

Canadian Nuclear
Safety Commission



Commission canadienne
de sûreté nucléaire

Minutes of the Canadian Nuclear Safety
Commission (CNSC) Meeting held
on March 27, 2014

Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held Thursday, March 27, 2014 beginning at 9:08 a.m. at the Public Hearing Room, 14th floor, 280 Slater Street, Ottawa, Ontario.

Present:

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

M. Leblanc, Secretary
L. Thiele, General Counsel
D. Carrière, Recording Secretary

CNSC staff advisors were: G. Rzentkowski, K. Lafrenière, F. Rinfret, M. Santini, A. Régimbald, B. Thériault, M. Rinker, K. Klassen, S. Faille, R. Awad, G. Frappier, Y. Akl, B. Torrie, C. Moses and S. Shim

Other contributors were:

- Ontario Power Generation: L. Swami, G. Newman, P. Spekkens, J. Vecchiarelli and M. Elliott
- Bruce Power: F. Saunders
- New Brunswick Power: D. Mullin
- RSB Logistics: G. Eckel

Participants: Shawn-Patrick Stensil
Chris Rouse

Constitution

1. With the notice of meeting CMD 14-M11 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 February 5 and 6, 2014, Commission Member Documents CMD 14-M11 to CMD 14-M19 were distributed to Members. These documents are further detailed in Annex A of these minutes.

Adoption of the Agenda

3. The revised agenda, CMD 14-M12.A, was adopted as presented.

Chair and Secretary

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

Minutes of the CNSC Meeting Held February 5 and 6, 2014

5. The Commission Members approved the minutes of the February 5 and 6, 2014 Commission Meeting as presented in CMD 14-M13.

STATUS REPORTS

Status Report on Power Reactors

6. With reference to CMD 14-M14, CNSC staff presented the Status Report on Power Reactors.
7. CNSC staff provided further details regarding an event that was reported to the Commission on August 21, 2013 where approximately 400 kilograms of heavy water leaked from the Heat Transport System instrument line in Bruce B, Unit 5. CNSC staff reported having reviewed the required Root Cause Analysis and implementation of corrective measures, and found that Bruce Power implemented sufficient corrective measures to prevent this type of event in the future. The event had no impact on the safety of workers and the environment.

Gentilly-2 Nuclear Generating Station

8. The Commission enquired about the status of the Gentilly-2 Heat Transport System (HTS) draining activities. CNSC staff noted that some small sections still need to be drained. CNSC staff also noted that the heavy water will be transferred into storage drums and eventually sold to another nuclear utility.
9. The Commission asked when the decommissioning plan for Gentilly-2 will be available. CNSC staff responded that the availability of the decommissioning plan remains unknown since Hydro-Quebec does not currently plan to proceed with decommissioning before 2055. CNSC staff stated that Hydro-Quebec has submitted its preliminary decommissioning plan, as required by its operating licence, and that efforts are being focused on the safe dry storage of used fuel.

Pickering Nuclear Generating Station

10. With regards to an event that occurred at the Pickering Nuclear Generating Station (NGS) on March 22 and 23, 2014, where Units 1 and 4 exceeded their combined Ontario Ministry of the Environment (MOE) Certificate of Approval limits for average

- cooling water temperature discharged over a 24-hour period, the Commission enquired about the environmental effects of operating at higher temperature. The Ontario Power Generation (OPG) representative responded that the limit is imposed by the MOE to limit impacts on the aquatic environment from changes in temperature of the cooling water discharged.
11. At the request of the Commission, the OPG representative provided details on the cause of the increase in average temperature. The Commission asked what kind of penalty OPG receives when exceeding this limit. The OPG representative responded that the MOE considers the overall performance of the plant in rendering its decision as to whether to impose a fine.
 12. The Commission enquired about the actions required if the cooling water discharge temperature cannot be maintained below the MOE limit for a long period of time. The OPG representative responded that it does not intend to operate the plant above the limit, and that this rise in average temperature was caused by a failure of the electrical system in the screenhouse which required the condenser cooling water pumps to be shutdown. The OPG representative stated that the cooling water discharge temperature limit has been exceeded in the past, and that, for every one of these infrequent events, investigations were performed and corrective actions were implemented to prevent reoccurrence. If it had to operate with a higher average cooling water discharge temperature, it would take additional measures to ensure that it met the requirements of its Environmental Compliance Approval Certificate issued by the MOE.
 13. The Commission asked if there are ways to manage the temperature difference across the plant. The OPG representative responded that there are limited opportunities to lower the temperature difference across the plant, other than to lower the power rating.

