



Canadian Nuclear
Safety Commission

Commission canadienne
de sûreté nucléaire

Record of Decision

in the Matter of

Applicant Hydro-Québec

Subject Application for a Nuclear Power Reactor
Decommissioning Licence for Gentilly-2

Public Hearing Date May 5, 2016

RECORD OF DECISION

Applicant: Hydro-Québec

Address: 75 René Levesque Boulevard West, Montréal, Quebec
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Purpose: Application for a Nuclear Power Reactor Decommissioning
Licence for Gentilly-2

Application received: September 30, 2015

Date of public hearing: May 5, 2016

Location: Canadian Nuclear Safety Commission (CNSC) public
hearing room, 280 Slater St., 14th floor, Ottawa, Ontario

Members present: M. Binder, Chair
A. Harvey
D.D. Tolgyesi

Secretary: M.A. Leblanc
Recording Secretary: D. Carrière
Senior General Counsel: L. Thiele

Applicant represented by		Record
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Intervenors		Record
See appendix A		
Others		
Minister of Public Security, Direction régionale de la sécurité civile et de la sécurité incendie de la Mauricie et du Centre-du-Québec, represented by S. Doire, Regional Director		

Licence: issued

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1.0 INTRODUCTION

1. On September 30, 2015, Hydro-Québec applied to the Canadian Nuclear Safety Commission (CNSC) for a Nuclear Power Reactor Decommissioning Licence (PRDL) for the decommissioning of the nuclear facility and the operation of the waste management facilities at Gentilly-2, located in Bécancour, Quebec. Its current Power Reactor Operating Licence (PROL) for Gentilly-2, PROL 10.03/2016, expires on June 30, 2016. Hydro-Québec is applying for a ten-year decommissioning licence.
2. The Gentilly-2 plant began production on October 1, 1983. Since the current licence was issued, the Quebec government decided to shut down the nuclear power plant and put an end to commercial production. The reactor was permanently shut down on December 28, 2012. Hydro-Québec initiated stabilization measures, such as unloading the reactor core, and shutting down and draining many of the plant's systems. At this time, Gentilly-2 is in a safe storage state with the spent fuel stored in the pools provided for this purpose [SSS (pools)].
3. Achieving dry safe storage state [SSS (dry)] is the next significant milestone to transition the nuclear facility toward eventual dismantling. In that state, all fuel will be removed from the pools and placed in dry storage in the outdoor CANSTOR modules provided for this purpose.
4. The requested authorization period would allow Hydro-Québec to complete the activities required to achieve SSS (dry) and, thus the beginning of the dormancy phase.

Issue

5. In considering the application, the Commission was required to decide, pursuant to subsection 24(4) of the *Nuclear Safety and Control Act*¹ (NSCA):
 - a. whether Hydro-Québec is qualified to carry on the activities that the licence would authorize; and
 - b. if, in carrying on those activities, Hydro-Québec would make adequate provision for the protection of the environment, the health and safety of persons, and the maintenance of national security and measures required to implement international obligations to which Canada has agreed

Public Hearing

6. The Commission, in making its decision, considered the information presented at a public hearing held on May 5, 2016 in Ottawa, Ontario. The public hearing was conducted in accordance with the *Canadian Nuclear Safety Commission Rules of Procedure*². The Commission considered written submissions and heard oral submissions from Hydro-

¹ Statutes of Canada (S.C.) 1997, ch. 9.

² Statutory Orders and Regulations (SOR)/2000-211.

Québec (CMD 16-H4.1, CMD 16-H4.1A) and from CNSC staff (CMD 16-H4, CMD 16-H4.A). The Commission also considered written submissions from five intervenors (see appendix A for a detailed list of interventions). The public hearing was broadcast live on the CNSC website, and the webcast is available on the same site for a period of 90 days following the decision.

