intended to ensure that sufficient defence-in-depth margins are present in the areas of external hazards such as seismic events, flooding, fire and extreme weather events, measures for prevention and mitigation of severe accidents, and emergency preparedness. To address the CNSC Task Force recommendations, the CNSC developed a four-year *CNSC Action Plan* to be implemented by licensees and CNSC staff, with the following elements:
    - strengthen reactor defence-in-depth;
    - enhance emergency response;
    - improve the regulatory framework; and
    - foster international collaboration.

    This action plan included short-term, medium-term and long-term FAIs with an implementation timeline comprising the deadlines by December 2012, December 2013 and December 2015, respectively. CNSC staff noted that this approach reflects a shift in regulatory focus from prevention of design basis accidents to prevention of beyond design basis accidents and mitigation of severe accident consequences.

110. CNSC staff reported that all 18 short-term FAIs had been closed for Bruce Power and OPG by the end of 2012, and were either closed or being reviewed for closure for the other licensees. CNSC staff added that this status was consistent with the deadlines established in the *CNSC Action Plan*, and that the Canadian nuclear power industry was on track to complete all FAIs by December 2015, as planned.

111. CNSC staff added that, in response to specific Fukushima action items, all NPP licensees provided updated evaluations of their reactor pressure relief capacity. This evaluation confirmed that the relief valves would provide adequate relief during design basis and beyond design basis accidents. CNSC staff also added that all NPP licensees had completed the installation of passive autocatalytic recombiners (PARs). This installation had been requested by CNSC staff to strengthen, in combination with additional cooling capability modifications, the

overall hydrogen mitigation strategy.

*Intervention regarding the Fukushima Action Items*

112. S. Nijhawan, in a written submission (CMD 13-M30.2), raising numerous objections, expressed concerns regarding CNSC staff's statement that all short-term FAIs had been closed, and noted that there was no information justifying why these action items had been closed. The intervenor specified that, in his opinion, the relief valves that provide overpressure protection on operating CANDU reactors do not meet the requirements of the applicable ASME standards[4]. The intervenor suggested that the Commission obtain an independent, qualified external review before accepting the 2012 NPP Report.

113. This intervenor also expressed his dissatisfaction with the information provided by CNSC staff upon request and stated that CNSC staff had not identified and disclosed relevant information regarding industry submissions on the closure of the short term Fukushima Action Items.

114. The Commission asked about direct contacts and communication with the intervenor. CNSC staff responded that they had met with the intervenor on a number of occasions and provided detailed responses to his concerns in 2004, 2007, 2009, 2010 and 2011. CNSC staff added that they were not aware of any outstanding items. Representatives from OPG and from CANDU Energy responded that they had numerous contacts with the intervenor and seriously considered the intervenor's concerns. As a result, they had reassessed their earlier assumptions, informed the industry and simulated the capacity of valves in question. They came to the conclusion that the configuration the industry had in the CANDU 6 reactors was still applicable and relevant for the beyond design basis accident that was considered. Similarly, the utilities with other reactor models did their independent assessments and came to the same conclusions.

115. The intervenor also expressed concerns related to effectiveness of installation of PARs. The intervenor suggested that the decision by CNSC staff to close this item be re-examined.

116. The Commission asked if the ASME codes had been followed as required under ASME and Canadian Standards Association (CSA). CNSC staff responded that the relief valves for the CANDU reactors had been certified for the required flow for design basis accidents according to the ASME code requirement. Since the ASME does not make requirements for beyond design basis accidents, a higher flow requirement had been assessed under a CNSC requirement by analysis, type testing of similar valves and extrapolation. CNSC staff added that

[4] American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III, Subsection NB.

they were satisfied with the finding that the relief capacity would be adequate for beyond design basis accidents.

117. Asked by the Commission to comment on the intervenor's submission that testing was done for reactors other than CANDUs, CNSC staff noted that light water reactors have much higher relief capacities since their design basis requirement is very much higher than the CANDU design. In a CANDU design, the relief is a two-stage process, and the intervenor's concerns are related to the second stage where the relief takes place a long time after the reactor is shut down and the heat load is much lower. Consequently, the requirement for relief is much lower for CANDU reactors.

118. The Commission asked if the valves had actually been tested by the utilities. CNSC staff confirmed that the industry had conducted tests and analyses as directed. The CANDU Energy representative responded that the influence of size on the behaviour of a valve had been tested during an event that had happened at the Pickering site wherein the valves were oversized and led to a small loss of coolant accident (LOCA). Based on lessons learned, AECL determined that proportionally smaller relieving capacity of the relief valve, with a vibration damping device, was appropriate for the design basis accident. AECL and CANDU Energy subsequently worked with the valve manufacturer and confirmed that the manufacturer had data that demonstrated the actual physical steam relief capacity of the valves. These data were used in analyses for beyond design basis accidents. The results of the analyses have shown that, with the actual physical steam relief valve capacity, the heat transport system could never physically reach a pressure high enough to fail the steam generator tubes.

119. The CANDU Energy representative added that if the degasser condenser valve is replaced by a valve with a larger relief capacity, it would discharge liquid much faster and empty the inventory of coolant from the heat transport system during design basis accidents, which is not desirable. For beyond design basis accidents, a fast liquid discharge would result in rapid steam formation in the heat transport system sooner, which would reduce the time available for the operator to take action to restore the heat sink resulting in quicker failure of pressure tubes.

120. A representative from OPG concurred and concluded that it is important to have the relief valves of the right size, which should be determined through optimization, since the larger valve capacity does not provide for any increased safety margin.

121. CNSC staff stated that they had been aware of these concerns since 2001, and had had numerous interactions with the intervenor, the valve manufacturer in Germany and with the industry. CNSC staff noted that suggestions by the intervenor could result in a reduced overall safety of

the facilities.

122. The Commission enquired about the physical configuration and installation geometry conditions during the tests. The CANDU Energy representative responded that they have simulated the actual physical configuration of that line from the vessel to the relief valve.

123. The Commission noted that the ASME codes were written before the Fukushima event and asked about the possibility that an ASME committee decides that valves should be tested for beyond design basis accidents. CNSC staff responded that, in order to decide on how the standards would be applied to beyond design basis accidents, the international community has to first decide on the approach for beyond design basis accidents. The next step would be to finalize the standards which can support the design of the features that need to be included to extend the design basis. A CSA representative stated that the CSA was reviewing all of its standards and was making reference to ASME documents in light of Fukushima and lessons learned. The CSA intends to present a report to the Commission by the end of 2013 or early 2014 with an explanation of their planned activities. The Bruce Power representative stated that the industry was also discussing these issues. The OPG representative stated that OPG was making modifications in the plant and adding equipment to address beyond design basis events. OPG had prepared a guideline for engineers and designers, which has been shared with the industry to obtain inputs from other sites.

124. The Commission asked if an independent third-party external review was a common practice for other regulators in similar situations. CNSC staff responded that they were not aware of other regulators bringing in third parties to sign off as something being completed and done. CNSC staff stated that they had submitted their action plan for third party review; however, in terms of closure of the actions, CNSC staff did not request a third-party review and considered an internal review to be sufficient.

125. The Commission enquired whether the additionally installed PARs are sufficient by themselves for beyond-design basis accidents. CNSC staff responded that PARs are one of various features already installed in CANDU reactors to deal with the problem of hydrogen generation. CNSC staff noted that PARs had been qualified for design basis accidents and that AECL had extended a testing partly to beyond design basis accidents. The OPG representative explained that the design basis accident for which PARs had been designed was an extreme event that would be currently characterized as a beyond design basis event. The OPG representative also noted that some utilities were in the process of analysing the PARs functionality, and some had already completed the analysis and concluded that the installed PARs were adequate for a beyond design basis event.

126. The Commission expressed its appreciation for the intention of the intervenor to bring these important issues to the attention of the Commission and of the public. The Commission recognizes that the approach adopted by the intervenor shows an intention to maximize the effectiveness of certain components of the system, while the approach of the designers accepted by CNSC staff aims at optimizing the protection and safety operation of the system as a whole. The Commission will strongly consider a third-party review of the submissions from CNSC staff and the intervenor.

*Public Information and Disclosure Program*

127. In its oral presentation, CNSC staff informed the Commission that all licensees had progressed in making sure that their public information and disclosure programs would meet the requirements of RD/GD-99.3[5] by the December 2013 deadline.