Bruce B Nuclear Generating Station

14. The Commission enquired about the root cause of the Bruce B Unit 5 Heat Transport System instrument line leak. CNSC staff responded that the test which led to the leak had not identified the requisite critical steps. CNSC staff stated that it reviewed the revised test procedure and found that it should prevent the reoccurrence of the event. CNSC staff stated that lack of experience was part of the cause, since the test is only conducted annually. Bruce Power has addressed this in their operator training programs, and has instituted a requirement to have an experienced person who has performed the test in the past conduct the pre-job briefing to provide a better understanding of the critical steps of the test. The Bruce Power representative provided further information on the test performed, and stated that clear indication of isolation was lacking during the event and clarity was lacking in operating

procedures. This procedure was re-written to clarify critical steps. Bruce Power is also changing their operator basic skills training program.

15. The Commission asked if this is the first occurrence of this type of mistake. The Bruce Power representative responded that it is, and is currently identifying other infrequently performed operations that have similar risks to prevent reoccurrence of this type of event.

Information on the Incident Involving Radiation Exposure of Workers at Cliffs Quebec Iron Mining Limited

16. With regards to an incident that occurred at the Cliffs Quebec Iron Mining Limited iron mine in Fermont, Quebec, where a group of workers received radiation doses above the public dose limit of one millisievert (mSv), CNSC staff provided preliminary information and a description of the incident, explaining that workers were doing maintenance work in the conveyors where two of four nuclear gauges had been unknowingly left in the open position. The company ceased work as soon as they were aware of the incident and informed the CNSC of the event the next day. CNSC staff stated that further investigation is required to determine the precise dose received. CNSC staff stated that investigations performed to date indicate that the dose to workers did not exceed the 50 mSv annual dose limit for nuclear energy workers, and that adverse health effects as a result of this incident are not expected. CNSC staff added that the company has been ordered to cease maintenance work in areas housing nuclear gauges and prohibited from handling nuclear gauges until corrective measures satisfactory to CNSC staff have been implemented. The company, 24 hours after notifying the CNSC, provided a preliminary report on the incident to the CNSC. CNSC staff is currently reviewing this information.
17. The Commission asked how CNSC staff can be certain that there are no adverse health effects from this event when the precise dose received by workers is unknown. CNSC staff responded that a radiation protection specialist, hired by Cliffs Quebec Iron Mining Limited, investigated the radiation fields in the area where maintenance work was being performed and, using information from worker's registries provided by Cliffs Quebec Iron Mining Limited, CNSC staff was able to estimate the dose received by workers based on occupancy of personnel in proximity to the nuclear gauges. CNSC staff stated that it is waiting for the final report from Cliffs Quebec Iron Mining Limited to have more precise doses.

18. The Commission asked why some nuclear gauges were left in the open position while others were closed. CNSC staff stated that it is still investigating why some nuclear gauges were left in the open position to determine if it was due to an operator error or mechanical failure. The Commission asked if the company has workers qualified by the CNSC to handle the nuclear gauges. CNSC staff explained that it does, and that these qualified workers are responsible for ensuring that gauges are in the closed position before maintenance work commences. CNSC staff stated that it will report back to the Commission with its findings of the investigation.

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by
June 2014

Update on Shield Source Incorporated

19. With regards to the status of cleanup activities of Shield Source Incorporated's (SSI) tritium processing facility located in Peterborough, Ontario, CNSC staff reported that cleanup and decontamination activities are complete. CNSC lab personnel and inspectors have been on site during all cleanup activities and can confirm, through their own monitoring results and verification of SSI's monitoring results, that the facility is clean and fit for a new non-nuclear, non-regulated tenant. CNSC staff also reported on the state of the environment, stating that it has significantly improved since the facility has ceased tritium production two years ago. CNSC staff stated that SSI has submitted a request to the Commission to revoke its Nuclear Substance Processing Facility Operating Licence for its Airport Road facility located in Peterborough, Ontario.¹
20. The Commission asked if tritium levels in the environment remain higher than normal background levels. CNSC staff responded that levels remain above background levels. Tritium levels in air are near zero, at 100 to 1000 times lower than what they were during operation. Tritium levels in soil are measurable, but are very low. CNSC staff stated that they will continue to monitor the one well showing tritium levels above the drinking water standard of 7,000 Becquerels per litre to ensure the activity levels continue to decrease. CNSC staff also stated that the wells around the facility are not drinking water wells.
21. The Commission asked if other ongoing monitoring is required, other than the one water well. CNSC staff responded that it will continue to monitor the facility only to gain knowledge and information about tritium cycling that may benefit the CNSC from a regulatory perspective since they are confident that the protection of people and the environment has already been achieved.

¹ On March 28, 2014, the Commission issued a licence to abandon for the facility, valid from April 1 to April 30, 2014.