2.0 DECISION

7. Based on its consideration of the matter, as described in more detail in the following sections of this Record of Decision, the Commission concludes that Hydro-Québec is qualified to carry on the activities that the proposed licence would authorize and that, in carrying on those activities, it will make adequate provision for the protection of the environment, the health and safety of persons, and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.

Therefore, pursuant to section 24 of the *Nuclear Safety and Control Act*, the Commission issues to Hydro-Québec Nuclear Power Reactor Decommissioning Licence PRDL 10.00/2026 for the Gentilly-2 nuclear facility and the Gentilly-2 waste management facilities. The licence is valid from July 1, 2016 to June 30, 2026.

8. The licence authorizes activities related to the decommissioning of the Gentilly-2 nuclear facility, and the operation of the waste management facilities at Gentilly-2.
9. The Commission includes in the licence the conditions recommended by CNSC staff, as set out in the draft licence attached to CMD 16-H4, with the following amendment:
 - 15.1 Before undertaking the activities contemplated in paragraph **IV(v)**, the licensee must submit a quality plan, project execution plan, environmental protection plan and an audit plan for approval by the Commission or the consent of a person authorized by the Commission.
10. The Commission authorizes the following powers:
 - regarding licence condition G.3, approve requests for changes to the ownership, possession or use of land within the exclusion zone and described in the Safety Report
 - regarding licence condition 3.3, approve requests for changes to operations or procedures that would invalidate the limits referred to in Condition 3.2
 - regarding licence condition 5.2, give consent to requests for changes to the design or equipment of the nuclear facility and of the waste facility that might invalidate the operating limits set out in Condition 3.2 or pose risks of a different nature or having a higher probability of occurrence than those considered in the safety analysis and in the probabilistic safety assessment

- regarding licence condition 15.1, give consent to quality, project execution, environmental protection and audit plans to be submitted by the licensee before undertaking the activities referred to in paragraph IV(v)

to the following CNSC staff members:

- Director of the Gentilly-2/Point Lepreau Regulatory Program Division
 - Director General, Directorate of Power Reactor Regulation
 - Executive Vice-President and Chief Regulatory Operations Officer
11. The Commission notes that CNSC staff can bring any matter to the Commission as applicable. The Commission directs CNSC staff to inform the Commission on an annual basis of any changes made to the Licence Conditions Handbook (LCH).
 12. The Commission asks CNSC staff to submit annual regulatory oversight reports on the performance of the Gentilly-2 facilities and on the status of nuclear facility decommissioning. CNSC staff shall present these reports at public proceedings of the Commission, where they will be included in the agenda.
 13. The Commission asks to be informed of the transition to Maintenance team autonomy in the CNSC's annual report.
 14. The Commission expects to receive from Hydro-Québec a report on the status of decommissioning once the SSS (dry) milestone has been achieved. This report will be assessed in a public Commission meeting.
 15. The Commission requests that Hydro-Québec's self-assessment of the impacts of the existing water intake at Gentilly-2 on the impingement and entrainment of biomass and fish be given to interested persons or parties, including the Council of the Huron-Wendat Nation and the Waban-Aki Nation.

3.0 ISSUES AND COMMISSION FINDINGS

16. In making its decision under section 24 of the NSCA, the Commission considered a number of issues relating to Hydro-Québec's qualification to carry out the proposed activities and the adequacy of the proposed measures for protecting the environment, the health and safety of persons, national security and international obligations to which Canada has agreed.

