Canadian Nuclear Safety Commission

Commission canadienne de sûreté nucléaire

Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held Wednesday, May 15, 2013 and Thursday, May 16, 2013

Canada

Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held Wednesday and Thursday, May 15 and 16, 2013, beginning at 15:20 at the Public Hearing Room, 14th floor, 280 Slater Street, Ottawa, Ontario.

Present:

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

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

CNSC staff advisors were:
R. Jammal, P. Elder, D. Howard, G. Rzentkowski, R. Lojk, P. Thompson, M. Rickard, B. Poulet, S. Faille, V. Khotylev, M. Dallaire, L. Forrest and C. Moses

OPG – Darlington:
- R. MacEacheron, Director, Nuclear Regulatory Affairs
- S. Ramjist, Director, Operations and Maintenance at Darlington Station

NB Power:
- A. Hayward, Director of Projects and Lead on the closure plug issue resolution team at Point Lepreau

AECL:
- R. Lesco, Vice-President Operations and Chief Nuclear Officer
- D. Cox, Senior Director of NRU Operations and the Facility Authority for the reactor
- J. Osborne, General Manager, NRU
- A. Bugg, Radiation Protection Program Authority

Hydro Québec:
- C. Gélinas, Plant Manager
- L.Pelletier, General Manager, Nuclear Development and Production Projects
- M. Désilets, Director, Nuclear Production

Constitution

1. With the notice of meeting, CMD 13-M20, having been properly given and a quorum of Commission Members being present, the meeting was declared to be properly constituted.

2. Since the meeting of the Commission held April 4, 2013, Commission Member Documents CMD 13-M20 to CMD 13-M27, CMD 13-M29 and CMD 13-M31 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-M21.A, was adopted as presented.

Chair and Secretary

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

Minutes of the CNSC Meeting Held February 20 and 21, 2013

5. The Commission Members approved the minutes of the February 20 and 21, 2013 Commission Meeting as presented in CMD 13-M22.

Minutes of the CNSC Meeting Held April 4, 2013

6. CNSC staff provided an update on the review of the Environmental Impact Statement (EIS) for the Gunnar Mine remediation. This matter was considered during the April 4, 2013 Commission meeting, and had been presented in CMD 13-M19. At that time, the Commission directed CNSC staff to provide an update on the status of the Gunnar protocol at the May 2013 Commission meeting[1].

7. CNSC staff reported that, after the review of the EIS, they were satisfied that the options presented would lead to improvements in the environment at the Gunnar site. However, CNSC staff requires some minor revisions to the documentation submitted by Saskatchewan Research Council (SRC).

8. CNSC staff further reported that Natural Resources Canada (NRCan), which is the other responsible authority for the Gunnar Mine remediation project under the *Canadian Environmental Assessment Act* (CEAA), did not yet agree with CNSC staff's opinion and believed that additional field work or site characterization might be needed. CNSC staff is satisfied that the site is being safely maintained by SRC.

9. CNSC staff informed the Commission that meetings between NRCan and SRC have already been arranged and that they were making arrangements for a meeting of senior level officials to make sure that the project could proceed without delays.

[1] See paragraphs 14 and 27 of the Canadian Nuclear Safety Commission Meeting held April 4, 2013.

10. CNSC staff will report back to the Commission in fall 2013 about the progress of the project and on potential needs for additional regulatory actions by the Commission. **ACTION** by November 2013

11. The Commission Members approved the minutes of the April 4, 2013 Commission Meeting as presented in CMD 13-M29, and with the update provided by CNSC staff.

Decision of the Commission

12. On April 22, 2013, a panel of the Commission approved the *Administrative Monetary Penalties Regulations* (AMPs Regulations). The document was proposed by the CNSC as part of the Responsible Resource Development initiative to increase compliance with the *Nuclear Safety and Control Act*[2] (NSCA) and its regulations. The AMPs Regulations was previously published in the *Canada Gazette*, Part I[3] in order to provide an opportunity for interested Canadians to review and comment. The AMPs Regulations provide the CNSC with an additional tool to strengthen environmental protection and address non-compliance. **DECISION**

STATUS REPORTS

Status Report on Power Reactors

13. With reference to CMD 13-M23, which includes the Status Report on Power Reactors, CNSC staff presented updates on the following Nuclear Generation Stations (NGS):

    - Bruce A NGS, Unit 1: all affected channels had been drilled to create alternate flow paths for annulus gas system, and Bruce Power had provided all information needed to release the hold point. Final verification that the annulus gas system is working was still required in order to release the hold point and allow Unit 1 to return to service.
    - Darlington NGS, Unit 4: regarding the May 4 reportable event (described below, starting at paragraph 14), CNSC staff stressed that there were no injuries or damage to the plant and confirmed that there was no risk to the public, workers or the environment.
    - Point Lepreau NGS: CNSC staff informed the Commission that New Brunswick Power (NB Power) has prepared a video presentation to explain problems with the fuel channel closure plugs and describe their strategy to address the issue (see below, starting at paragraph 17).

[2] Statutes of Canada (S.C.) 1997, chapter (c.) 9.
[3] *Canada Gazette*, Part I, Vol. 147, No. 7 — February 16, 2013.

Event at the Darlington NGS

14. The Commission sought more details regarding the event at Darlington NGS, Unit 4, where an electrical fault caused the display modules to fail so that the reactor had to be tripped in accordance with procedures and placed in a guaranteed shutdown state. The Commission asked if operators could monitor and control the reactor when the display modules are not functioning. The OPG representative explained the role of display modules in the reactor control process and noted that they could verify that the controlling computers were operating correctly based on panel indications that are driven independently. Operators were also able to successfully validate that all control programs were functioning as expected. The OPG representative also stated that there are panel meters for all essential parameters used to validate the operation of control programs.