22. The Commission enquired about the decommissioning cost and how it compared with the financial guarantee that was in place for decommissioning. CNSC staff responded that there was sufficient funding in the financial guarantee to cover the cleanup costs, and that most of the funding was used for cleanup.
23. The Commission asked if other regulators and stakeholders agree with the cleanup of SSI's tritium processing facility. CNSC staff responded that there are two stakeholders, the Municipality of Peterborough (the landlord) and the Ontario Ministry of the Environment (MOE). CNSC staff stated that the Municipality of Peterborough is interested in obtaining information stating that the facility has been cleaned-up to inform their next tenant. The MOE has some concerns regarding environmental monitoring; CNSC staff will submit its preliminary plan to better understand tritium in the environment to the MOE and will discuss future monitoring with the MOE.

INFORMATION ITEMS

Update on the Incident Involving Four Uranium Hexafluoride Cylinders at the Port of Halifax

24. With reference to CMD 14-M19, CNSC staff presented an update on an incident involving four uranium hexafluoride cylinders at the Port of Halifax on March 13, 2014. CNSC staff presented a detailed account of the incident and reported that regulatory requirements were met throughout the event. CNSC staff also reported that it was safe for people working near the packages and the environment. All four packages involved in the incident were found to be intact; there was no release of uranium hexafluoride (UF₆) from the packages. CNSC staff stated that the cause and circumstances of the incident are still under review, and it will report to the Commission in writing following the completion of the investigation.
25. The Commission asked if this type of incident occurs frequently at ports. The RSB Logistics representative stated that the Port of Halifax informed them that this type of incident occurs once every 200,000 container moves.
26. The Commission enquired about maintenance and inspection of port equipment. The RSB Logistics representative responded that the port facility is responsible for maintenance and inspections since it owns the equipment. RSB Logistics is awaiting maintenance and service records for equipment involved in the incident from the Port of Halifax to determine if these were current.
27. The Commission enquired about the number of layers of flatracks contained in a cargo hold and asked if there is a possibility that the drop could have exceeded the UF₆ container 9-metre drop design

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by
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- limit if more layers had been removed from the cargo hold. The RSB Logistics representative responded that there are several layers of flatracks. CNSC staff stated that there is no height limitation in the regulation for lifting the containers. The drop limit for which the containers are designed is to simulate a road accident at a certain speed. The Commission requested that the potential consequences of a 9-metre drop be evaluated.
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by
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28. The Commission enquired about UF₆ and the design of packages used to contain it. CNSC staff provided a description of UF₆ product that was involved in the incident and associated hazards. CNSC staff also provided information on the design qualification of UF₆ packages and explained the package certification process. The Commission requested further information from CNSC staff on the design requirements for the manufacture of cylinders containing UF₆, including what would happen if they were to be dropped while being loaded into overpacks.
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29. The Commission enquired about the incident response time. CNSC staff explained that the Canadian Transport Emergency Centre, known as CANUTEC and operated by Transport Dangerous Goods Directorate of Transport Canada, and RBS Logistics were the first to be notified. CNSC staff was then notified by CANUTEC. When transportation accidents occur, emergency responders are trained to contact CANUTEC first. CNSC staff stated that it was contacted at 10:00 p.m., and that it had an inspector on site by 4:00 p.m. the following day. The Commission commented on the length of time it took for CNSC staff to arrive at the site. CNSC staff explained that there was no breach of containment and that the situation was under control through the night by having a safety perimeter established by the first responders. CNSC staff was assisting remotely from Ottawa prior to arriving on site through direct contact with first responders. CNSC staff had the option of sending a CNSC inspector from the Saint-John's, New Brunswick office earlier if it had been deemed necessary; staff decided, given that the situation was not dire, to send expert staff from Ottawa the next day, rather than non-expert staff on the same day.
30. The Commission enquired about first responder training. CNSC staff responded that it trains first responders across Canada under the Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) Resilience Strategy for Canada. The Commission asked if the performance of first responders during the event was satisfactory. CNSC staff responded that first responders did exactly what was expected of them by the CNSC. CNSC staff will address how first responders report radiation dose rates to the media in its training program.

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| <p>31. The Commission asked if areas for improvement were noted during CNSC's response to this incident. CNSC staff stated that they will be discussing lessons learned from the event in early April 2014 and will report its findings to the Commission.</p> <p>32. The Commission asked why the containers of UF₆ were transferred into new overpacks. CNSC staff responded that there were minor damages to the overpacks, and new flatrack with new overpacks were brought in as a precautionary measure.</p> <p>33. The Commission asked why it took the terminal operator a few more days to resume normal operation after the CNSC inspector determined that it was safe to resume operation. CNSC staff responded that the terminal operator wanted sufficient insurance that there was no loose contamination on the surface of the container and wanted the containers to be removed from the cargo hold while there were less people in the terminal.</p> | <p><u>Action</u>
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Fitness for Service of Pressure Tubes