3.1 Management System

17. The Commission examined Hydro-Québec's management system, which covers the framework that establishes the processes and programs required to ensure that Hydro-Québec achieves its safety objectives, continuously monitors its performance against these objectives, and fosters a healthy safety culture. CNSC staff informed the

Commission that its assessment of this safety and control area (SCA) at Gentilly-2 focused on the following specific areas:

- Management system
 - Organization
 - Performance assessment, improvement and management review
 - Change management
 - Configuration management
 - Records management
 - Management of contractors
18. CNSC staff rated Hydro-Québec's performance in this SCA as "satisfactory" for the current licence period.
 19. The Commission assessed the information submitted by Hydro-Québec and CNSC staff regarding the transition to the new Gentilly-2 management system, implemented in 2015 following achievement of SSS (pool). Although Hydro-Québec claims that its new management system complies with the applicable regulatory requirements, including CSA N286³, the Commission recognizes that CNSC staff must complete their monitoring of changes to the management system and verify compliance with the regulatory requirements. Moreover, the Commission is of the opinion that the management system in place and continuous monitoring by CNSC staff confirm Hydro-Québec's ability to continue to maintain a satisfactory level of compliance during the proposed licence period. The Commission acknowledges that the management system will have to be revised during the proposed licence period to adapt it to the activities and monitoring that will be required for SSS (dry).
 20. Hydro-Québec and CNSC staff completed several audits and inspections of the management system at Gentilly-2 during the current licence period. The Commission is satisfied that Hydro-Québec has made the required corrections to the shortcomings identified during the inspections. The Commission expects Hydro-Québec to continue taking corrective action to address the non-compliances identified in the corrective action program, namely the analysis of events and the schedule of changes to the time frames for closing records of changes.
 21. The Commission is satisfied that Hydro-Québec recognizes the importance of managing the configuration and decommissioning of the Gentilly-2 plant. In its submission, CNSC staff mentioned a specific new standard for configuration management of nuclear facilities that will probably be published in 2016. Once this new standard has been published, CNSC staff will assess whether it should serve as a guide for the Gentilly-2 facilities, using a graduated approach.
 22. The Commission requested more information on the measures in place for managing long-term knowledge at the Gentilly-2 facilities, and to maintain the interest and attention

³ N286, *Management system requirements for nuclear facilities*, CSA Group (2012).

of Hydro-Québec personnel to ensure continued performance for decades to come. A Hydro-Québec representative reported to the Commission on their established organizational culture, the retention of knowledge through detailed documentation management, formal training plans and continuous knowledge transfer. A Hydro-Québec representative also informed the Commission that the organization communicates openly with its employees to mobilize them and ensure that, wherever possible, future job cuts will be offset where possible by attrition and the transfer of skills elsewhere in the organization. The Commission believes that the steps taken by Hydro-Québec to ensure the management of long-term knowledge and to maintain the interest of qualified employees are satisfactory.

23. In light of the information presented, the Commission concludes that Hydro-Québec has the appropriate organizational and management structures and that its performance during the current licence period is a positive indication of Hydro-Québec's ability to adequately carry out the activities under the proposed licence.

3.2 Human Performance Management

24. Human performance management encompasses activities that enable effective human performance through the development and implementation of processes that ensure that licensees have sufficient staff in all relevant job areas with the necessary knowledge, skills, procedures and tools in place to safely carry out their duties. CNSC staff informed the Commission that its assessment of this SCA at Gentilly-2 focused on the following specific areas:
 - Personnel training
 - Personnel certification
 - Human performance program
 - Work organization and job design
25. CNSC staff rated Hydro-Québec's performance in this SCA as "satisfactory" for the current licence period.
26. The Commission assessed the information submitted by Hydro-Québec and CNSC staff related to Hydro-Québec's training programs and to the review of the training process and the process used for task analysis. The Commission is of the opinion that Hydro-Québec maintains training programs that comply with the regulatory requirements that will allow Hydro-Québec to ensure that employees are qualified to safely carry out the tasks they have to perform. The Commission expects Hydro-Québec to use its task analysis process for this purpose.
27. Regarding the information submitted to the Commission on the accreditation of personnel, the Commission concludes that Hydro-Québec has an adequate qualified and accredited workforce and a training program for senior health physicists (SHP) in accordance with regulatory requirements. CNSC staff noted that the regulatory requirements for making an application for SHP certification was again clarified with the

personnel in charge at Gentilly-2. CNSC staff will continue to administer the certification exam for senior health physicists under the new guidelines in force for Gentilly-2.