15. The Commission asked if the root cause of this event was known. The OPG representative provided details on the possible causes of this event, noting that it was caused by a temporary drop in the power supply to the display module.

16. The Commission further asked if Unit 4 was back in service. The OPG representative responded that the unit was operating at 30% of full power, and that a return to full power was expected within one day.

NB Power Fuel Channel Closure Plugs Item

17. NB Power presented a video clip which included a detailed explanation of the function of the fuel channel closure plugs and a description of the mechanical problem occurring with the new closure plugs used after the refurbishment of the plant. The new closure plugs, designed by Atomic Energy of Canada Limited (AECL), have a slightly modified design that has been used in the newer CANDU-6 reactors, and some of them did not function properly after refuelling of the Point Lepreau reactor.

18. NB Power informed the Commission that the dysfunctional closure plugs were inspected, and that a team was put in place to work with CANDU Energy Inc. and AECL to resolve the problem. The inspection showed that the malfunction did not affect the pressure boundary of fuel channels and did not cause any damage to the fuel or fuel channels. Following assessments and analyses, CANDU Energy Inc. recommended additional machining of some parts of the plugs as an interim solution. NB Power added that a Province of New Brunswick authorized nuclear inspector had approved the use of the repaired plugs.

19. NB Power further informed the Commission that they were sequentially replacing the closure plugs from the reactor core with the repaired ones, and that, during the replacement, the reactor operates at a reduced power level as a consequence of the slowdown in the fuelling rate. After completion of the closure plugs replacement, Point Lepreau NGS would return to full power operation.

20. The Commission enquired about a durable solution to the problem. The NB Power representative responded that work on the root cause analysis was still going on, and that they were looking for a workable solution and final design through collaboration with AECL. The results were expected in about two years. NB Power representatives added that, although the interim solution was safe, they were looking for a long-term solution with a complete assurance for a period of 25 to 30 years of operation.

21. The Commission asked about the number of plugs that were malfunctioning. The NB Power representative responded that they intend to replace all of the plugs.

22. Asked about potential loss of material strength due to the repairs done, NB Power representatives stated that they had completed all needed stress tests and other analyses through CANDU Energy Inc. and AECL, and had no safety concerns. The NB Power representative noted that AECL had fully cooperated to resolve the issue.

23. Asked for comments, CNSC staff noted that those closure plugs could have been repeatedly forced on the end of the fuel channels on and off, and that the identical closure plugs had been used in Wolsong and Quinshan reactors overseas with no safety concerns. CNSC staff stated that the decision by NB Power to stop refuelling was a conservative one and had been made to fully ensure the safe operation of the reactor.

24. The Commission sought more information about foreign experience with these closure plugs. NB Power representatives responded that, after their experience with the issue, they have received information about similar issues disappearing after several refuels. The NB Power approach minimizes a possibility for material particles, which could be shaved off during re-insertion of the plugs, to cause damage to the fuel or fuel channels. NB Power representatives noted that they were of the opinion that they have chosen the most prudent approach.

25. The Commission will be asking for an update on this event at the next Commission meeting. **ACTION** by August 2013

Event Initial Report (EIR)

Atomic Energy of Canada Limited: NRU Reactor – Operator Error on February 27, 2013

CNSC Staff Presentation

26. With reference to CMD 13-M27, CNSC staff presented information regarding an operator error that occurred on February 27th at AECL NRU reactor. Instead of closing process water valves, the rods supervisor started to close main heavy water pump outlet isolation valves. This error was noticed by the facility manager who immediately stopped the closure of the valves and reopened them. No workers or members of the public were affected, and there were no effects on the environment. CNSC staff added that potential impact and potential damage that could have been caused by the event was not yet clear. The closure of all the valves would have resulted in a loss of flow event followed by overheating of the reactor fuel.

27. CNSC staff reported that AECL had met all the regulatory reporting requirements associated with this event. CNSC staff also reported that, immediately after the event, their onsite inspectors had confirmed that AECL had performed the appropriate equipment checks prior to restarting the reactor. All equipment was confirmed to be operational and there was no indication of any damage. CNSC staff noted that they had requested AECL to provide additional information about their compensatory measures. AECL had submitted the requested information and CNSC inspectors continued to monitor the implementation of compensatory measures.

28. CNSC staff added that AECL had submitted a report on the root cause analysis, and that they were reviewing it.

AECL Presentation

29. AECL representatives provided details of the event and summarized the immediate actions taken after the event. They informed the Commission that the minimum flow during the event, as estimated from the data logs, was not lower than 93% of the full flow, which was consistent with no detected damage and with no other subsequent alarms associated with the event.

30. AECL representatives informed the Commission that a safety stand-down had been immediately conducted for each of the operating crews with an emphasis on human error reduction and preventive measures to avoid reoccurrence of the event. AECL representatives added that they had improved the labelling of the valve groups on the main control panel and introduced administrative changes to restrict the authorization to operate the reactor controls to only certified senior reactor shift engineers.

31. AECL representatives further informed the Commission that the reactor remained shutdown for four and a half days, for maintenance activities that were anticipated as part of the shutdown. Before restarting the reactor, a post-event review of data and logs was conducted to confirm that the event had no impact on any reactor systems or equipment.

General Questions

32. The Commission asked if the rod supervisor was fit for duty and qualified for the procedure that he attempted to perform. AECL representatives responded affirmatively and added that all individuals involved in the event had been interviewed and the cause analysis had concluded that fatigue and fitness for duty were not contributing factors to the event. They also excluded any possibility of sabotage.

33. The Commission asked if this potential loss of flow was part of the safety analysis report. The AECL representative responded that this particular event had not been identified as part of the existing safety analysis report in terms of the sequence of events. CNSC staff concurred and added that one of their requests to AECL had been to identify differences between this particular event and the existing analysis of flow, in order to verify whether the conclusions of the analysis are valid under all conditions.