34. With reference to CMD 14-M15 and CMD 14-M15.1, Bruce Power, Ontario Power Generation Inc. (OPG) and CNSC staff presented on the topic of fitness for service of pressure tubes. This presentation was general in scope, and it did not focus on any specific facility. Bruce Power and OPG described the pressure tube life cycle management process and discussed the elements for continued safe operation of CANDU nuclear reactors. They also described recent research, assessment methodologies and development results. CNSC staff presented its regulatory approach to fitness for service of pressure tubes and provided a brief overview of regulatory oversight of pressure tube operation, focusing on regulatory requirements and their effective implementation to ensure CANDU nuclear power plants operate safely in accordance with the licensing basis.
35. The Commission enquired about the operating life of pressure tubes. The Bruce Power representative responded that the life expectancy of pressure tubes depends on hydrogen concentration; they can predict the number of years based on calculations using reactor-specific operating conditions. The length of fitness for service does not vary greatly for different reactors with similar number of hours of hot operation. The Commission asked how these calculations compare with the concept of equivalent reactor full power hours. The Bruce Power representative explained that during the initial reactor design stage, designers did not have a thorough understanding of how pressure tubes age and used equivalent reactor full power hours as an appropriate target for operating life. Other methods have since been developed. The Bruce Power representative further explained the issue of hydrogen ingress in pressure tubes.

36. The Commission asked if the industry will recommend changing the equivalent reactor full power hours for which a reactor is allowed to operate to align with the actual condition of pressure tubes. The Bruce Power representative responded that reactors can operate safely up to a concentration of hydrogen of 124 parts per million (ppm); therefore, they can determine how long each individual reactor can operate safely by finding the time at which that specific concentration of hydrogen is reached in each reactor. The Bruce Power representative further stated that they continue to pursue studies on this topic to find if reactors can be operated safely above this concentration of hydrogen.
37. The Commission enquired about the number of pressure tube failures that have occurred. A Bruce Power representative enumerated the different pressure tube failures that have occurred, stating that there has only been one significant failure since CANDU reactor operations began in Canada.
38. The Commission enquired about OPG and Bruce Power's confidence in their research results, and how their results have been proven. The OPG representative stated that they are confident that their laboratory measurements are representative of the properties of operating pressure tubes since they are testing material that has been in service in operating reactors.
39. With regards to probabilistic studies conducted, the Commission asked how the industry can be assured that all pressure tubes in every unit have been evaluated and are being adequately monitored. A Bruce Power representative responded that a fairly substantial number of pressure tubes are periodically inspected and some are sampled for hydrogen isotope concentration. Fuel channels are also periodically taken out of service and tested. Using data they collect, they calculate the likelihood of pressure tube failure and compare with the industry standard acceptance criteria.
40. The Commission enquired about the regulation of reactor-specific conditions, if the concentration of hydrogen becomes the standard for determining fitness for service. CNSC staff responded that there are a number of factors that require consideration in its regulatory oversight. The CSA standards will be revised to better reflect the new condition for operating reactors and licensees' procedures will be reviewed to ensure that all conditions are monitored through the main control room.
41. The Commission enquired about the fracture toughness models and the relationship between the pressure tube material strength and temperature. CNSC staff and an OPG representative explained that most metallic materials are brittle at low temperature and, conversely, more ductile and stronger at higher temperatures. The

OPG representative also explained the fracture toughness models, stating that the curves present the limit in a specific material property and only apply to the specific metal alloy used in pressure tubes. The Commission asked if the risk of fracture is a function of fracture toughness added to the hydrogen concentration and the length of exposure time to hydrogen. The OPG representative responded that it is not additive; the length of time operating at high temperature determines the concentration of hydrogen and the concentration of hydrogen determines the change in fracture toughness. The OPG representative stated that there is no cumulative weakening of the material toughness when in the cool region of the curve.

42. With regards to questions from the Commission about destructive and non-destructive testing, an OPG representative described the methods used to test pressure tubes.
43. The Commission enquired about other possible phenomena that could impact the aging of pressure tubes. An OPG representative responded that they periodically remove and test fuel channels to confirm that other degradation mechanisms are not present. CNSC staff described other aging-related degradation mechanisms affecting the fitness for service of pressure tubes. The presentation was focused on hydrogen intake because it is a predominant degradation mechanism and it is directly related to the fractural toughness of the pressure tubes.