128. The Commission sought more information about a new website introduced by Bruce Power and the reaction of the public. The representative from Bruce Power responded that the website had been introduced to inform the public about the role nuclear energy plays in electricity production in Ontario, with 50% to 60% of the power in Ontario coming from nuclear power plants. This website also provides the public with an application for calculating their electricity bills and help them better understand the cost of various technologies. The Bruce Power representative added that the website has been well received by the public.

*Safety and Control Area Framework*

129. In its oral presentation, CNSC staff informed the Commission that, for this 2012 NPP Report, they had conducted a review of the specific SCAs within the partially revised framework to evaluate the licensees' safety performance. CNSC staff added that they expect the complete revised SCA framework to be implemented for the 2013 NPP Report.

130. CNSC staff noted that, since the safety and control area framework has been in use since 2010, they were able to present three-year trends in the performances and ratings of the licensees in the 2012 NPP Report. CNSC staff added that the CNSC was in the process of updating the set of safety performance indicators reported by licensees, and that, once the new set of indicators is approved, appropriate indicators could be selected for introduction for future use in NPP reports.

<u>Status Update on the CNSC Action Plan: Lessons Learned from the Fukushima Accident</u>

[5] RD/GD-99.3, *Public Information and Disclosure*, CNSC, 2012.

*CNSC Staff Presentation*

131. With reference to CMD 13-M34, CNSC staff presented its third update on the Status of Implementation of the CNSC Action Plan on the lessons learned from the Fukushima accident and the evolution of the CNSC overall Integrated Action Plan.

132. CNSC staff summarized the main elements of the reviews by the Fukushima Task Force and the External Advisory Committee, as well as a general chronology of the steps undertaken by CNSC staff that led to the development of the Integrated Action Plan.

133. CNSC staff reported that the Integrated Action Plan was based on the Fukushima Task Force review and extensive consultation with stakeholders and the public. It outlines the actions to further enhance the safety of operating nuclear power plants in Canada and reduce the associated risk to as low as reasonably practicable.

134. CNSC staff intends on reporting to the Commission annually on the status of all actions listed in the Integrated Action Plan. The last update is expected in August 2016 and should mark the closure of the CNSC Integrated Action Plan.

135. CNSC staff provided a summary of the 13 recommendations put forward by the CNSC Task Force in the report published on October 28th, 2011 and the 9 recommendations identified by the External Advisory Committee in their April 2012 report.

136. CNSC staff noted that the actions were raised with well defined deliverables and timelines for their completion as stated in the CNSC Action Plan. Closure criteria and expectations for each Fukushima action were developed based on deliverables published in the CNSC Integrated Action Plan. Regarding nuclear power plants, CNSC staff added that the closure of a Fukushima action does not mean full implementation. The verification of design upgrades, analysis or procedural changes specific to a facility is tracked through normal compliance verification processes. Regarding major facilities other than nuclear power plants, actions are considered closed when the related activities have been verified as complete at all relevant facilities.

137. CNSC staff provided a summary of the actions raised in the CNSC Integrated Action Plan, as well as the associated timelines, which extended from December 2012 to December 2015. This Plan resulted in a total of 82 Fukushima actions, either to CNSC staff or members of the industry, stemming from 40 recommendations which are being applied with specific deliverables and timeline as shown.

138. CNSC staff provided a summary of the actions that have been closed based on the activities completed by licensees of operating nuclear

power plants and other major facilities during the reporting period.

139. CNSC staff also provided an outline of future actions aimed at addressing the remaining medium and long-term actions of the Integrated Action Plan. CNSC staff noted that licensee actions are currently focused on strengthening the reactors defence-in-depth. CNSC staff described the major improvements that were already completed for nuclear power plants and other major facilities.

140. CNSC staff described the actions related to CNSC staff, providing which ones had been closed and a description of the future actions required to be completed. CNSC staff also described in details the activities done to complete the required action items. CNSC staff noted that all short-term actions pertaining to CNSC staff and scheduled for closure in December 2012 have been completed, and that significant progress had been made on the completion of medium-term action items scheduled for completion in December 2013.

141. CNSC staff intends on providing annual updates to the Integrated Action Plan in August of each year.

*Industry Presentation*

142. With reference to CMD 13-M34.1, representatives from Ontario Power Generation Inc. (OPG), New Brunswick Power (NB Power) and Bruce Power presented their response to the events at Fukushima and the recently issued Canadian nuclear utility principles for beyond design basis events.

143. In his oral presentation, the OPG representative stated that the three utilities developed a working set of principles with a common objective to implement a consistent approach using international best-practices. The OPG representative noted that the principles were not previously communicated to CNSC staff but will be in the near future.

144. The OPG representative reported that the Canadian nuclear utility principles consist of one objective and nine principles. The OPG representative stated that the objective is to eliminate the potential for societal disruption due to a nuclear incident by maintaining multiple and flexible barriers to severe event progression.

145. In his oral presentation, the representative from OPG explained each of the nine principles. The representatives from OPG, NB Power and Bruce Power also described the activities to adhere to each of the nine. These representatives expressed the industry’s commitment to these principles to protect against beyond design basis events such as the Fukushima accident.

*General Questions*

146. The Commission congratulated members of the industry and CNSC staff for the work done since the Fukushima accident to make facilities safer.

147. The Commission asked if the Integrated Action Plan has changed since its issuance and enquired as to how the Integrated Action Plan is kept current. CNSC staff responded that lessons learned from Fukushima are continuously evaluated on an international level and, should an update be required, the CNSC Action Plan would be amended accordingly. CNSC staff added that they benchmark against international understandings of lessons learned from Fukushima.

*Nuclear Power Plants*

148. The Commission asked for information regarding station boundary monitoring. CNSC staff responded that the Integrated Action Plan required that each licensee implement gamma radiation monitoring at their physical boundary at approximately one kilometre from the reactor. CNSC staff added that, more specifically, at Bruce Power, additional gamma monitoring systems are located offsite at 3 and 10 kilometre areas to complement existing Health Canada fixed point monitoring systems that were previously installed in an effort to track radiation distribution across Canada.

149. The Commission sought information on the long-term management of contaminated reactor water. An OPG representative responded that nuclear power plants have introduced multiple layers to ensure that the fuel remains cool to prevent any leaks or threats to the containment integrity caused by an excessive amount of contaminated water in the containment.

150. The Commission sought information regarding the Gentilly-2 NPP's involvement in the Fukushima Action Plan. A representative from Gentilly-2 responded that they are cooperating on applicable action items and will continue to do so for the duration of their decommissioning. The Gentilly-2 representative added that, prior to the shut-down of Gentilly-2, certain actions were implemented. The Gentilly-2 representative noted that the newly developed principles will be examined and applied where possible.

*Other Nuclear Reactors*

151. The Commission sought clarification on the timeline of the integration of the Integrated Action Plan for AECL's Chalk River NRU reactor. CNSC staff responded that closure dates for action items related to this plan coincide with the AECL operating licence expiry in 2016.

152. The Commission enquired about the involvement of nuclear reactors other than nuclear power reactors in the implementation of the Fukushima Action Plan. CNSC staff responded that all licensees are expected to employ the same continuous improvement mechanism but that these specific licensees are less involved in the industry working groups. CNSC staff added that the CNSC is able to ask further questions of these facilities through its licensing compliance process should additional requirements arise as the Action Plan is updated.

*Communication and Public Education*

153. The Commission sought information regarding the CNSC's crisis Web site. CNSC staff responded that the crisis Web site would only be activated based on the decision of the executive committee in the event of a significant domestic or international nuclear emergency or accident.

154. The Commission asked for details on activities done to communicate the increased safety of nuclear power plants to the public. CNSC staff explained that several activities have been put in place, including the CNSC 101 sessions which provide information on the role of CNSC staff and the Commission. CNSC staff also noted the existence of an action plan which will be activated should another nuclear event occur. The CNSC web site has also been updated, including information on safety systems within a power plant and changes that occurred as a result of the lessons learned from the Fukushima accident. Representatives from OPG, Bruce Power and NB Power detailed the activities done to get the message out that the NPPS are even safer than before the Fukushima accident.