34. The Commission further asked if human factors were part of safety analyses, noting that, after the Fukushima event, the Commission had insisted that human factors and errors be integrated into safety analyses. CNSC staff responded that the post Fukushima activities have not been completed and that all recommendations relating to accident management were not yet in place for NRU. CNSC staff added that the probabilistic safety report, which is prepared periodically, did consider human errors. CNSC staff stated that a safety analysis does include a loss of flow event in general; however, in this particular case they wanted to make sure that it was investigated if there was a weakness that has to be addressed. AECL representative confirmed that, as part of their safety analysis report, they were doing probabilistic safety analysis that includes human factors and errors. They stated that they were taking a

rigorous approach in order to better understand the way human performance affects the safety of the NRU reactor.

35. The Commission enquired about overheating in case of absence of flow, and asked how long it would take before it becomes an issue. AECL representatives responded that, taking into account the significant heat sink, low thermal output and low operating temperature of the reactor, it would take several hours to reach the point of overheating. However, before this point is reached, several alarms would have been triggered, which would allow operators, facility manager or senior reactor shift engineer to intervene. The AECL representative added that they have performed thermo-hydraulic analysis which showed that there was no potential impact on the reactor fuel from such an event.

36. The Commission enquired if a “significance level one (the highest)” was an appropriate characterization of the event, given the results of investigation that have shown that this event could not have led to any serious consequences. The AECL representative responded that, since the event was human performance related, AECL had attributed the highest significance level to it. In return, the resulting root cause investigation had helped AECL to identify opportunities to revise and improve their shutdown procedure within the control room.

37. CNSC staff stated that they support AECL’s decision to attribute the highest significance level to the event since it was an unusual one, caused by human error that had not occurred before. CNSC staff noted that such events need to be thoroughly investigated.

38. The Commission noted that the World Association of Nuclear Operators (WANO) representatives had been at the facility during the event, and asked about their observation. AECL representatives responded that, at the time of the event, AECL was undergoing a WANO peer review. A WANO member observed the event, and provided views and findings regarding areas for improvement. These observations were consistent with CNSC staff's observations regarding AECL’s performance.

39. The Commission stressed the importance of proactive disclosure in all similar events. The Commission requested that CNSC staff report to the Commission their findings regarding the root cause analysis. CNSC staff responded that they would look at their criteria for event reporting. The AECL representative agreed with the proactive disclosure of events that receive media attention.

ACTION
by
November
2013

Atomic Energy of Canada Limited: Dose records not submitted to National Dose Registry

CNSC Staff Presentation

40. With reference to CMD 13-M31, CNSC staff presented information regarding AECL's discovery that they failed to submit 1650 dose records to Health Canada's National Dose Registry (NDR) between the years 2009 and 2012. The records consisted of 825 pairs of whole body and skin dose records, and contained results from 825 thermoluminescent dosimeters (TLDs) that were not returned to Dosimetry Services by workers after they had worn them. AECL reported this event to the CNSC on April 18, 2013 and filed a preliminary report on the following day. AECL submitted a detailed event report on May 8, 2013, as required by their dosimetry licence.

41. CNSC staff explained that, in cases like this where the TLD is not available, a dose received by a worker is estimated from readings of their additional electronic dosimeters, when workers were required to wear them. In cases when workers did not wear additional dosimeters, they were assigned a nominal dose of 0.05 mSv (millisieverts), conservatively estimated by AECL. The doses assigned are manually entered in AECL's corporate dosimetry system, verified by AECL dosimetry staff, flagged in the dosimetry system and filed with the NDR.

42. In this case, the verification step had not been completed, dose records had not been flagged in AECL's corporate dosimetry system and, therefore, not filed with the NDR. This event constitutes a non-compliance with section 19 of the *Radiation Protection Regulations*[4] and two licence conditions of AECL's dosimetry licence.

43. CNSC staff informed the Commission that, since the event, AECL had assigned and trained a three-member team to clear the backlog of unverified dose records, and submitted to CNSC staff a report containing the proposed corrective actions. After reviewing the report, CNSC staff requested additional information and AECL responded promptly and in a satisfactory manner.

AECL Presentation

44. The AECL representative stated that there were no health or safety consequences related to the event, and that the issue was about their administrative process related to transmittal of the dose records to the NDR. The AECL representative noted that AECL

[4] Statutory Orders and Regulations, S.O.R. 2000/203.

had successfully transmitted more than 500,000 dose records to the NDR and that the number of dose records that had not been filed with the NDR represent 0.32% of the total number of dose records. The AECL representative added that all records in question were eventually filed with the NDR.

Commission's Questions

45. The Commission enquired about the process of entering the dosimetry records into the corporate dosimetry system. AECL representatives responded that the process of manually entering records into the corporate dosimetry system only applies to situations where the TLDs are not available. In that case, the dose is estimated and the data is manually entered into the corporate dosimetry system. This data is verified before being sent to the NDR. Routine dosimetry data for all other dosimeters are entered automatically into the corporate dosimetry system.

46. The Commission enquired on the possible automation of this process. AECL representatives added that they were reviewing the possibility to fully automate the process to avoid similar errors in the future. CNSC staff noted that the main issue was the internal data verification step that was not followed.

47. The Commission asked whether a weakening of working ethics or safety culture played a role in the event. The AECL representative responded that AECL has a strong reporting culture and strong corrective action program, and pointed out that the issue had been self-identified within AECL. The AECL representative noted that the event had been reported to CNSC staff as soon as it was recognized as a reportable one.

48. The Commission asked CNSC staff about the procedure for verification of compliance and about the interaction between the regulator and the licensee in the events like this one. CNSC staff reiterated that AECL's licence includes a condition for AECL to submit within 30 days the doses for the previous quarter to the NDR. CNSC staff reviews all procedures encompassed by the licence, and interacts intensively with the licensee to ensure that the procedures meet the requirements and expectations. Detailed inspections are conducted in five-year intervals since this type of licensees is considered to be of low-risk, from the point of view of health and safety. The inspection done in 2007 identified issues with submission of doses to the NDR for atypical doses. AECL implemented corrective measures that CNSC staff found satisfactory.