28. Regarding the information submitted about the transition to autonomy of the Maintenance team, the Commission believes that Hydro-Québec will complete this transition within an acceptable time frame and that monitoring by CNSC staff will be enough to ensure that the improvement measures noted are fully integrated in the transition plan. Although CNSC staff have confirmed that they will continue auditing the implementation of training, especially with respect to the training co-management phase, the Commission asks to be kept informed of this transition through the annual report from CNSC staff.
29. The Commission was informed that documentary review and site observations were conducted for some of the new process proposed by Hydro-Québec to ensure that the required personnel are available at the required times. CNSC staff raised and communicated to Hydro-Québec some questions in their observations on the validation exercises. The Commission notes the validations demonstrating that Hydro-Québec will be able to call back staff and that such staff is able to use and operate the equipment required in case of malfunction. These validations will have to be verified by CNSC staff. However, the Commission is of the opinion that the time frame proposed by Hydro-Québec, namely the schedule of the plan for transition to autonomy of the Maintenance team, is acceptable.
30. The Commission believes that workforce changes and downsizing at Gentilly-2 are made on the basis of a reduced risk and workload, based on the progress of decommissioning activities. The Commission is of the opinion that Hydro-Québec maintains a sufficient number of qualified personnel to safely and securely operate the facilities as required by the regulations, and that this will be verified by CNSC staff during the proposed licence period. The Commission emphasizes that Hydro-Québec has confirmed that there will be control centre personnel constantly on duty to take immediate charge of actions relating to the health and safety of employees and the public.
31. Regarding human performance, the Commission believes that the plans proposed by Hydro-Québec and the measures taken to ensure adequate human performance are sufficient to maintain safe and secure operations at Gentilly-2. CNSC staff explained that one of Hydro-Québec's objectives is to modify and reduce its workforce in accordance with a reduced risk and workload. The Commission is of the opinion that the monitoring activities by CNSC staff will confirm that a sufficient number of qualified workers is present at Gentilly-2 and that the regulatory requirements related to Hydro-Québec's human performance program will be met during the proposed licence period.
32. Based on its consideration of the information submitted, the Commission concludes that Hydro-Québec has appropriate programs in place and that current efforts related to human performance management provide a positive indication of Hydro-Québec's ability to adequately carry out the activities under the proposed licence. The Commission is satisfied that Hydro-Québec has adequate programs to train and certify personnel, and to

monitor fitness for duty. Oversight activities, including CNSC-required audits and inspections, will continue.

33. The Commission asks to be informed of the transition to autonomy of the Maintenance team in the annual report from CNSC staff.

3.3 Operating Performance

34. Operating performance includes an overall review of the conduct of the licensed activities, activities that enable effective performance as well as improvement plans and significant future activities at the Gentilly-2 plant. CNSC staff informed the Commission that its assessment of the operating performance of Hydro-Québec focused on the following specific areas:

- Conduct of licensed activities
- Procedures
- Reporting and trending
- Outage management performance
- Safe operating envelope
- Severe accident management and recovery
- Accident management and recovery

35. CNSC staff rated Hydro-Québec's performance in this SCA as "satisfactory" for the current licence period.
36. The Commission considered the information submitted by Hydro-Québec regarding the activities that took place during the current licence period. Since the achievement of SSS (pool), the number of systems in operation has been significantly reduced; these are primarily systems related to pool operation, heavy water storage and storage of radioactive waste and spent fuel. Hydro-Québec indicated the surveillance rounds and operating policies and principles (OP&P) of the nuclear facility were revised to adapt to SSS (pool) conditions.
37. The Commission requested notification on the level of safety of various shortcomings identified during the site inspections. CNSC staff explained that these deficiencies are generally considered minor and administrative and, therefore, inconsequential to safety, and that close monitoring is being done to correct them.
38. Based on its review of the information submitted by Hydro-Québec and by CNSC staff, the Commission considers that the surveillance rounds documented by Hydro-Québec and the envelope monitoring system allow adequate monitoring of the condition of the equipment and facilities at Gentilly-2. The Commission is of the opinion that the monitoring activities carried out by CNSC staff, which include monitoring and inspections, have confirmed that Hydro-Québec is implementing the authorized activities in accordance with the regulatory requirements of the CNSC, and that existing programs ensure effective performance. The Commission expects Hydro-Québec and CNSC staff to continue conducting this type of monitoring for the proposed licence period to ensure