*Canadian Nuclear Utility Principles*

155. The Commission enquired about the purpose of the Industry's newly developed Canadian Nuclear Utility Principles and sought comment from CNSC staff. The OPG representative responded that the principles were developed to complement the Fukushima Action Plan and to provide benchmarking for Canadian utilities. CNSC staff stated that they are pleased with the principles as they are aligned with the Fukushima Action Plan and will allow for faster implementation.

156. The Commission commented that, in the information provided on the Principles, the technical side seem to be well covered but that the human factor side of actions seem to be missing. The OPG representative welcomed that feedback. The OPG representative also later noted that the work has been done with respect to human factors as part of the Canadian Nuclear Utilities Principles but that it was not referenced.

157. The Commission enquired about the reaction from other regulators on the structured approach of the newly developed principles. An OPG

representative responded that feedback from other regulators has not been received but that international discussions are ongoing and, as a group, Canadian utilities are contributing to these discussions. CNSC staff responded that the CNSC is in constant communication with the regulatory bodies worldwide and that the status of the action plan is reviewed bi-annually.

158. The Commission enquired if the industry will submit the newly developed principles and if CNSC staff will reference the principles in licensees' licence conditions handbooks (LCHs). CNSC staff responded that the industry developed the principles in accordance with the Fukushima Action Plan and that they will be assessed and possibly referenced in LCHs, as deemed necessary. CNSC staff noted that licensees are required to put communications in place and to establish proactive disclosure.

*Emergency Preparedness*

159. The Commission sought information regarding the maintenance of emergency equipment and its cost. An OPG representative responded that every new piece of equipment has its own preventative maintenance program. All of the emergency equipment is also set up in a way where it is tested regularly. The Bruce Power representative estimates the cost not to be trivial. The NB Power representative responded that it is in the process of acquiring dedicated emergency mitigation equipment for the fall of 2013 to move away from sharing an adjacent community's fire trucks. CNSC staff confirmed that implementation and testing of emergency equipment will be inspected and verified as part of the licensee's safety system.

160. The Commission asked how the mutual aid agreement between nuclear power plant licensees extends across the provinces and sought information regarding potential liaisons with the United States. An OPG representative responded that the agreement is a commitment by all utilities to support each other to the best of their ability in terms of expertise and equipment. A representative from NB Power stated that, in the event of an emergency, the other utilities would be notified and assistance would be requested at that time if deemed necessary. An OPG representative added that the United States were not mentioned at this time as discussions are ongoing to establish a potential offsite regional centre.

161. The Commission sought information regarding the Bruce Power's Huron Challenge emergency response exercise. The Bruce Power representative responded that over 70 agencies were involved in the planned emergency response exercise and the communication and execution of the response was successful.

CNSC Co-op Student's Experiences with ICRP in Fukushima, Japan

162. With reference to CMD 13-M46, CNSC staff and a CNSC co-op student (co-op student) presented information regarding the collective experience of co-op students in Fukushima post accident.

163. CNSC staff reported that the CNSC established a cost-free co-op program through the International Commission on Radiological Protection (ICRP) whereby students have the opportunity to participate in ICRP dialogues in Japan regarding the Fukushima Daiichi nuclear disaster. The co-op student reported that the ICRP created and initiated dialogues in Japan in the fall of 2011 to bring members of the ICRP and radiological experts together with affected community members to have themed open discussion sessions. The co-op student added that, to date, four co-op students have attended the ICRP dialogues in Japan.

164. The co-op student reported that the living conditions in Japan remain complex, and that through smaller and less formal dialogues, residents still have a lot of questions concerning health care, education, loss of culture and social stigma. The co-op student noted that the ICRP experts serve as a trusted critical support role in the community, working with the people rather than for them.

165. The co-op student described several decontamination projects that were initiated by local residents in the Fukushima region. The co-op student reported that several locals purchased their own dosimeters and survey meters, mapped and monitored contaminated areas, cleaned and washed soil and foods, and shared their findings and knowledge with other residents.

166. Overall, the co-op student reported that mistrust and misunderstanding towards the government and experts are still prevalent issues for residents of Fukushima and is inhibiting their ability to move forward. Furthermore, the co-op student stated that consistent guidance and education is suggested to continue working towards the ultimate goal of reducing fear, uncertainty and discrimination in the region.

167. The co-op student thanked the Commission on behalf of the co-op students who have shared similar experiences with the ICRP and expressed that the experience has allowed for personal growth as students and future professionals in the nuclear and radiological industry.

168. The Commission asked about the overall health of the population in the Fukushima region. The co-op student responded that during his visit he did not observe any major health issues in the public and that the individuals that participated in community activities were generally healthy and fit. The co-op student noted that he did not visit the areas of the Fukushima regions with temporary shelters. The ICRP

representative did, however, and explained that there are some psychological and physical health concerns amongst individuals who are still in temporary housing such as increased levels of stress, childhood obesity, and alcoholism. The ICRP representative added that there are some communities that have not recovered as well as others to date and this has an overall impact on the physical rather than radiological health of that population.

169. The Commission sought information on the choice of location for the co-op students to visit. The co-op student responded that the dialogues were organized by the ICRP. The ICRP representative responded that the ICRP was first welcomed into the community of Fukushima City to facilitate communication and dialogue amongst members of the public as well as provide some educational and expert advice. The co-op student and the ICRP representative noted that an overall perspective on the progress of the Fukushima Prefecture cannot be derived from one community as they are all unique.

170. The Commission asked how, regarding this experience, radiation protection culture can be translated into non-emergency preventative activities. The co-op student responded that education was a recurring theme throughout his visit and suggested that information on radiation and radiation protection should be incorporated into the school curriculum worldwide. The co-op student added that it would be preventative and beneficial for students to be educated on radiation prior to an event rather than trying to educate the public following an event.

171. The Commission enquired about the perception in Japan on the dose rate and dose limits and what impacts the media have had on the public in Fukushima. The co-op student responded that locally grown food was being tested for contamination and had to fall below the set regulatory limits to be deemed as safe. The ICRP representative further responded that the people of Fukushima are less concerned with actual dose numbers but with the ability to return to daily activities as life was before the accident. The ICRP representative added that the residents of Fukushima need to feel reassured that they are safe. The ICRP representative noted that the media, particularly smaller local media, have been helpful in conveying expert information to the public with some exceptions.

172. The Commission asked if the co-op student program with ICRP is exclusive to the CNSC. The ICRP representative responded that, currently, the CNSC is the only agency with interns at ICRP but that the arrangement is not exclusive.

<u>Presentation on Inter-Agency Integration of Emergency Plans in Response to a Nuclear Event</u>

*OPG Presentation*

173. With reference to CMD 13-M45.1 and 13-M45.1A, an Ontario Power Generation Inc. (OPG) representative presented an overview on the inter-agency integration of emergency plans in response to a nuclear event.

174. The OPG representative reported that nuclear emergency management is a planned, integrated process that includes all levels of government and industry. The OPG representative further reported that the response to a general emergency is well integrated in that OPG activates the emergency plan, notifies offsite agencies and mitigates the emergency.

175. The OPG representative stated that the Province of Ontario is the lead agency that coordinates the offsite response though the provincial emergency operation centre and provides direction to the designated municipalities while Public Safety Canada coordinates the response of federal partners in support of the province.

176. The OPG representative stated that there are many stakeholders involved in responding to a nuclear emergency and the respective emergency plans must be validated using multi-agency exercises to ensure that they are well-integrated and can support an efficient and well-coordinated response. The OPG representative explained in detail the process of the emergency plan which is documented in the Provincial Nuclear Emergency Response Plan (PNERP).

177. The OPG representative reported that Exercise Unified Response, which is scheduled for May 2014, is a large-scale, multi-agency integrated exercise that would require participants to activate their respective emergency plans in response to a severe nuclear emergency at the Darlington nuclear station. The OPG representative noted that this exercise was planned in response to lessons learned from the Fukushima nuclear accident.

178. The OPG representative stated that the objectives of the exercise are to test the preparedness and integration of nuclear emergency response plans for OPG, provincial and federal governments, municipalities and non-government agencies. The OPG representative added that the exercise will also demonstrate that the provincial nuclear emergency response plan is an effective tool for managing the response to a nuclear event, and that the exercise will be used to validate the revised Federal Nuclear Emergency Plan (FNEP).