49. CNSC staff added that, earlier in 2013, they had reviewed and compared dose records obtained from the NDR, and an unrelated

issue found by CNSC staff led to AECL's discovery of some dose records not submitted to the NDR. CNSC staff added that they are reviewing AECL's procedures when performing inspections to ensure the validity of the dosimetry results.

50. CNSC staff commented that they considered AECL to be non-compliant with the reporting requirement licence condition because of undue delays to identify the event and report it.

51. The Commission asked if AECL's staff is sufficient for the work related to dosimetry activities. AECL representatives responded that AECL has enough staff to perform these activities, and added that some cross-training of other dosimetry staff had been performed, in order to assist with the additional work on rectification of this dosimetry record issue.

52. The Commission sought more information about missing dosimeters, which were unavailable for assessment. The AECL representative responded that AECL issues between 65 000 and 70 000 dosimeters per year. A small number of those, mainly issued to contracted staff, are not returned either at the end of the working shift or at the end of the contract, becoming thus unavailable for the assessment.

53. The Commission enquired about the possibility of a worker leaving the premises after receiving a high dose and not knowing it. The AECL representative responded that the probability of such a scenario was unlikely, since AECL's ALARA program has requirements for individuals to wear personal alarming dosimeters for any work where an individual may be exposed to an external radiation hazard.

54. The Commission sought more information about the established nominal dose value of 0.05 mSv assigned to a worker when a dose from a dosimeter is not available. CNSC staff responded that they had requested a validation of the procedure for identifying the dose of 0.05mSv as a nominal one, and stated that they were reviewing AECL's response.

55. The Commission enquired about mitigation measures and improvements that AECL would implement to prevent reoccurrence of this event. CNSC staff responded that AECL had identified similar events, as stated in their event report. AECL had put in place corrective actions. CNSC staff stated that they had requested AECL's assessment of the effectiveness of these corrective measures.

56. CNSC staff added that they would review AECL's detailed event report and corrective measures, and that they intend to conduct a

focused inspection to verify the implementation of the corrective measures and their effectiveness.

57. The Commission requests that CNSC staff present a report on the effectiveness and adequacy of the corrective measures implemented by AECL. **ACTION** by August 2013

INFORMATION ITEMS

Hydro-Québec: Decommissioning activities of the Gentilly-2 Nuclear Generating Station

58. With reference to CMD 13-M24.1 and CMD 13-M24, Hydro-Québec and CNSC staff presented an update on the status of the activities related to decommissioning of the Gentilly-2 nuclear generating station (NGS).

Hydro-Québec Presentation

59. Hydro-Québec presented a chronology of the decision to close and decommission the Gentilly-2 NGS and described their action plan and steps taken to communicate with employees, stakeholders and the general public. Hydro-Québec also described their plans for supporting affected employees and emphasized the important role and contribution of unions' representatives in identifying innovative and reliable solutions. Hydro-Québec noted that they were analysing the recommendations issued by the parliamentary commission held in January 2013 and that the Québec government had announced the nature of the recently established diversification funds. Hydro-Québec emphasized that the safety of workers and the environment will be paramount during the decommissioning activities.

60. Hydro-Québec informed the Commission about the governance established for decommissioning of the Gentilly-2 NGS, and explained that they had created three management structures with distinct mandates. The executive office will ensure that the stabilization phase of the project would be realized without compromising safety of the public and employees, and protection of the environment. The second one is a team for preparation of works, which will elaborate strategies, prepare documents required for realization of works and keep an updated plan for the end of life of the facility. This team would also address all regulatory requirements. The third team is responsible for execution of operations and for issues related to the health, safety, radiological protection and protection of the environment, as well as for the human performance, including training.

61. Hydro-Québec noted that they were doing a step-by-step reduction of staffing, in accordance with the decommissioning plan, while ensuring that sufficient resources are available. Hydro-Québec added that most of the employees affected are still within the Crown Corporation and could come back to the Gentilly-2 NGS if needed.

62. Hydro-Québec indicated that contacts with the rest of the nuclear industry are maintained in order to benefit from the decommissioning experience of others, especially OPG.

63. Hydro-Québec further informed the Commission about the schedule for stabilization activities until the end of December 2014 and provided a list of planned activities. The list includes the following activities:

    - defueling of the reactor;
    - preventive maintenance of safety systems;
    - preparation of a monitoring plan for safe storage;
    - preparations for retirement and closure of the systems; and
    - disposal of wastes.

    Hydro-Québec representatives provided a detailed description of each of these activities, and added that they were preparing a management system for the activities planned for the period after 2014, and a plan for training the personnel needed for these activities. Hydro-Québec representatives added that they were continuously working on a program to protect their workers, the public and the environment from radiation associated with decommissioning activities.

64. Hydro-Québec noted that they are planning the completion of defueling activities in July 2013. Hydro-Québec noted that they were establishing procedures that would be used during removal from operational service of the systems, which will begin this summer. In 2014, a number of reports would be prepared to document the status of the systems for later phases when the facility would be dismantled, which is expected to take place around 2050.

65. Hydro-Québec informed the Commission that non-radioactive waste produced during decommissioning activities would be treated under the existing procedures, while radioactive wastes would be placed in the facility for management of solid radioactive waste, which was built for the refurbishment project. Used fuel would be transferred to the dry storage site, after a cool down period in pools. A proposal for procedures required for treatment of large amount of water at the facility and related mitigation measures will be submitted to the CNSC for their review.