Joint Industry Presentation on Probabilistic Safety Assessment (PSA)

44. With reference to CMD 14-M16 and CMD 14-M16.1, Bruce Power, Ontario Power Generation Inc. and New Brunswick Power presented an overview of the probabilistic safety assessments (PSA) used as part of their overall safety assessment at their respective facilities. The presentation included the concept of risk and safety goals, an overview of PSA methodology, the various uses of PSA, the various PSA improvements to methodology, and a perspective from the whole site approach to risk assessment. CNSC staff presented the licensing requirements stemming from the general safety and health objectives and their effective implementation to reduce the likelihood of severe accidents and potential radiological consequences.
45. The Commission sought more information regarding the safety goals being the surrogate of health outcomes. CNSC staff explained that the release limits are set at a value that triggers either a temporary or shortened evacuation to reduce societal impacts to the extent possible. An OPG representative explained that, through the surrogate safety goals, they have set a more stringent goal on an actual large release, which is at the same frequency limit as the health risk and which does not necessarily

- result in cancer fatality. By focusing on avoiding the long-term relocation or prolonged evacuation of the public, as that being the threshold at the same frequency as the health objective, meeting the surrogate will meet the health objective.
46. The Commission asked why Level 3 PSAs are not performed. An OPG representative responded that Level 3 PSAs are not performed because they require complex modelling factors that carry a great uncertainty. The goals in Level 3 PSAs are set to a point where there is no or minimal societal disruption. Level 1 and Level 2 PSA have a higher degree of certainty than Level 3 PSA, which is important for showing that the safety goals are met. CNSC staff stated that the approach it currently applies is to establish release limits for the safety goals, which is a better method since it protects the society at large and it is not subject to uncertainty. The Commission asked if a Level 3 PSA has ever been attempted. A NB Power representative responded that, while it did not perform a full Level 3 PSA, it did go beyond the Level 2 PSA and performed some offsite consequence analyses as part of its plant refurbishment. This work was completed to gain information in the context of future cost-benefit assessments, valuations and for assisting with emergency planning purposes. CNSC staff added that the U.S. NRC is currently undergoing a research project on Level 3 PSAs in order to determine if work to date is sufficient for these to be practical. There is no international standard on Level 3 PSAs, but the IAEA has a working group on Level 3 PSAs to revise the standard and guidelines. The IAEA is not currently recommending that a regulator follow the guidelines for Level 3 PSAs.
47. The Commission asked what additional information or data a Level 3 PSA would provide if a Level 3 PSA is not required to guarantee that the plant is secure and safe. CNSC staff responded that current PSAs provide the precise conditions which will trigger the evacuation of the population. A Level 3 PSA would provide useful information that would allow the prediction of health effects on the public. CNSC staff added that the safety and the effects on the population are not exclusively determined by PSAs. PSAs are effective and evolving tools for identifying vulnerabilities and performing cost-benefit analyses.
48. The Commission asked if the multi-unit site will be taken under consideration in the Level 3 PSA. CNSC staff responded that the entire site must be considered because performing analyses on a per-unit basis may not accurately reflect reality under accident scenarios.

49. The Commission enquired about risk aggregation. CNSC staff responded that its objective is to establish a proposed regulatory position on risk aggregation by December 2014. CNSC staff stated that using the same safety goals on a per unit basis and per station basis may not be appropriate. CNSC staff said that it currently uses direct aggregation for its own knowledge as a safety indicator, not a risk metre, in guiding its decisions. As a safety indicator, risk aggregation is a very useful input into the risk-informed decision-making process. An OPG representative stated that its plants are safe because it has multiple ways of assessing the safety of the plants. PSA is one approach, which is compared to safety goals limits and targets on a regular basis.

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by
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2014

50. The Commission asked if PSA results vary from reactor to reactor on a given site. CNSC staff and an OPG representative responded that the PSA does not vary from one unit to another on a given site since a reference unit is selected to conduct one PSA per site. The Commission asked if maintenance histories for components of all units on a site are taken into consideration when conducting PSAs. The OPG representative responded that one reference unit is selected to conduct the per-unit safety goal assessment.

51. The Commission asked how it is proven that health limits are met. CNSC staff explained the frequency of external and internal events and stated that the approach taken by the CNSC is very pragmatic, setting the frequency for the large release and the limit for the large release at the same time. A Bruce Power representative stated that a health study is associated with the safety report that looks at each accident sequence, the isotopes that would be released, the impact that would have on the critical group, and the area with the highest concentration of that isotope. This is a very conservative deterministic way of proving health limits are met, by requiring that the releases wouldn't expose a member of the public to health effects. CNSC staff added that safety goals extend the design basis envelope to include severe accidents, specifically to ensure that their likelihood is limited to as low as practical and also to mitigate the consequences should an accident happen. The release limits for design basis accidents are limited to ensure that no member of the public receive a dose greater than 20 mSv.

52. The Commission enquired about levels of releases and levels of uncertainty in PSAs. A Bruce Power representative explained that this is primarily looking at the difference between internal equipment-based modelling and external event modelling. To calculate equipment-based probabilities, licensees model systems in the plants to determine the approximate failure frequency. Probabilities for external events are much harder to calculate since the events are unpredictable and errors associated with predictions for external events are much greater than for equipment-based events.