that the procedures remain adequate and that the operating envelope for systems that are still operational is maintained.

39. The Commission considered the organizational chart of the permanent structure in place at Gentilly-2. The Commission is satisfied that Hydro-Québec maintains a sufficient number of qualified personnel to carry out the planned activities safely. This number could be expected to decline once the SSS (dry) milestone has been reached, but the Commission is of the opinion that the programs in place at Gentilly-2 and the regulatory oversight by CNSC staff will ensure that a workforce suitable for the status of the facility is maintained.
40. Furthermore, the Commission is reassured that Hydro-Québec will conduct its operations at the Gentilly-2 facilities in accordance with the OP&P. The Commission notes the amendments to the OP&P to adapt to the SSS (pool) conditions, and is confident that CNSC staff will ensure that any required changes to or deviations from the OP&P will comply with the regulations and will continue to ensure the safety of operations.
41. Finally, the Commission is satisfied with Hydro-Québec's performance regarding the reporting requirements under the CNSC's regulatory standard REGDOC-3.1.1⁴. In June 2015, the Commission granted an application from Hydro-Québec to ease the enforcement of REGDOC-3.1.1 for certain periodic reports and safety-related performance indicators given the current state of the power plant (discharged core). The Commission expects Hydro-Québec to continue to issue the reports required by REGDOC-3.1.1 considering the previously accepted concessions.
42. Based on the above information, the Commission concludes that the operating performance at the facility during the current licence period is a positive indication of Hydro-Québec's ability to successfully carry out the activities under the requested licence.

3.4 Safety Analysis

43. Safety analysis is a systematic evaluation of the potential hazards associated with the conduct of a proposed activity or the operation of a facility, and considers the effectiveness of preventive measures and strategies in reducing the effects of such hazards. It supports the overall safety case of the facility. CNSC staff rated Hydro-Québec's performance in this SCA as "satisfactory" for the current licence period.
44. Based on a review of the information submitted by Hydro-Québec and CNSC staff, the Commission is of the opinion that Hydro-Québec completed appropriate safety analyses for the Gentilly-2 facilities and is confident that Hydro-Québec will make the necessary changes to its safety reports to reflect the current state of the plant. The Commission has no concern with the safety reports for the nuclear facility and for the waste facility being incorporated into one document once SSS (pool) is achieved, should the review of CNSC staff consider this to be acceptable. The Commission believes that the audits conducted

⁴ REGDOC-3.1.1, *Reporting requirements for nuclear power plants*, version 2 (April 2016).

by CNSC staff were able to validate the compliance of Hydro-Québec programs with the enforcement documents in the applicable regulations.