66. Hydro-Québec further informed the Commission about their current priorities and noted that they would continue to respect requirements related to all safety and control areas that were applied during the operation of the NGS. Hydro-Québec would continue to apply their current emergency management and fire protection programs until the risks related to the safe storage are evaluated. These programs would then be reviewed and modified as required. Radiation protection would remain one of the priorities and the related programs will remain unchanged until the end of the stabilization period. Hydro-Québec representatives noted that, for the last few years, the collective doses to the workers have consistently remained lower than the average values across the industry.

CNSC Staff Presentation

67. CNSC staff informed the Commission about the CNSC activities related to the decommissioning of the Gentilly-2 NGS, and noted that these activities mainly consisted of monitoring and making sure that all planned activities were conducted in a timely fashion and in compliance with regulatory requirements and the current licence conditions. CNSC staff provided a chronology of their activities during the current licence period and an overview of the phases of decommissioning.

68. CNSC staff further provided a summary of regulatory compliance activities and the timeline for these activities from 2014 until 2062. With respect to the period until 2014, CNSC staff continue to verify the licensee's compliance with regulatory requirements and the current licence conditions, with the emphasis on continued program inspections. These activities also include a review of the final operational plan, review of the stabilization plan, and review of current action items. CNSC staff would also review regulatory requirements and their implementation under the safe storage state.

69. CNSC staff added that the protocol between CNSC and Hydro-Québec was updated to serve as an administrative arrangement to identify and mark project milestones in the future. This protocol defines the responsibilities of both sides and describes upcoming stages of the project, including the issuance of a new licence in 2016. In addition, a liaison committee has been established to discuss technical issues, compliance with the licence, and other operational issues.

General Questions

70. The Commission enquired about a long-term schedule for decommissioning activities beyond 2014. The Hydro-Québec representative responded that one of their current planned activities

is to outline activities for the period between 2015 and 2050; however, for now they are focused on bringing the facility to the safe storage state, and consequently, the schedule and plans for the period 2012-2014 contains much more details. The Hydro-Québec representative added that the starting point for making a detailed decommissioning plan is the existing preliminary decommissioning plan, which was the requirement for each licence renewal and already outlines key activities for decommissioning of the facility.

71. The Commission asked about a possibility for an accelerated decommissioning process. The Hydro-Québec representative responded that they have no intention of unduly prolonging the decommissioning phase. The preliminary decommissioning plan foresees a long dormant period; however, with better understanding of accelerated decommissioning, Hydro-Québec requested from the company that had developed their preliminary decommissioning plan to prepare a study on rapid decommissioning of the facility. It is expected that the study would be completed by the beginning of 2014. The Hydro-Québec representative added that it was too early to balance benefits and disadvantages of a rapid decommissioning and noted that a rapid decommissioning would impose a need to store radioactive wastes on site. He remarked that even a rapid decommissioning could not start before 15 years after the year 2014 and that the used fuel first needs to be transferred in dry storage.

72. The Commission asked CNSC staff for their position regarding the rapid decommissioning of the facility. CNSC staff stated that they were expecting Hydro-Québec to submit a more detailed decommissioning plan so that they could evaluate radiation protection measures, waste management and other relevant safety areas in order to ensure an effective regulatory monitoring of the decommissioning and dismantlement of the NGS.

73. The Commission asked if the dismantlement of Gentilly-1 and Gentilly-2 could be synchronized. CNSC staff responded that it would be possible as long as proper measures were taken. The Hydro-Québec representative added that they did not discuss this matter with AECL and noted that there are pros and cons for both options.

74. The Commission expressed concerns regarding relative imprecision and volatility in the organisational scheme and related documentation envisaged for the decommissioning activities. Hydro-Québec representatives stated that the preparatory, stabilization period 2012-2014 was their priority and reiterated the duties of each of three teams of the new management structure. They noted that the executive office will include the personnel already engaged in operation of the NGS, and the team for preparation of works will be formed of the technical service

personnel, to ensure that the expertise is retained and used. Hydro-Québec representatives added that employees had been relocated, but the majority was still engaged in the Gentilly-2 NGS. The Hydro-Québec representatives also noted that the presented long-term organizational scheme and timeline were a summary of more detailed documents and plans. The Hydro-Québec representatives stated that no compromise would be made while performing the decommissioning activities.

75. Asked to comment, CNSC staff stated that they are experienced in monitoring all steps that lead to safe storage of a facility, and added that they had shifted their focus from monitoring the operation of the Gentilly-2 NGS to safety measures related to the current preparatory activities and the planned ones. CNSC staff added, as an example, that the inspection report regarding defueling of the reactor shows that Hydro-Québec has met all regulatory requirements, and that all required radiation protection measures are in place. In addition, CNSC staff intends to conduct a detailed inspection of the pools for storage of the used fuel bundles. CNSC staff also added that they were reviewing information regarding the new organizational structure and that they intend to conduct an inspection to verify if the new structure is conformant with the licence conditions. With respect to the lack of precision in long-term planning, CNSC staff noted that the decision to decommission the Gentilly-2 NGS was a sudden one, and all revisions to the former plans would be done step-by-step as the preparatory activities progress. Meanwhile, the current shut-down activities have already been approved by the Commission since they are identical to those planned for the refurbishment of the NGS.

76. The Commission asked if the existing expertise could be retained after transition from operation to decommissioning of the NGS, and sought more details about the morale of the employees in the situation of imminent closure of the facility. Hydro-Québec representatives responded that the company had put in place measures to ensure the retention of critical personnel, and that the management had conducted numerous meetings with the employees and continued to engage and consult with the personnel. In that way the personnel are reassured that their future is not endangered, since the company guarantees employment for all permanent employees.

77. The Commission asked if construction of new buildings would be necessary during this stabilization phase. The Hydro-Québec representative responded that they have no need for any new objects for this site. In case of rapid decommissioning, Hydro-Québec noted that there is a probable need for a new radioactive waste storage facility.