53. The Commission asked how the output of PSAs currently being conducted by the industry would reduce the likelihood of a major event, such as the Chernobyl or Fukushima accidents, from occurring. A Bruce Power representative responded that the PSA would have determined the weaknesses in design where operator errors with significant outcomes are more likely to occur. PSAs help in identifying potential events and individual sequences that may lead to them in order to assess the overall design.
54. The Commission expressed concerns with conducting PSAs on a per unit basis as opposed to PSAs for multiple units and commented that this subject is of interest to the general population. The Commission suggested that a whole site risk assessment be developed for each site. An OPG representative responded that they understand the challenge associated with site-wide risk assessments and are committed to producing one within the next few years.

DECISION ITEMS

Fukushima Omnibus REGDOC Amendments Project: REGDOC 2.4.1, *Deterministic Safety Analysis*, and REGDOC 2.4.2, *Probabilistic Safety Assessment (PSA) for Nuclear Power Plants*

55. With reference to CMD 14-M17, CNSC staff presented to the Commission its recommendation on the final two new regulatory documents in the Fukushima Omnibus Amendments Project, Regulatory Document REGDOC-2.4.1, *Deterministic Safety Analysis*, and Regulatory Document REGDOC-2.4.2, *Probabilistic Safety Assessment (PSA) for Nuclear Power Plants*, which are key elements of its overall regulatory framework improvements as part of the Fukushima Staff Action Plan. These documents contain amendments to existing regulatory documents, standards and guides to address the lessons learned from the event at Fukushima. CNSC staff presented background information regarding the project and its approach to public consultation, outlined the general feedback received by stakeholders focusing on the results of an additional round of consultations, discussed the specific improvements that are suggested in the two proposed regulatory documents, as well as the implementation plan.
56. A Bruce Power representative provided comments on the proposed regulatory documents, stating that section 4.7 of REGDOC-2.4.2 does not provide sufficient clarity on the methodology and computer codes to be used for PSAs. It is requesting that general requirements and the technical inputs that are necessary be included in REGDOC-2.4.2. The Bruce Power representative stated that it is otherwise satisfied with the amendments that were made to these two regulatory documents. CNSC staff responded that it agrees that a technical standard describing the requirements

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by
March 2016

- would help provide the clarity and direction the industry is requesting; since it does not currently exist, a general provision was included in REGDOC-2.4.2 for CNSC staff acceptance of the methodologies proposed by licensees on a case by case basis. CNSC staff committed to defining the methodology to be used for the PSA within the next two years and report to the Commission.
57. Further to a question from the Commission regarding amendments to regulatory documents, CNSC staff explained that it welcomes comments on regulatory documents at any time and that, depending on the nature of the comments, immediate changes can be implemented or changes can be made during subsequent revisions of documents. The Commission recognizes that regulatory documents are continuously revised and stakeholders will be invited to participate in future developments of regulatory documents.
58. In his intervention, the Greenpeace representative enquired about CNSC staff's and licensees' obligations to release PSA information to the public. The Commission also enquired about what is reasonably disclosed in PSAs. CNSC staff responded that the public information program requirements are defined in Regulatory Document RD/GD-99.3, *Public Information and Disclosure*. However, given the feedback received from stakeholders and from the Commission during the Commission Meeting in August 2013, CNSC staff decided that it was appropriate to include specific guidance suggesting the release of information related to PSA, subject to security considerations in REGDOC-2.4.2. The OPG representative stated that it cannot release the full PSAs, due to security issues, and provides information to the public to the extent it can. It provides summary information upon completion of PSAs. The Commission requests licensees to provide useful and timely information on PSAs as part of their public information program and as part of the requirements of RD/GD-99.3.
59. The Greenpeace representative requested that a requirement be added to REGDOC-2.4.2 for information related to offsite health and environmental risks determined by PSAs to be released to offsite emergency planning organizations. CNSC staff explained that requirements regarding emergency preparedness and response are included in a separate regulatory document currently undergoing review. This regulatory document will include the CNSC's expectations regarding disclosure of information.
60. The Greenpeace representative commented that the proposed REGDOC-2.4.2 does not consider all the lessons from Fukushima regarding PSA. Specifically, the CNSC has yet to modernize safety goals to address the risk posed by site-wide risk assessment of individual reactors as well as the metrics of consequence that are used to judge social acceptability. The intervenor stated that he is