45. In its submission, the Council of the Huron-Wendat Nation asked what could be the worst-case scenario at the Gentilly-2 facilities. A Hydro-Québec representative explained that the two safety issues for the current condition of the Gentilly-2 facility are related to the cooling of the spent fuel storage pool and storage of the moderator. Furthermore, the safety analysis shows that beyond the perimeter of the exclusion zone, the risks to the population are very low. The possible doses following an accidental release would be below regulatory limits. Following the accident in Fukushima, measures have been taken and equipment put in place to ensure the pool is cooled in case of a power outage or other event. CNSC staff confirmed that Hydro-Québec has appropriate contingency measures to adequately respond to a loss of cooling. Concerning the risks associated with the CANSTOR modules, the Hydro-Québec representative explained that the risks are very low given the design of this storage method. The CANSTOR modules meet seismic requirements and are safe. The aging management plan includes regular monitoring. CNSC staff explained that the safety analysis includes analysis of the CANSTOR modules, which are seismically safe and certified. Hydro-Québec added that in an emergency, in addition to the safety personnel in a state of readiness onsite at all times, it also has a dedicated call-back system. Only the presence in the control room has decreased, which was considered acceptable by the Commission at a hearing held on September 16, 2014.
46. The Commission acknowledges that Hydro-Québec had undertaken work on the probabilistic safety assessment when the decision to close the Gentilly-2 plant was made, but finds that it is no longer required given the current status of the Gentilly-2 facilities. Moreover, by means of the audit conducted by CNSC staff, the Commission is satisfied that Hydro-Québec is performing the tasks required to meet regulatory requirements concerning reliability and the probabilistic risk assessment. CNSC staff indicated that the probabilistic safety assessment submissions and quarterly and annual reports complied with the regulations.
47. The Commission asked if there is a list of probabilities and consequences of adverse events, as requested by the intervenor F. Caron. CNSC staff responded that the risk matrix is presented in the CMD, but the application of these criteria is not based on a probabilistic assessment. The requirements for probabilistic analysis assessments were removed from Hydro-Québec's licence when the licence was last amended. CNSC staff noted that with the removal of all fuel from the reactor, with storage in the pool and activities that were completed to reduce the level of risk, the residual risk is significantly lower than when the plant was in production.
48. The Commission considers that continuous monitoring by Hydro-Québec of systems important to the safety and the reliability of the plant, as verified by CNSC staff through quarterly reports and annual reliability reports in accordance with the regulatory requirements is adequate, and the Commission is satisfied that this continuous monitoring will ensure the safety of the Gentilly-2 facilities for the proposed licence period. The Commission finds it acceptable to reduce the reliability requirements since the fuel was

completely discharged from the reactor during the current licence period. The Commission is satisfied with the improvements implemented following the lessons learned from the Fukushima accident, and that the required water supply and power generation equipment (which were installed by Hydro-Québec at the request of CNSC staff following the lessons learned from the Fukushima accident) were audited onsite and determined to be operational by CNSC staff. The Commission expects that CNSC staff will continue to conduct inspections of pools and their cooling until SSS (dry) is achieved.

49. On the basis of the information presented, the Commission concludes that the systematic assessment of the potential hazards and the preparedness for reducing the effects of such hazards is adequate for the decommissioning and waste management activities under the requested licence. The Commission is of the opinion that Hydro-Québec is complying with the regulatory requirements.

3.5 Physical Design

50. The physical design relates to activities that affect the ability of structures, systems and components (SSCs) to meet and maintain their design basis, as new information arises over time and taking into account changes in the external environment. CNSC staff informed the Commission that its assessment of this SCA at Gentilly-2 focused on system design. CNSC staff rated Hydro-Québec's performance in this SCA as "satisfactory" for the current licence period.
51. Hydro-Québec and CNSC staff described the work and changes in SSCs that were completed during the current licence period to simplify the operation of required systems during the SSS (pool) phase:
- changes to electrical distribution systems
 - changes to cooling systems
 - drainage and withdrawal from service of many operation systems
 - draining and drying of coolant heavy water systems and moderator
 - transfer and storage of heavy water from moderator and coolant circuits and their respective auxiliary systems
52. The Commission is satisfied that the configuration work and SSC withdrawals were carried out in accordance with the applicable codes and standards under the regulatory oversight of CNSC staff.
53. Hydro-Québec and CNSC staff also described the anticipated work for the requested licence period:
- transfer of the 230 kilovolts (kV) power supply to a 25 kV supply when SSS (dry) is achieved
 - withdrawal of systems as cooling, power and utilities (water, air) requirements are reduced
 - changes in power supply systems to guarantee the reliability of these systems