179. The OPG representative reported that the number of agencies participating in the exercise is extensive and that the U.S. Federal Emergency Management Agency (FEMA) may be an observer of the exercise while the Institute of Nuclear Power Operations will use the exercise as an opportunity to test elements of their recently developed U.S. nuclear industry event response framework.

180. The OPG representative provided an update on the development of a new CSA standard, N1600, *General Requirements for Nuclear Emergency Management Programs*. The OPG representative reported that, when published, N1600 will be a new Canadian standard that outlines the requirements for onsite and offsite emergency management programs to address nuclear emergencies at nuclear power plants. The OPG representative added that the focus for the standard is on preparedness, response and recovery from a nuclear emergency.

181. The OPG representative reported that one of the goals for the N1600 standard is that it be aligned with the new CNSC regulatory document 2.10.1 – *Nuclear Emergency Preparedness and Response*, which was recently released for public review.

182. The OPG representative stated that the draft of CSA Standard N1600 was posted on the CSA website on August 20th, 2013 and will be available for public review and comment for 60 days.

*General Questions*

183. The Commission enquired about the CNSC's role in the inter-agency integration of emergency plans. CNSC staff responded that, in addition to the role as a regulator and providing regulatory response in the event of an emergency, CNSC staff is also made available, as subject matter experts and liaison officers, to other agencies to support and ensure the integration with the federal response. CNSC staff added that, as the regulator, the CNSC is responsible for creating and maintaining the regulatory framework to ensure that all of the external agencies undertake the appropriate actions in response to an event.

184. The Commission enquired if there will be presentations from other nuclear power plants addressing their plans to comply with the new CSA N1600 Standard and how compliance is measured. CNSC staff responded that OPG's presentation was given in response to a previous request made by the Commission but that the same request can be made for the remaining power plants if requested. CNSC staff noted, however, that compliance with the new standard would be discussed during relicensing hearings. CNSC staff added that each nuclear power plant undertakes a large-scale exercise annually whereby the performances are evaluated by CNSC staff as part of the compliance program, but that the difference with the planned exercise at Darlington is that it will involve external agencies.

185. The Commission sought confirmation from CNSC staff regarding the development of site-specific integrated emergency plans. CNSC staff confirmed that, as a result of the Fukushima action plan, the Commission made a regulatory decision to implement the need for offsite integration emergency plans.

*Exercise Unified Response*

186. The Commission asked about the challenges of planning and coordinating the unified response exercise. CNSC staff responded that the biggest challenges include the coordination of the extensive number of people that are involved, coordination of the budgets, and appropriate planning to ensure that the Darlington nuclear power plant will continue to operate safely without any impacts during the execution of the exercise.

187. The Commission sought information from OPG regarding the 12-hour estimate to define the offsite response that is required in the case of an emergency. The OPG representative responded that 12 hours is the time threshold that the province uses to assess the required offsite response. The OPG representative noted that the nuclear power plant systems are in place to prevent a release to the public but, in planning for a possible emergency, the systems allow more time than 12 hours to assess the accident scenario.

188. The Commission enquired about the efforts being made to communicate to the public in the event of an emergency. The OPG representative responded that focus groups with members of the public would be planned to create and develop the appropriate information and tools that would be deemed necessary and useful for each household in a state of emergency. The OPG representative committed that OPG would continue to work on how best to communicate the plan and the information to the public.

*Update on new CSA Standard N1600 – General Requirements for Nuclear Emergency Management Programs*

189. The Commission enquired about the relationship between the new CSA standard and Exercise Unified Response, and if the CSA standard being developed will be used as the basis for planning and assessing the success of the exercise. The OPG representative responded that the exercise is being planned and coordinated to test the existing plans that are currently in place and to validate recent revisions that were made to other plans. The OPG representative further responded that the standard will not be published until after the exercise is conducted, therefore, the expectation is that organizations that adopt the standard will be encouraged to incorporate lessons learned from the exercise.

190. The Commission enquired about the consultation process during the development of the CSA standard. The OPG representative responded that non-governmental organizations (NGOs) and the public currently have the opportunity to participate in the process. The OPG representative noted that OPG had committed to the Commission to consider 30 recommendations that were received in the Canadian

Environmental Law Association (CELA) report in May 2013 and that all were reviewed and considered for the final draft of the CSA standard.

191. The Commission sought information regarding the distribution of potassium iodine tablets. The OPG representative responded that the CSA standard includes requirements for the distribution of potassium iodine directly to the public in advance of an emergency.

2013 Annual Update on the Darlington New Nuclear Project

*CNSC Staff Presentation*

192. With reference to CMD 13-M32, CNSC staff presented its first update on the Darlington New Nuclear Project (DNNP), including information on activities starting from the issuance of the Joint Review Panel (JRP) Report in August 2011 up to July 2013, at which time work under Ontario Power Generation Inc. (OPG) service agreements and CNSC pre-licensing vendor design reviews were completed.

193. CNSC staff reported that the elements of the project were to conduct an environmental assessment (EA) and prepare the site based on the assessment. Some of the activities allowed under the site preparation licence included:
    - Construction of site access control measures;
    - Excavation of grading of site to 78m above sea level;
    - Construction of environmental monitoring and mitigation systems; and
    - Construction of flood protection and erosion control measures.

194. CNSC staff reported that the JRP for the DNNP released its Report in August 2011 that concluded that the DNNP Project is not likely to cause significant adverse environmental effects, provided that the proposed mitigation measures and commitments made by OPG during the review, and the JRP's recommendations, are implemented.

195. CNSC staff added that 67 recommendations were made by the JRP in its Report and of those, 43 were specifically directed to the CNSC. CNSC staff added that key recommendations included:
    - Conducting a number of technical studies regarding site characterization, site evaluation and analysis of accidents;
    - Putting in place mitigating measures regarding habitat impact; and
    - Developing a policy for land use around the new nuclear power plant.

196. CNSC staff reported that, in April 2012, the Government of Canada (GoC) responded to the recommendations in the JRP Report and accepted the intent of 62 of the JRP recommendations directed at responsible authorities (RA) and federal authorities (FA), including the

CNSC. CNSC staff added that the GoC did not make any comment regarding the remaining 5 recommendations that were directed at other levels of government.

197. CNSC staff stated that, as a result of the GoC Response, the RAs will exercise their powers or perform duties/functions with respect to the DNNP to ensure that appropriate mitigation measures are implemented and that the DNNP will not likely cause significant adverse environmental effects.

198. CNSC staff noted that, to date, one JRP recommendation has been fully addressed relating to the cost-benefit analysis for reactor cooling technologies.

199. CNSC staff reported that the licence to prepare site, PRSL 18.00/2022, was issued on August 17, 2012 for the future construction and operation of up to four Class 1A nuclear power plants with a maximum combined net electrical output of 4800 megawatts electric, and is valid for a period of 10 years.

200. CNSC staff briefly summarized the status of the activities that OPG has undertaken thus far pertaining to commitments made by OPG and JRP recommendations. CNSC staff noted that the commitments and recommendations include management system and implementing documents, cost-benefit analysis for reactor cooling technologies, round whitefish action plan, bank swallow mitigation measures and plans, aquatic baseline studies, site geological and seismic hazard investigation program, communications, consultation and stakeholder relation program/plan and land use planning. CNSC staff stated that all but one of the following recommendations are ongoing, and that these recommendations would be addressed by 2014-2015 based on the vendor selection assumption.

201. CNSC staff reported that EA follow-up work and preparatory activities for the LTPS will be carried out between 2013 and 2015. CNSC staff added that OPG is currently awaiting a decision by the province in the selection of a vendor and that this is expected to take place sometime in 2014. CNSC staff further added that, based on this assumption, an application to construct will be submitted in 2014-2015 followed by an application for a licence to operate in 2017-2020[6].

202. CNSC staff reported that, while the LTPS only authorizes OPG to prepare the Darlington Nuclear site for future construction and operation of a new NPP, it is recognized that certain decisions will have to be made on construction related activities during the LTPS stage. Thus, CNSC staff noted that a protocol was agreed upon between OPG

[6] On October 10, 2013, the Government of Ontario announced that the Darlington new build project was cancelled and would therefore not be part of Ontario's long term energy plan.

and CNSC staff.