78. The Commission enquired about the storage for heavy water, including protocols for pre-testing and ongoing monitoring to ensure the integrity of those long-term storage tanks. The Hydro-Québec representative responded that heavy water will be safely stored in the existing reservoirs at the site. Hydro-Québec representatives added that they were still in the preparation phase, that the reservoirs would have to be certified for a long-term storage, and that a surveillance method would be put in place.

79. The Commission enquired about reporting frequency. CNSC staff responded that the Commission will be updated by annual reports, and, if needed, through progress reports.

80. The Commission enquired if the funds for decommissioning were sufficient for the level of operations required. The Hydro-Québec representative responded that, during each year of operation, the company had put certain amounts of money aside. The additional amount needed for decommissioning is provided by the stakeholders.

Transport of Nuclear Substances: an Overview of the CNSC Package Certification Process

CNSC Staff Presentation

81. With reference to CMD 13-M26, CNSC staff presented to the Commission an overview of the CNSC package certification process. CNSC staff explained the regulatory basis, the process of the preparation of shipments and the certification and licensing requirements. CNSC staff also explained compliance activities undertaken by the CNSC and their ongoing work related to the regulatory oversight of transport. CNSC staff noted that the safety record associated with the transport of nuclear substances shows that millions of shipments are carried out annually in Canada and around the world without an accident resulting in radiological impacts to the public or to the environment.

82. CNSC staff explained that the transport of nuclear materials operates within a regulatory system in which national, international and modal regulations overlap. The International Atomic Energy Agency (IAEA) *Regulations for the Safe Transport of Radioactive Material*[5] is accepted as the basis for regulating the packaging and transport of radioactive materials worldwide. These regulations and related United Nations recommendations, international codes and technical instructions are incorporated or referred to in Transport Canada's *Transportation of Dangerous Goods Regulations*[6] and the

[5] IAEA Safety Standards Series No. TS-R-1, IAEA, Vienna, 2009, and Specific Safety Requirements No. SSR-6, IAEA, Vienna, 2012..
[6] S.O.R./2012-245.

CNSC *Packaging and Transport of Nuclear Substances Regulations*[7] (PTNSR). CNSC staff noted that the responsibility to ensure safe transport of nuclear substances in Canada is jointly shared between Transport Canada and the CNSC. To coordinate the activities of these two agencies, a Memorandum of Understanding was put in place in 1981, and revised in December 2012.

83. CNSC staff further explained that the current PTNSR is based on the 1996 edition of the IAEA Regulations. In June 2012, the Commission instructed CNSC staff, as a result of a recommendation made by the International Regulatory Review Service follow-up mission of the IAEA in 2011, to apply the 2009 edition of the PTNSR, to the extent that doing so does not create conflicts with the current PTNSR.

84. CNSC staff informed the Commission about risks related to the transport activities and about the results of comprehensive studies of the risk associated with the transport of spent nuclear fuel conducted in the USA in early 1970-s and in 2012. These results show that IAEA-based regulations provide for adequate safety and protection of the public and the environment during transportation of nuclear substances.

85. CNSC staff noted that, although environmental assessments are not required under the *Canadian Environmental Assessment Act*, CNSC staff will evaluate the need to conduct an evaluation under the NSCA through an environmental protection assessment process.

86. CNSC staff further informed the Commission about the transport stream which outlines the process to be followed and responsibilities of parties involved in the process: an original owner licensee of the nuclear substances (consignor), a new recipient licensee (consignee) and a carrier. CNSC staff stated that the CNSC conducts compliance verification activities at each stage of transport (consignor, carrier and consignee) to ensure compliance with regulatory requirements.

87. In their overview of the elements of the transport stream, CNSC staff provided detailed explanations regarding the classification of dangerous goods (including criteria for exemptions), types and certification of packages, test requirements, preparation for shipment and labelling, transport licensing, transport radiation protection, and emergency response.

[7] S.O.R./2000-208.

88. CNSC staff informed the Commission that CNSC inspectors conduct compliance verification using a risk-informed approach to ensure that licensees and carriers comply with the CNSC and Transport Canada's regulations. CNSC applies a graduated enforcement approach for the implementation of corrective measures. CNSC staff noted that, although the carriers are usually not licensed by the CNSC, they are required to follow the regulations and could be subjected to strong enforcement measures in order to rectify non-compliance situations.

89. In addition, CNSC staff presented video clips on mechanical testing of packages and large containers in Germany and the United Kingdom. CNSC staff noted that the presented testing and verification were similar to the activities done in Canada and other countries for the certification of transport packages.

90. CNSC staff informed the Commission that their ongoing work includes revision of the *Packaging and Transport of Nuclear Substances Regulations* (Ref. 7) to incorporate the 2012 edition of the SSR-6 (see Ref. 5). It is expected that the draft of the new PTNS Regulations will be pre-published in *Canada Gazette,* Part I this fall, and coming into force of the new regulations is expected for 2014.

Commission's Questions

91. Referring to re-validation of packages approved in other countries prior to their use in Canada, the Commission asked if there was a possibility to facilitate this process with other countries in a similar way that had been done with the USA. CNSC staff responded that an international working group will be established this year to prepare international guidelines that could be used by all countries for package certification. CNSC staff added that all regulatory requirements and documents would be consolidated into a single document that would cover all the regulations related to packaging and transport of nuclear substances.

92. The Commission enquired about challenges posed by public perception and acceptance regarding transport of radioactive materials and nuclear substances. CNSC staff responded that the main purpose of their activities, such as this presentation at the Commission's public proceeding and other outreach activities, is to assure the public that the transport of nuclear substances in Canada is regulated and safe. CNSC staff noted that the biggest challenge they have to confront is fear mongering associated with all issues related to 'nuclear' and added that their target audience is the segment of the public that is not informed, but is willing to accept facts when introduced to them.