- requesting that the public be included in consultation on new site-wide goals, including metrics that will be used, and acknowledgement that this proposed regulatory document is not a final response to Fukushima. As mentioned in paragraph 57 above, the Commission recognizes that regulatory documents are continuously revised and stakeholders will be invited to participate in future developments of regulatory documents. Accordingly, REGDOCs relating to Fukushima are evolutionary and will incorporate other lessons learned as they arise.
61. In his intervention, C. Rouse discussed his concerns regarding changes made in the last round of consultations of REGDOC-2.4.2. Specifically, the intervenor was concerned about a change in the terminology used in section 3a of REGDOC-2.4.2 where the word “comply” in the sentence “... the design will comply with the fundamental safety objectives...” was changed to “align”, which he states is no longer enforceable. CNSC staff responded that the term align is appropriate in this case because the fundamental safety objectives of the NSCA are enforceable and the design of the PSA is to align with those objectives. The requirements of the NSCA are captured in the regulatory framework, not through a regulatory document on probabilistic safety assessment.
62. The intervenor was also concerned about a change in the terminology used in section 4.7 of REGDOC-2.4.2 where the word “shall” in the sentence “The methodology shall be suitable to support the objectives of the PSA [...] and to support the intended PSA applications” was changed to “should”. The intervenor stated that this change weakens the requirements currently in place and would be inconsistent with the NSCA and Canada’s international obligations. CNSC staff explained that, as a result of feedback received from the Fukushima Task Force stating that the CNSC should better explain what it is trying to accomplish with PSAs, CNSC staff developed objectives for PSAs. These objectives are consistent with the approach from IAEA, and not intended to be requirements; they are a guide to explain what is to be accomplished. The balance of REGDOC-2.4.2 sets out how to meet those objectives. CNSC staff stated that the change in terminology serves to clarify what PSAs are to accomplish. The Commission recommended minor changes to the text to clarify that it is guidance.
63. The Commission stated that it has noticed that small reactor licensees had not provided comments during the consultation periods for the two draft REGDOCS and asked if the documents will increase the number of expectations on those smaller installations. CNSC staff responded that feedback was received from one small reactor operator facility recommending that all changes made as a result of stakeholder comments be equally applied to requirements for small reactor facilities. Staff also

- indicated that reactor operators are not required to perform certain activities larger utilities are, such as PSAs. The amendments proposed would not impose significant changes to the licensing process of new small reactors.
64. The Commission requests that CNSC staff review REGDOCs 2.4.1 and 2.4.2 to correct typographical errors noted.
65. After considering the recommendations submitted by CNSC staff, the Commission approves Regulatory Document REGDOC 2.4.1, *Deterministic Safety Analysis*, and Regulatory Document REGDOC 2.4.2, *Probabilistic Safety Assessment (PSA) for Nuclear Power Plants*, for publication and use. DECISION

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

66. With reference to CMD 14-M18, CNSC staff presented to the Commission its recommendation on Regulatory Document REGDOC-2.5.2, *Design of Reactor Facilities: Nuclear Power Plants*, which has been drafted to update requirements for the design of new water cooled nuclear power plants, implement recommendations from the Fukushima Task Force Report and provide guidance to licensees in understanding and complying with the requirements. CNSC staff presented background information regarding the project and its approach to public consultation, outlined the general feedback received by stakeholders focusing on the results of an additional round of consultations, discussed the specific improvements that are suggested in the proposed regulatory document, and discussed the implementation plan.
67. The Commission sought more information regarding section 11, *Alternative Approaches*. CNSC staff explained section 11, stating that if licensees or applicants cannot meet the specific details of REGDOC-2.5.2, they can demonstrate equivalent levels of safety to be considered by CNSC staff. Applicants wishing to introduce new, non-water cooled reactor designs in Canada can take advantage of the CNSC's pre-project design review services to present their safety case. CNSC staff stated that this REGDOC is a guide for determining requirements for specific new designs.
68. The Commission asked if this document will be applicable to any existing nuclear power plant in Canada. CNSC staff responded that it is intended for new constructions only. CNSC staff explained that this document will be useful during refurbishment projects for assessing whether existing plants have equivalent levels of safety or what gaps need to be addressed.

69. The Commission asked if CNSC staff expects to receive a new design project in the foreseeable future. CNSC staff responded that discussions for or against new projects are ongoing across Canada and that CNSC staff is maintaining their regulatory framework up-to-date in the event that there is an application for new reactor design. CNSC staff also added that it maintains this document in order to compare currently operating reactors to the design requirements for new reactors during future refurbishment projects.
70. The Commission asked if other nuclear regulators have a similar document with up-to-date design specifications. CNSC staff responded that all major regulators have requirements associated with new designs. CNSC staff stated that it consulted design documents from other regulators when writing REGDOC-2.5.2. Other regulators also consult CNSC regulatory documents.
71. The Commission asked if the benchmark study completed by CNSC staff comparing RD-337, *Design of New Nuclear Power Plants*, against the design requirements of five foreign regulators is publicly available. CNSC staff stated that the abstract is available on the CNSC website and the entire report can be requested through the CNSC. The Commission asked why the CNSC design requirements for electrical systems do not compare with those of other regulators. CNSC staff explained that other regulators found that the CNSC electrical system requirements were not sufficiently comprehensive. The electrical system requirements have since been modified to be quite comprehensive and cover all aspects of the electrical system designs.
72. With regards to the additional round of consultation, the Commission asked if the CNSC will revise its document consultation process. CNSC staff explained their standard public consultation process, and stated that this process is adjusted to add a post-consultation period when substantive changes are made or if there are changes to the approach of a direction as a result of the comments received in the first round of consultation. CNSC staff has committed to providing copies of draft regulatory documents to stakeholders at least 60 days before they are presented to the Commission for approval in order to provide enough time for review.
73. The Commission asked if REGDOC 2.5.2 also considers the decommissioning phase in the design stage of new reactors. CNSC staff responded that when it reviews the design of the plant at the construction licensing phase and during the vendor design review process, it looks at the ability to decommission the plant. This is cited in section 7.24 of REGDOC-2.5.2.