203. CNSC staff reported that a number of regulatory documents were developed to assist licensees in preparing for potential construction of new NPPs and to assist reactor vendors to help inform their design activities. CNSC staff stated that several documents were approved and issued by the Commission but that they are undergoing revision to include Fukushima lessons learned and international best practices. CNSC staff added that two documents are currently in development.

*Status of OPG Commitments and JRP Recommendations*

204. The Commission enquired if studies have been conducted to show that fish entrapment and impingement would not pose a risk to the surrounding aquatic life with respect to once-through condenser cooling technology. CNSC staff responded that there are design criteria in place to ensure that fish entrapment or impingement is minimized. CNSC staff added that the once-through cooling system can be made to perform equivalent to towers for aquatic effects, given proven mitigation technology that has been demonstrated internationally and in the U.S. CNSC staff further added that CNSC staff's assessment of the once-through cooling system was published on the CNSC Web site. An OPG representative noted that the Darlington design was originally designed to mitigate impingement effects and that the future potential once-through cooling water system would include enhancements to the existing design.

DECISION ITEMS – Regulatory Documents

Fukushima Omnibus REGDOC Amendments Project

*CNSC Staff Presentation*

205. With reference to CMD 13-M35, CNSC staff presented to the Commission its recommendation to approve the proposed REGDOCs for publication:
    - REGDOC-2.9.1, *Environmental Protection Policies, Programs and Procedures*
    - REGDOC-2.3.2, *Severe Accident Management Programs for Nuclear Reactors*
    - REGDOC-2.4.1, *Deterministic Safety Analysis*
    - REGDOC-2.4.2, *Probabilistic Safety Assessment*

206. CNSC staff reported that the *CNSC Fukushima Task Force Report*, the *CNSC Staff Action Plan on the CNSC Task Force Recommendations* and the report of the independent External Advisory Committee (EAC) identified the need to strengthen the CNSC's regulatory requirements in a number of key areas, in order to address lessons learned from the Fukushima nuclear incident.

207. CNSC staff stated that the updated requirements and guidance were consolidated into four new REGDOCs, consistent with the set of REGDOCs in the regulatory framework plan that was presented to the Commission in May 2013. CNSC staff noted that while the consolidated REGDOCs themselves are new, the majority of the content is not.

208. CNSC staff reported that the CNSC followed the standard regulatory document public consultation process for the proposed REGDOCs.

209. CNSC staff stated that the proposed amendments were provided to stakeholders for input in the summer and fall of 2012 and that, during the consultation period, the CNSC received 109 comments from five respondents, primarily from nuclear power plant licensees and CANDU Energy. CNSC staff added that, in the period for feedback on the comments, 21 additional comments were received from three interested members of the public and from AECL. CNSC staff noted that all comments were taken into account in finalizing the draft REGDOCs for the Commission's consideration and approval.

210. CNSC staff reported that several of the comments indicated that some of the proposed changes were not directly related to Fukushima. CNSC staff noted that while in some cases this was true, certain changes were retained to ensure that the CNSC regulatory framework would continue to reflect modern developments in nuclear safety and regulation, and good industry practice.

211. CNSC staff found that stakeholders noted that some language included in the current published version of GD-310 could be construed as being regulatory requirements and as a result of this feedback, CNSC staff reviewed and confirmed that the intent of these statements was guidance, subsequently changing five statements that included "shall" to clarify the guidance language in the proposed REGDOC.

212. CNSC staff reported that if the Commission approves the proposed amendments, the four REGDOCs would be published on the CNSC Web site and be made available to affected licensees, and other stakeholders. CNSC staff noted that applicants for new licences would be required to comply with the proposed amended requirements as set out in these REGDOCs.

213. CNSC staff stated that existing licences and associated LCH would be updated to include reference to the new documents, as appropriate. CNSC staff added that specific implementation plans outlined in the LCHs for existing licences would include the dates by which licensees would need to comply.

214. CNSC staff noted that they are of the opinion that the amended requirements of the existing regulatory documents in response to the

*Fukushima Task Force Report* recommendations and action plans, as set out in the REGDOCs, are ready for final approval by the Commission and for use by CNSC staff and licensees.

*CANDU Industry Integration Team Presentation on REGDOCs 2.3.2 and 2.9.1*

215. A CANDU Industry Integration Team (Industry) representative presented to the Commission an industry perspective on the omnibus amendment on behalf of Ontario Power Generation Inc., Bruce Power, and NB Power (the utilities).

216. The Industry representative stated that the utilities do not have concerns with the proposed publication of REGDOCs 2.3.2 and 2.9.1 and are satisfied with the single round of consultation as specific revisions were aligned with the Task Force Report and had the benefit of prior public consultation.

217. While many of the concerns expressed by the utilities were addressed by the CNSC through the first round of consultation, the Industry representative reported that the document that was issued on July 17th, 2013 was significantly different than the document that had been issued for consultation because it reflected several changes that addressed the utilities' concerns.

REGDOC-2.3.2, *Severe Accident Management Programs for Nuclear Reactors*

218. The Commission asked for more information regarding the change from "demonstrate with reasonable assurance" to "demonstrate with a high level of confidence" on page 99 of the disposition document. CNSC staff responded that reasonable confidence still means very high confidence but not as extreme as is required for design-based accidents. CNSC staff added that they are working to define various concepts associated with the events considered in the beyond design basis category. CNSC staff also added that they are working to align the terminology with the international community.

219. The Commission noted that there are three documents being consulted on emergency management and enquired how the severe accident document is related. CNSC staff responded that the CNSC is working in conjunction with emergency management and CSA personnel to establish an improved overall suite of documents on emergency management. CNSC staff further responded that REGDOC-2.3.2 supersedes Regulatory Guide G-306, *Severe Accident Management Programs for Nuclear Reactors*, once consultation and revision are complete.

REGDOC-2.9.1, *Environmental Protection Policies, Programs and Procedures*

220. The Commission enquired about comments received by the public with respect to this REGDOC. CNSC staff responded that specific comments received from members of the public were not related to this document.

*Industry Comments on* REGDOCs 2.4.1 *and* 2.4.2

221. The Industry representative reported that, with regards to REGDOC 2.4.1 and 2.4.2, the utilities do not concur with the proposed changes that are not directly related to the Task Force Report. The Industry representative noted that the utilities have significant technical concerns with REGDOCs 2.4.1 and 2.4.2 and would like the opportunity to provide comments through a second consultation process.

222. The Industry representative reported that Regulatory Document (RD) 310 was merged with Guidance Document (GD)-310 to form REGDOC-2.4.1. The Industry representative noted that by merging RD-310 and GD-310, new requirements that have not undergone consultation have been unintentionally introduced. The Industry representative added that while RD-310 is a fundamental licensing document that is currently referenced in all operating licences, it was never intended that GD-310 be referenced in the licences. As a result of the merging of RD-310 and GD-310, the Industry representative states that REGDOC-2.4.1 contains some unintended prescriptive language such as “shall” and “minimum expectations”. The Industry representative requested, on behalf of the utilities, that additional time be provided to review the merged document to confirm that there are no other unintentional requirements that have been introduced.

223. Much like REGDOC 2.4.1, the Industry representative stated that a second round of consultation on REGDOC-2.4.2 would improve the document and should not compromise the CNSC’s objective of publication by year-end 2013, consistent with the Fukushima Action Plan. With respect to REGDOC-2.4.2, the Industry representative reported that the changes went well beyond the changes identified in the Task Force Report and, as a result, did not have the benefit of prior public review through the Task Force Report consultation process.

224. The Industry representative stated that these revised documents are expected to be referenced in licences and therefore, a second round of consultation would ensure that the requirements are understood by all parties and are achievable. The Industry representative added that the Industry is committed to treating the review with priority and requested 30 days from August 22nd, 2013 to complete the review.

225. The Commission asked the Industry what implications and risks the approval of all four REGDOCs would pose on the operation of the

facilities. The Industry representative responded that there were several examples of new requirements introduced to licensees as a result of merging regulatory and guidance documents and if these requirements were to be literally interpreted, the licensees would not comply with those documents without making cost-prohibitive changes. CNSC staff noted that these requirements would not apply to existing power reactors.