93. The Commission asked if airlines still have their own policies regarding whether they are willing to carry radioactive substances or not. CNSC staff responded affirmatively and added that, for example, Air Canada transports medical isotopes on a regular basis. They noted that services are offered by courier companies, as well as by smaller companies. CNSC staff stated that they perform periodic compliance inspections with these carriers.

94. The Commission sought more details about the methods used to ensure that radioactive fissile material prepared for transport remain sub-critical. CNSC staff responded that package developers, designers and regulators follow national and international standards and guidelines to ensure the sub-criticality of packages. Assessments of potential criticality are done through a large number of benchmark experiments and relevant measurements which are used to calibrate and validate calculation models used for the assessment of criticality safety during transportation. In addition, a large, conservative safety margin is applied for each package to ensure sub-criticality.

95. The Commission asked about the number of transport licences issued per year in Canada. CNSC staff responded that the majority of licences are issued for the shipments in transit, and that a number of such licences is about 200 per year. CNSC staff added that about 90 different package models are certified in Canada.

96. The Commission asked about verification of the manufacturing processes for packages. CNSC staff responded that they have developed a new procedure for the inspections of manufacturers in Canada. Testing facilities are required to inform the CNSC for any testing of packages so that CNSC staff come to verify the facility and is present during testing. CNSC staff stated that none of the CNSC certifications had been rejected by other countries. The Commission further asked if there had been packages accredited by other countries that the CNSC has rejected. CNSC staff responded that there had been a few cases where some changes or additional tests were required after verification, but not an outright rejection.

97. The Commission asked who is responsible for regulating the transport system, since the carriers are not licensed by the CNSC. CNSC staff responded that every carrier has to comply with the regulations, and that the CNSC can enforce the regulations but does not issue licences to the carriers. The provinces control road transport, and Transport Canada is responsible for air, marine and rail shipments. CNSC staff will participate in inspections conducted by Transport Canada or the provinces. A licensee must ensure that the carrier has all necessary arrangements in place, since in case of an accident, the licensee or the consigner is responsible.

98. The Commission asked if there are some requirements which are specific to Canada. CNSC staff responded that, in general, Canadian requirements are identical to those in the IAEA regulations, with exception of the requirements regarding uranium ore. While the IAEA regulations are based on uranium content of about two percent, some ores extracted in Canada reach concentration of about 35 %. In such cases, the IAEA regulations are not sufficient and Canada has adopted more stringent ones.

99. The Commission enquired about proactive dissemination of information, disclosure restrictions and other issues related to potential transport of highly enriched uranium (HEU). CNSC staff responded that there is no application before the Commission regarding this matter, but CNSC staff intends to be proactive in engaging communities of interest in order to provide timely and accurate information regarding HEU. CNSC staff added that some contacts had been already made with local politicians and regional councils.

100. The Commission commented that environmental assessments (EAs) related to packaging and transport of radioactive material are not formally dealt with since there are no CEAA requirements for EAs in this case; however, an environmental protection assessment process is embedded in all the analyses and risk estimations done by CNSC staff under the NSCA. CNSC staff confirmed that the evaluation of environmental aspects is an integral part of the package certification, according to requirements of the environmental protection assessment process.

101. The Commission congratulated CNSC staff for their presentation and suggested that they post it on the CNSC web site.

Update on 2012-13 Regulatory Framework Program

CNSC Staff Presentation

102. With reference to CMD 13-M25, CNSC staff presented the 2012-2013 annual report on the regulatory framework program. The report included an overview of the program and its objective, a review of the regulatory policy cycle including an overview of the role of the Commission members, and a summary of accomplishments in the past fiscal year.

103. CNSC staff explained that the objective of the CNSC regulatory framework program is to develop clear, updated and well documented regulatory requirements and guidance, which would be easily accessible to all stakeholders. CNSC staff stated that the key activities in this program include the following sets of activities:

- developing and publishing of regulations and regulatory documents;
- implementing regulatory reform initiatives arising from the Government of Canada's Responsible Resource Development initiative and the Red-Tape Reduction Action Plan; and
- engaging and communicating with stakeholders.

104. CNSC staff informed the Commission about their effort to consolidate and integrate regulatory requirements, guidance and process information into a comprehensive and robust regulatory framework in order to ensure that licensees and applicants have a clear understanding of CNSC's regulatory requirements. CNSC staff further informed the Commission about the ongoing efforts to engage and communicate with stakeholders, demonstrating the revamped CNSC's regulatory framework web site. CNSC staff reported that the entire regulatory framework plan had been posted on the website and is updated regularly.

105. CNSC staff outlined a new regulatory framework structure that encompasses all existing documents and document projects organized in the following categories:

    - regulated facilities and activities;
    - safety and control areas; and
    - other regulatory areas.

    These categories are sub-divided into 25 series that encompass a total of 57 regulatory documents. The nomenclature and numbering system for regulatory documents has also been revised to align with the above categories and document series.

106. CNSC staff stated that major achievements in the past fiscal year included the following:

    - publishing Regulated Timelines Regulations as part of the Government's Responsible Resource Development initiative;
    - posting CNSC's forward regulatory plans and service standards for high-volume regulatory authorizations as part of the Government's Red Tape Reduction Action Plan;
    - consulting on five discussion papers; and
    - publishing six regulatory documents.

    In addition, CNSC staff updated its FY 2012-19 Regulatory Framework Plan. The Plan sets out the regulations and other regulatory framework documents and projects planned for development or amendment in the coming years. Included in the Plan are updates to several regulatory documents addressing lessons learned from the Fukushima event.

107. CNSC staff reported that they had begun programmatic reviews of key regulatory program areas such as environmental protection, waste management and decommissioning, and human performance at nuclear facilities. At the conclusion of each review, CNSC staff would determine whether there is a need to amend or revise regulations or regulatory documents, or whether the current set of requirements are sufficient to ensure the continued safety of regulated facilities and activities.