74. The Commission asked if existing facilities meet the design specifications presented in REGDOC-2.5.2. CNSC staff responded that existing plants are reviewed against the newest standards and the onus is placed on the licensee to demonstrate gaps that can be closed or to provide alternatives to show that the plants are operating safely. All operating reactors must at least meet the safety goals established by the standard. The safety of operating facilities is currently very close to the safety which is defined by REGDOC-2.5.2. The Commission recommended that this be explained in REGDOC-2.5.2 in order to give assurance that, although this REGDOC does not apply to existing facilities, they are still operating safely. CNSC staff responded that there are other means within the regulatory framework to explain how modern standards are to be used in operating facilities.

75. The Commission instructed CNSC staff to prepare a common glossary of terms applicable to all regulatory documents. CNSC staff stated that it was committed to preparing a glossary of terms for regulatory documents.

ACTION
by
October
2014

76. After considering the recommendations submitted by CNSC staff, the Commission approves Regulatory Document REGDOC 2.5.2, *Design of Reactor Facilities: Nuclear Power Plants*, for publication and use.

DECISION

Closure of the Public Meeting

77. The meeting closed at 4:58 p.m.

Recording Secretary

MAY 08 2014

Date

Secretary

MAY 08 2014

Date

APPENDIX A

CMD	DATE	File No
14-M11	2014-02-24	Edocs # 4377506
Notice of Meeting of March 27, 2014		
14-M12	2014-03-12	Edocs #4381360
Agenda of the meeting of the Canadian Nuclear Safety Commission to be held on Thursday, March 27, 2014, in the Public Hearing Room, 14 th floor, 280 Slater Street, Ottawa, Ontario		
14-M12.A	2014-03-20	Edocs # 4402592
Revised Agenda of the meeting of the Canadian Nuclear Safety Commission to be held on Thursday, March 27, 2014, in the Public Hearing Room, 14 th floor, 280 Slater Street, Ottawa, Ontario		
14-M13	2014-03-25	Edocs # 4402786
Approval of Minutes of Commission Meeting held February 5 and 6, 2014		
14-M14	2014-03-26	Edocs # 4408521
Status Report on Operating Reactors units as of March 26, 2014		
14-M15	2014-03-19	Edocs # 4407364
Presentations on Fitness for Service of Pressure Tubes – Oral presentation by CNSC staff		
14-M15.1	2014-03-19	Edocs # 4404969
Presentations on Fitness for Service of Pressure Tubes – Oral presentation by Bruce Power and Ontario Power Generation Inc.		
14-M16	2014-03-25	Edocs # 4407366
Presentations on probabilistic Safety Assessment (PSA) – Oral presentation by CNSC staff		
14-M16.1	2014-03-19	Edocs # 4404974
Presentations on probabilistic Safety Assessment (PSA) – Oral presentation by Bruce Power, Ontario Power Generation Inc. and NB Power		
14-M17	2014-03-07	Edocs # 4380669
Fukushima Omnibus REGDOC Amendments Projects: REGDOC 2.4.1 Deterministic Safety Analysis, and REGDOC 2.4.2 Probabilistic Safety Assessment (PSA) for Nuclear Power Plants – Oral presentation by CNSC staff		
14-M17.A	2014-03-18	Edocs # 4402578
Fukushima Omnibus REGDOC Amendments Projects: REGDOC 2.4.1 Deterministic Safety Analysis, and REGDOC 2.4.2 Probabilistic Safety Assessment (PSA) for Nuclear Power Plants – Supplementary Information - Oral presentation by CNSC staff		

March 27, 2014

14-M18 2014-03-18 Edocs # 4396001
Regulatory Document REGDOC 2.5.2 Design of Reactor Facilities: Nuclear Power
Plants – Oral presentation by CNSC staff

14-M18.A 2014-03-18 Edocs # 4402648
Regulatory Document REGDOC 2.5.2 Design of Reactor Facilities: Nuclear Power
Plants – Supplementary Information - Oral presentation by CNSC staff

14-M19 2014-03-26 Edocs # 4404060
Update on the Incident involving four uranium hexafluoride cylinders at the Port of
Halifax – Oral presentation by CNSC staff