226. The Commission enquired about CNSC staff's reaction to the industry's request for an additional 30 days for review of REGDOCs 2.4.1 and 2.4.2. CNSC staff responded that the industry's comments are well known and that general feedback is welcomed at any time on the CNSC Web site. CNSC staff added that these REGDOCs are fundamental design documents relating to both deterministic and probabilistic design analysis that need to be accurate and, if more time is required, it will be used for additional review. The Commission further enquired if 30 days is sufficient for additional consultation. The Industry representative responded that the review process has already been initiated and that 30 days is sufficient for their complete review.

227. The Commission asked who should be invited to participate if a document is opened to additional consultation. CNSC staff responded that, consistent with past practice regarding a document on regulatory reporting, stakeholders who participated in the initial consultation period could be invited to participate again.

REGDOC-2.4.1, *Deterministic Safety Analysis*

228. The Commission enquired if the wording "minimum expectations" from Table 3 of REGDOC-2.4.1 was intended for interpretation as guidance or regulation and where the misinterpretation in Table 3 originated. CNSC staff responded that GD-310 was consolidated into REGDOC-2.4.1 to provide guidance for operating plans and new designs and is not a requirement on new or current operating plans. The Industry representative noted that the term "minimum expectations" has the appearance of being a mandatory requirement and requires clarification. CNSC staff stated that the wording that was used was to accommodate guidance for several different facility designs as well as non-CANDU designs. The Industry representative reiterated that GD-310 was never reviewed for the purpose of being referenced in a licence and that the language of REGDOC-2.4.1 does not correspond with the intended use of GD-310.

229. The Commission enquired if there were any comments or concerns regarding the requirements for small reactor licensees. CNSC staff responded that while extensive comments were not received with regards to small reactor requirements, one operator of a small reactor noted that the comments received related to nuclear power plants should be applied equally to the content related to small reactors in the

proposed revision of REGDOC-2.4.1.

REGDOC-2.4.2, *Probabilistic Safety Assessment*

230. The Commission sought information regarding the issues the industry has with this document. The Industry representative responded that the clarity of the requirements of this document could be improved and provided one example to this effect relating to the requirement that a PSA be done for low power conditions. CNSC staff responded that they are in agreement with the industry but that the CANDU design is not the only design that is considered in the document. CNSC staff further responded that other designs that do operate at low power are expected to be analyzed.

231. The Commission enquired if the industry has any concerns with the scope of the proposed changes having set the issue of clarity aside. The Industry representative responded that the concern originated from the large-scale revisions that were made to this document following public consultation as there were no previous opportunities for public consultation. The Industry representative reiterated their request for further consultation to look at the changes made to the document more closely.

232. The Commission sought information on public access to PSAs. CNSC staff responded that the CNSC does not allow the detailed analysis of a PSA to be made public as it identifies all potential failure combinations that, although having a very low probability of occurring, could have consequences if made public especially to those with malicious intent. CNSC staff further responded that the general results of the PSA are made public and include the executive summary and the methodology of the analysis. CNSC staff noted that there are no explicit references to public transparency requirements within REGDOC-2.4.2, but that RD/GD-99.3 outlines the CNSC's expectations, both requirements and guidance, for public information programs and disclosure. An Industry representative responded that it is their intent to make public as much as possible from probabilistic safety evaluations.

233. The Commission sought information regarding the effort and investment of conducting a probabilistic safety assessment. The Industry representative responded that building a PSA model is a large undertaking with heavy financial and time investment. The Industry representative stated that if an update of a PSA model is simply a case of updating the data, it is not a large undertaking. The Industry representative added that sensitivity analysis for existing models is straightforward but that it is a significant investment if the model requires revision to incorporate new elements that previously did not exist.

*Decision*

234. After considering the recommendation submitted by CNSC staff, the Commission approves, in part, the Fukushima Omnibus REGDOCs Amendment Project and approves, for publication and use, regulatory documents: **DECISION**
    - REGDOC-2.3.2, *Severe Accident Management Programs for Nuclear Reactors*
    - REGDOC-2.9.1, *Environmental Protection Policies, Programs and Procedures*

235. The Commission directs CNSC staff to conduct a 30-day round of consultation on REGDOC-2.4.1, *Deterministic Safety Analysis*, with emphasis on clarity, particularly regarding GD-310 integration (shall vs. should, minimum expectations), and only with those who participated in the initial round of consultation. **DECISION**

236. The Commission directs CNSC staff to conduct a 30-day round of consultation on REGDOC-2.4.2, *Probabilistic Safety Assessment*, only with those who participated in the initial round of consultation. CNSC staff are to consider including expectations for provision of PSA results to the public, subject to appropriate security considerations. **DECISION**

Regulatory Document REGDOC-2.5.2, *Design of Reactor Facilities: Nuclear Power Plants*

*CNSC staff Presentation*

237. With reference to CMD 13-M36, CNSC staff presented to the Commission its recommendation to approve regulatory document REGDOC-2.5.2, *Design of Reactor Facilities: Nuclear Power Plants,* for publication and use.

238. CNSC staff explained that REGDOC-2.5.2 consolidates updated requirements and new guidance related to the design of nuclear power plants (NPPs) contained in draft RD-337 version 2, *Design of Nuclear Power Plants*, and draft GD-337, *Guidelines for the Design of New Nuclear Power Plants.* Staff noted that the proposed regulatory document is currently only available in English at this time in order to streamline the development process. CNSC staff clarified that the document, if approved by the Commission, would be published in both English and French in the fall of 2013.

239. CNSC staff noted that REGDOC-2.5.2 is intended for use by CNSC staff in their review of applications to construct new water cooled NPPs and provides requirements and guidance to applicants and licensees involved in preparing applications for a licence to construct a NPP. CNSC staff indicated that this proposed regulatory document is risk-informed and aligned with accepted national and international

requirements. CNSC staff further noted that REGDOC-2.5.2 also assists reactor vendors in developing their reactor designs.

240. CNSC staff stated that the proposed regulatory document would apply only to new NPPs and noted that this regulatory document is technology neutral, and includes requirements and guidance on:
    - establishing safety goals and principles;
    - utilizing safety principles;
    - designing structures, systems and components;
    - interfacing engineering aspects, plant features and facility layouts; and
    - integrating safety assessments into the design process.

241. CNSC staff further stated that REGDOC-2.5.2 adopts principles set forth in International Atomic Energy Agency (IAEA) document SSR-2/1, *Safety of Nuclear Power Plants: Design*, and is adapted to align with Canadian practices. CNSC staff described the changes from SSR-2/1.

242. CNSC staff noted that REGDOC-2.5.2 takes into account a CNSC benchmarking study with design requirements for NPPs in the United States, the United Kingdom, France, Finland, and countries comprising the Western European Nuclear Regulators Association (WENRA). Two significant differences that CNSC staff used for improvements are:
    - more comprehensive requirements for electrical systems, and
    - more stringent requirements for operator action times.

243. CNSC staff remarked that an important change, and one that resulted in stakeholder concerns, is related to the proposal to amend operator action times from 15 minutes to 30 minutes inside the control room and from 30 minutes to 1 hour outside the control room. Staff explained that the changes would increase the amount of time the design must withstand an accident without operator intervention to halt or mitigate it.

244. CNSC staff further reported that REGDOC-2.5.2 incorporates recommendations from the CNSC *Fukushima Task Force Report* that relate to the design of NPPs, including:
    - improved requirements for spent fuel storage;
    - new requirements for mobile equipment for use during emergency situations; and
    - more comprehensive coverage for design extension conditions.

245. CNSC staff added that the Fukushima accident has shown that more attention needs to be paid to incidents that have a small probability but that are potentially high consequence events.

246. CNSC staff also outlined additional improvements made to REGDOC-2.5.2 in the following areas:
    - updated terminology;
    - revised requirements for complementary design features;
    - updated requirements for cyber security;
    - included guidance and additional information sections; and
    - updated and expanded reference to technical codes and standards.

247. CNSC staff reported that it considered all stakeholder comments, 324 in total, received on the draft documents RD-337, version 2 and GD-337 (now combined into REGDOC-2.5.2) when preparing REGDOC-2.5.2 for the Commission's consideration. CNSC staff noted that stakeholder comments were received from licensees, reactor vendors and international experts.

248. CNSC staff reviewed the key comments received on the proposed regulatory document, which related to proposed operator action time, design extension conditions and change of classification of complementary design features, and described its response to these comments.