108. CNSC staff described the activities regarding their review of CNSC regulations. In particular, CNSC staff explained that they were developing regulations to implement an administrative monetary penalty (AMP) regime. Following intensive pre-consultation with stakeholders, the draft of the AMPs regulations was published in the *Canada Gazette*, Part I, in February of 2013 for a 30-day consultation period[8]. CNSC staff considered the feedback and continues with various steps related to the approval of the AMPs regulations and implementation of the AMPs regime.

109. CNSC staff provided more details about their activities related to the Red Tape Reduction Action Plan. These activities include implementation of a one-for-one system and a small business lens.

110. To respond to these requirements, CNSC launched an annual compliance reporting initiative to simplify annual compliance reporting for certain types of nuclear substance licences and provide for electronic filing.

111. In addition, CNSC staff recommended the withdrawal and archiving six regulatory documents that have been superseded by the Canadian Standards Association CSA standards, or do not reflect the current regulatory environment and are no longer used or referenced in current licences or licence condition handbooks.

Commission's Questions

112. The Commission asked, as a matter of principle, whether it was possible to revive documents that had been archived at some point. CNSC staff responded that the copy of an archived document would be retained for historical reference, and the document could be brought back into force if needed. CNSC staff added that they will make sure that all stakeholders are informed that the archived documents are no longer included in the licensing basis for existing facilities.

[8] The AMPs regulations have been approved and will be published in *Canada Gazette*, Part II, on July 3, 2013.

113. The Commission agreed with CNSC staff's recommendation to archive six regulatory documents that are no longer relevant or necessary in the current regulatory environment.

114. The Commission enquired on the purpose of having both CSA standards and CNSC regulations. CNSC staff responded that, with the exception of two standards in the *Nuclear Substance and Radiation Devices Regulations*, CSA standards are not referenced in CNSC regulations. Instead, CSA standards are referenced in licences and licence conditions handbooks. The CNSC establishes regulatory requirements, and the industry, using their extensive experience participates in developing standards and standard procedures to meet these requirements. The technical committees at the CSA determine the content of any standard, and the Regulatory Operations Branch of the CNSC determines whether a standard or part of a standard is useful for regulatory purposes.

115. The Commission asked if CNSC staff have received any input from stakeholders or any peer review regarding the new structure of the regulatory framework. CNSC staff noted that they had presented the new structure to industry representatives involved in the CSA nuclear program. Industry has not raised any significant issues with this initiative; the only questions CNSC staff received were related to clarification of the new numbering scheme. CNSC staff further noted that a new consolidated numbering scheme would make all regulatory requirements and CNSC documents more accessible to all stakeholders.

116. The Commission enquired about the protocol for endorsing documents prior to their publication, and asked if the Commission has to endorse all documents entering into the regulatory framework. CNSC staff responded that, if documents are intended to apply new regulatory requirements to licensees, they are always presented to the Commission for approval. However, documents intended for guidance or to inform licensees how to meet the existing requirements are approved internally.

117. The Commission sought more information about the administrative burden to small business, and how that issue was addressed in the context of the mentioned review of regulations. CNSC staff responded that they were still collecting experience regarding these issues, and noted that they were looking at it with respect to the packaging and transport regulations and other ongoing initiatives. CNSC, being the regulator, has to demonstrate to the Treasury Board that it had searched for alternative ways for the small business to meet a new requirement in a less burdensome way. CNSC staff further explained that the "administrative burden" may consist of the filing of a report, while the "compliance burden" is putting in place the appropriate safety measures that are required.

118. The Commission concluded that the work on the new structure of the regulatory framework and ongoing reviews is a good opportunity to re-examine the level of conservatism in the existing requirements and to address opportunities to minimize administrative burden in the CNSC regulations.

Closure of the Public Meeting

119. The meeting closed at 12:31 p.m.

Recording Secretary

2013-08-26
Date

Secretary

26/8/13
Date

APPENDIX A

CMD	DATE	File No

13-M20 2013-04-15 Edocs #4119956
Notice of Meeting of May 15 and 16, 2013

13-M21 2013-05-02 Edocs #4130268
Agenda of the meeting of the Canadian Nuclear Safety Commission to be held on Wednesday and Thursday, May 15 and 16, 2013, in the Public Hearing Room, 14th floor, 280 SlaterStreet, Ottawa, Ontario.

13-M21.A 2013-05-10 Edocs #4135041
Updated Agenda of the meeting of the Canadian Nuclear Safety Commission to be held on Wednesday and Thursday, May 15 and 16, 2013, in the Public Hearing Room, 14th floor, 280 SlaterStreet, Ottawa, Ontario.

13-M23 2013-05-14 Edocs #4128744
CNSC Staff on Status Report on Operating Reactors

13-M24 2013-04-30 Edocs #4129185
Presentation from CNSC Staff on the decommissioning of the Gentilly-2 Nuclear Generating Station

13-M24.1 2013-04-30 Edocs #4129429
Presentation form Hydro-Québec on the decommissioning of the Gentilly-2 Nuclear Generating Station

13-M25 2013-05-08 Edocs #4133564
Presentation from CNSC Staff- Annual Regulatory Framework Program Report - May 2013

13-M25 2013-03-25 Edocs #4130447
CNSC staff on Regulatory Framework Year-End Review FY 2012-13

13-M26 2013-05-16 Edocs #4128926
CNSC Package Certification Process

13-M26 2013-05-15 Edocs #4130264
Presentation to the Commission: Certification Process for Transport Packages

13-M27 2013-03-28 Edocs #4120367
Event Initial Report on AECL NRU

13-M31 2013-03-25 Edocs #4135030
Event Initial Report - AECL - Dose records not submitted to National Dose Registry