249. CNSC staff added that the proposed regulatory document also includes a new section on cyber security to reflect new developments in industrial control systems and new practices to protect computer-based systems and equipment from cyber threats and cyber attacks.

250. CNSC staff stated that REGDOC-2.5.2 would provide a clear and consistent set of requirements and guidelines for applicants and licensees, for reactor vendors in their design activities, and for CNSC staff in their review of applications to construct new NPPs in Canada.

251. The Chair invited comments from industry representatives on the proposed regulatory document REGDOC-2.5.2.

252. The representative from Bruce Power stated that the proposed REGDOC-2.5.2 is complex and that they have not had sufficient time to prepare a comprehensive review for the Commission. They explained that, while comments were made on an earlier draft, the industry received the proposal, in its current form, only two weeks prior to the Commission meeting. The Bruce Power representative added that the document pertains to new power plants but that there will be an expectation that current facilities implement changes over time. This, it was stated, creates uncertainty and therefore more time is required to review the document and discuss with CNSC staff. The Bruce Power representative indicated that a review period of more than 30 days would be required for an adequate review and that a workshop would be useful to have a clear understanding of the requirements.

253. The representative from Ontario Power Generation (OPG) concurred with the Bruce Power representative that additional time is required to fully review and understand the ramifications of the changes proposed in REGDOC-2.5.2, and to discuss the issues with CNSC staff. The OPG representative supported the idea of a workshop.

*Consultation*

254. The Commission sought information on comments received from an international expert and the comment disposition prepared by CNSC staff. CNSC staff indicated that the international expert commented on GD-337 but not on RD-337. CNSC staff indicated that some comments were valuable but that it did not appear that the commenter was familiar with the CNSC's document framework since many points raised were covered in RD-337, and other comments were dealt with in RD-310, now REGDOC-2.4.1.

255. The Commission sought information on international benchmarking. CNSC staff indicated that benchmarking was undertaken and although the level of detail or prescriptiveness may vary, the CNSC reactor design requirements are essentially in line with international requirements.

256. The Commission sought clarification about posting CNSC research studies on its web site. CNSC staff indicated that they were not aware of the status of posting the benchmarking study and would provide an update to the Commission.

*Application of* REGDOC-2.5.2 *to Existing Facilities*

257. The Commission asked about the application of the proposed regulatory document to existing facilities. CNSC staff reiterated that REGDOC-2.5.2 does not apply to existing facilities. However, when an integrated safety review is undertaken, CNSC staff would compare the existing facility with modern standards to determine how the gap could be minimized. CNSC staff added that RD-360 is the document that describes the process for integrated safety reviews and addressing gaps and indicated that a cost benefit analysis is used to disposition gaps.

258. The Commission asked if there existed a document linking new and old standards in order to provide clarity. CNSC staff indicated that RD-360 provides a measure of clarity. Staff added that new regulatory documents are being developed that will describe the process for gap identification and disposition in order to provide clarity to CNSC staff and industry. The Commission indicated that a link between various regulatory documents could be made to provide clarity and that explanatory text could be inserted in the preface, for example, that explains the real purpose of the document and the application of the document to new and old facilities. CNSC staff agreed with the idea.

259. The Commission sought clarification on the statement that the document is technology neutral. CNSC staff indicated that the document is intended to apply to all new water-cooled reactor designs, not only the CANDU design. Therefore, staff noted, one technology would not have an advantage over another because of the regulatory system in Canada.

*Operator Action Times*

260. The Commission asked about the impact of the proposal to amend operator action times from 15 minutes to 30 minutes inside the control room and from 30 minutes to 1 hour outside the control room, and on the possibility of permitting different times, if justified. CNSC staff noted that the operator action times relate to the time that a reactor design should enable the reactor to withstand an event without operator intervention, but that operator intervention is expected at the earliest possible opportunity. CNSC staff indicated that new designs, including the CANDU EC-6, can meet the proposed new requirement. CNSC staff added an alternate time is permitted if it could be shown that the safety case is maintained. A CANDU Energy representative indicated that different amounts of time should be allotted for the operator to be able to take appropriate action in different circumstances and that this should be credited in the time limit.

*Decision*

261. After considering the recommendations submitted by CNSC staff and comments provided by intervenors on REGDOC-2.5.2, the Commission directs that a further consultation period of 60 days take place and that the matter be brought back before the Commission at the earliest opportunity. The consultation is limited to those who participated in the initial consultations. The Commission further directs that REGDOC-2.5.2 provide assurance that both existing and new facilities would be safe under the terms of the regulatory document. The Commission is leaving to the discretion of CNSC staff whether a workshop is necessary. **DECISION**

Regulatory Document REGDOC-3.1.1, *Operating Nuclear Power Plant Reporting*

*CNSC Staff Presentation*

262. With reference to CMD 13-M44, CNSC staff presented its update and recommendation on proposed REGDOC-3.1.1, *Operating Nuclear Power Plant Reporting.* The subject matter was last presented to the Commission on September 13, 2012, at which time the Commission directed CNSC staff to streamline and simplify two previous draft

documents, RD-99.1, *Reporting Requirements for Operating Nuclear Power Plants,* and GD-99.1, *Guide to the Reporting Requirements for Operating Nuclear Power Plants* and consolidate these two draft documents. CNSC staff also indicated that the revised draft regulatory document identifies clearly for each of the proposed Safety Performance Indicators (SPIs) where industry and CNSC are in agreement, and where they are not, and outlines outstanding points of contention.

263. CNSC staff noted that REGDOC-3.1.1 combines RD-99.1 and GD-99.1. Staff also noted that REGDOC-3.1.1 would supersede S-99, *Reporting Requirements for Operating Nuclear Power Plants,* which was published in 2003.

264. CNSC staff explained that the proposed regulatory document sets out the requirements and guidance for reporting on events, compliance monitoring reports and SPIs used by CNSC staff in the regulatory oversight of licensees' activities.

265. CNSC staff noted that the following fundamental principles/approaches were adopted in the development of the draft regulatory document:
    - S-99 SPIs were used as the starting point in addition to any previously agreed to with industry;
    - existing requirements were not reinvented or duplicated;
    - lessons learned to establish SPIs with industry were applied;
    - adjustments to the reporting requirements are to be made in future, if necessary, as experience is gained through implementation;
    - SPIs are used to complement CNSC regulatory oversight, not to replace or substitute for inspections;
    - not every Safety and Control Area (SCA) requires an SPI;
    - duplication of reporting requirements found in S-99 have been eliminated from those in legislation and other regulatory instruments;
    - reporting has been simplified by separating event reporting from compliance reporting; and reporting requirements for industry have been streamlined.

266. CNSC staff stated that a list of 31 SPIs that fulfill CNSC requirements has been developed with industry and that all SPIs and licensee reporting requirements meet the CNSC's regulatory requirements. CNSC staff added that nine of the SPIs are from CNSC document S-99 and 22 from industry.

267. CNSC staff provided a summary table of SPIs and examples of SPI use. CNSC staff indicated that licensee reporting requirements have been updated based on CNSC internal input and CNSC/industry working group meetings. CNSC staff stated that the resource impacts of regulatory reporting would be minimized through incorporating industry SPIs and by including industry reports submitted to other regulatory

bodies.

268. CNSC staff outlined the proposed implementation strategy indicating that the proposed REGDOC-3.1.1 would be introduced into the *Recommendations and Guidance* section of the Licence Condition Handbooks and into Power Reactor Operating Licences to replace S-99. CNSC staff added that further adjustments would be made, if needed, based on experience gained from implementation.

269. CNSC staff outlined the proposed next steps to complete REGDOC-3.1.1, including obtaining further industry comments or agreement on the technical content. CNSC staff noted that they anticipate finalizing the regulatory document in early fall of 2013 with publication, subject to Commission approval, early in 2014.

*General Questions*

270. The Bruce Power representative commented that the industry is in favour of the revised document. The Bruce Power representative noted that work within the industry itself is needed to align their definitions and that CNSC proposals were appropriate. He added that the industry is pleased with the consolidated table on scheduled reporting but noted that there remain some issues regarding scheduled reporting, especially in the environmental area. The Bruce Power representative remarked that he is confident that issues would be resolved and was pleased about the industry interaction with CNSC staff to resolve issues.

271. The Ontario Power Generation (OPG) representative stated that there has been much progress on safety performance indicators and that only a few issues remain to be clarified with CNSC staff.

272. The Commission asked the industry representatives if publication of the proposed regulatory document in early 2014 was appropriate. The Bruce Power representative indicated that it was.

273. The Commission asked about providing raw data, in real time, to residents living near a NPP. The Bruce Power representative indicated that, contrary to the understanding of some intervenors, real time data is not yet available. The representative added, however, that Bruce Power was moving in the direction of making real time data available to the public and that the utility was planning to put more information on its website.

*Safety Performance Indicators*

274. The Commission sought further information on international benchmarking. CNSC staff commented that they are proposing to accept 10 SPIs from the World Association of Nuclear Operators (WANO) and that the SPIs would be identical for all of the industry. Therefore, CNSC

staff stated, international benchmarking would be evaluated and included in the next NPP report.

275. The Commission sought additional information on the convergence within CNSC staff on where SPIs are coming from or being suggested. CNSC staff commented on the regulatory approach used at the CNSC and noted that information on licensee performance comes from many sources in addition to SPIs, including inspections and desktop reviews. CNSC staff added that a licence is accompanied by a Licence Condition Handbook which contains compliance verification criteria. CNSC indicated that SPIs do not exist for all SCAs but that through a comprehensive assessment using various means, staff is able to assess regulatory compliance. Therefore, CNSC staff noted, the SPIs serve to complement regulatory oversight.

*Terminology*

276. The Commission asked about the term "mispositioning index" in the SPI summary table and whether this referred to human factor events. CNSC staff informed the Commission that this is a term used by industry and relates to components found in an incorrect position.

277. The Commission sought clarification on the use of the word "immediately" in relation to reporting. CNSC staff stated that the word is used in the regulations. The regulations state that certain issues must be reported to the CNSC immediately, or at once, when the licensee becomes aware of certain issues. The immediate reporting may be by telephone, by email or by other means, and the reports are then followed up with more detailed formal reporting as information becomes available or within a time specified in regulation.

278. The Commission enquired about industrial accidents and the possibility of arriving at a single measure to provide greater clarity. The Bruce Power representative commented that three measures are used by industry and that industry has agreed to use common definitions to avoid confusion. He noted that industry uses the lost-time injury rate, severity and the all-injury rate that includes lost time and medically-treated injuries. The representative noted that the first two are the most accurate and that the third has the most variation since it is subject to influence by policy and availability of medical services.

*Decision*

279. After considering the recommendations submitted by CNSC staff and comments from intervenors, the Commission directed that, following consideration of comments received through additional consultation, CNSC staff forward the final version of REGDOC-3.1.1 to the Secretary of the Commission who will determine, based on the nature and scope of any changes made, how the document will be considered **DECISION**

by the Commission.

Regulatory Document REGDOC-2-12.1, *High Security Sites: Nuclear Response Force*

Note: the following item was held in closed session.

280. With reference to CMD 13-M37, CNSC staff presented, in a closed session, its recommendations regarding the publication and use of REGDOC-2.12.1, *High Security Sites: Nuclear Response Force*.

281. The Commission requests CNSC staff to provide in the document further clarity on "tachypsychia testing", and whether it applies to an officer's time of reaction or the understanding of perpetrator time of reaction.

282. After considering the recommendations submitted by CNSC staff, the Commission approves Regulatory Document REGDOC-2.12.1, *High Security Sites: Nuclear Response Force*, for publication and use. **DECISION**

Closure of the Public Meeting

283. The meeting closed at 2:57 p.m. on August 22, 2013.

Sophie Gingras
Recording Secretary

2013-12-17
Date

For all Recording Secretaries

Secretary

17-12-13
Date

APPENDIX A

| CMD | DATE | File No |
|---|---|---|

13-M38 2013-07-17 Edocs #4169497
Notice of Meeting of August 21 and 22, 2013

13-M39 2013-08-07 Edocs #4173949
Agenda of the meeting of the Canadian Nuclear Safety Commission to be held on Wednesday and Thursday, August 21 and 22, 2013, in the Public Hearing Room, 14th floor, 280 Slater Street, Ottawa, Ontario.

13-M39.A 2013-08-15 Edocs #4185414
Updated Agenda of the meeting of the Canadian Nuclear Safety Commission to be held on Wednesday and Thursday, August 21 and 22, 2013, in the Public Hearing Room, 14th floor, 280 Slater Street, Ottawa, Ontario.

13-M40 2013-07-19 Edocs #4173903
Approval of Minutes of Commission Meeting held May 15 and 16, 2013

13-M41 2013-08-20 Edocs #4187206
Status Report on Power Reactors Units as of August 20, 2013

13-M41.1 2013-08-14 Edocs #4185104
Status Report on Power Reactors – Oral presentation by Ontario Power Generation Inc.

13-M42 2013-06-18 Edocs #4156530
Event Initial Report:
Ontario Power Generation Inc. – Manual Shutdown at Pickering Units 1 and 4

13-M30 2013-08-13 Edocs #4118711
CNSC Staff on Integrated Safety Assessment of Canadian Nuclear Power Plants for 2012 – Oral presentation by CNSC staff

13-M30.2 2013-07-16 Edocs #4172671
CNSC Staff on Integrated Safety Assessment of Canadian Nuclear Power Plants for 2012 – Written submission from Sunil Nijhawan

13-M30.3 2013-05-16 Edocs #4172675
CNSC Staff on Integrated Safety Assessment of Canadian Nuclear Power Plants for 2012 – Written submission from Power Workers' Union

13-M34 2013-08-06 Edocs #4177795
Status Update on the CNSC Action Plan: Lessons Learned from the Fukushima Accident – Oral presentation by CNSC staff

13-M34.1 2013-08-14 Edocs #4185038
Status Update on the CNSC Integrated Action Plan: Lessons Learned from the Fukushima Accident – Oral presentation by Ontario Power Generation Inc.

13-M34.2 2013-08-14 Edocs #4185223
Status Update on the CNSC Integrated Action Plan: Lessons Learned from the Fukushima Accident – Oral presentation by NB Power Nuclear

13-M34.3 2013-08-14 Edocs #4184930
Status Update on the CNSC Integrated Action Plan: Lessons Learned from the Fukushima Accident – Oral presentation by Bruce Power

13-M46 2013-08-06 Edocs #4181685
CNSC Co-op Students' Experiences with the ICRP in Fukushima, Japan – Oral presentation by CNSC Co-op Students

13-M45.1 2013-08-08 Edocs #4180027
Presentation on Inter-Agency Integration of Emergency Plans in Response to a Nuclear Event – Written submission by Ontario Power Generation Inc.

13-M45.1A 2013-08-14 Edocs #4185108
Presentation on Inter-Agency Integration of Emergency Plans in Response to a Nuclear Event – Oral presentation by Ontario Power Generation Inc.

13-M32 2013-08-14 Edocs #4181373
2013 Annual Update on the Darlington New Nuclear Project – Oral presentation by CNSC staff

13-M35 2013-08-15 Edocs #4160644
Decision Items on Regulatory Documents:
Fukushima Omnibus REGDOC Amendments Projects – Oral presentation by CNSC staff

13-M35.1 2013-08-14 Edocs #4184978
Decision Items on Regulatory Documents:
Fukushima Omnibus REGDOC Amendments Projects – Oral presentation by Ontario Power Generation Inc., Bruce Power and NB Power Nuclear

13-M36 2013-08-15 Edocs #4185140
Regulatory Document REGDOC-2.5.2, Design of Reactor Facilities: Nuclear Power Plants – Oral presentation by CNSC staff

13-M44 2013-08-20 Edocs #4164431
Information Items:
REGDOC-3.1.1 – Reporting Requirements for Operating Nuclear Power Plants – Oral presentation by CNSC staff

13-M33 2013-05-29 Edocs #4148616
Event Initial Report:
Les Laboratoires d'essais Mequaltech Inc.: Overexposure of a Member of the Public

13-M37 2013-08-21 Edocs #4146089
Decision Items on a Regulatory Document:
REGDOC 2.12.1, High Security Sites: Nuclear Response Force – CMD 13-M37 contains prescribed security information and is not publicly available