- changes to instrumentation and control systems by installing a new parameter monitoring system for the Gentilly-2 nuclear site that will result in replacement of the two “X” and “Y” control computers
54. The Commission expects that the work and changes that will be required to achieve SSS (dry) will continue in accordance with Hydro-Québec’s change management guideline PROG-120-009, *Traitement, implantation et fermeture des demandes d’ingénierie* (processing, implementation and closing of engineering requests), which is documented in Hydro-Québec’s quality management system and which has been accepted by CNSC staff. The Commission is satisfied that sound management of the configuration of these systems for the purposes of future dismantling of Gentilly-2 facilities is ensured through the documentation of the withdrawal of systems in “withdrawal reports” by Hydro-Québec. The Commission is confident that CNSC staff will verify compliance through its reviews of the changes proposed by Hydro-Québec and its regulatory oversight.
55. In its submission, Hydro-Québec noted that work on pressurized systems and components will now be performed by certified external firms. The Commission requested additional information on the systems and components that are still pressurized. Hydro-Québec representatives explained that the number of pressurized systems has decreased significantly; what is left are the moderator and coolant heavy water storage system and pool cooling systems. A Hydro-Québec representative explained that an outside firm which holds appropriate authorization certificates has been hired to perform work on pressurized systems, and Hydro-Québec plans to make very few changes to these systems during the current licence period. The Hydro-Québec representative noted that these systems are part of Hydro-Québec’s Aging Management Program (AMP). The Commission is satisfied that work on pressurized systems and components has been and will continue to be carried out in accordance with the regulatory requirements.
56. Hydro-Québec also informed the Commission that emergency mitigation equipment to deliver water to the pool and to measure the level and temperature of the pool following a complete blackout at the site for a prolonged period, as well as an emergency alternate site for situations where the main control room is unavailable were set up following the Fukushima accident. CNSC staff confirmed that all actions taken from the *CNSC Integrated Action Plan on the Lessons Learned from the Fukushima Daiichi Nuclear Accident* have been completed by Hydro-Québec.
57. The Commission asked what additional information is required in the MCP for the seismic qualification program. CNSC staff explained that the MCP presented in CMD 16-H4 was still in development when the CMD was published and that some information about the seismic qualification program, which must be confirmed and verified periodically, had to be added. CNSC staff informed the Commission that there were no concerns about Hydro-Québec’s seismic qualification program and that, for the systems to which CSA N289.1⁵ applies, the audit criteria would be established before the

⁵ N289.1, *General requirements for seismic design and qualification of CANDU nuclear power plants*, CSA Group (2008, confirmed 2013).

proposed licence is issued. The Commission is therefore satisfied that the seismic qualification program is adequate for the Gentilly-2 facilities.

58. Based on the information presented, the Commission concludes that the design of the Gentilly-2 facilities is adequate for SSS (pool) and will remain adequate for the operation period set out in the proposed licence. The Commission considers that Hydro-Québec programs and regulatory oversight by CNSC staff will ensure that the changes to the design of facilities that will be required to achieve SSS (dry) will be completed in accordance with regulatory requirements.

3.6 Fitness for Service

59. Fitness for service covers activities that affect the physical condition of SSCs to ensure that they remain effective over time. This includes programs that ensure all equipment is available to perform its intended design function when called upon to do so. CNSC staff informed the Commission that its assessment of this SCA at Gentilly-2 focused on the following specific areas:
- equipment fitness for service/equipment performance
 - maintenance
 - structural integrity
 - aging management
 - chemistry control
 - periodic inspection and testing
60. CNSC staff rated Hydro-Québec's performance in this SCA as "satisfactory" for the current licence period.
61. The Commission considered the information presented by Hydro-Québec and CNSC staff concerning this particular area. Hydro-Québec and CNSC staff informed the Commission that, since the nuclear risks associated with a power station in safe storage state are greatly reduced, the monitoring, aging management, testing, inspection and maintenance programs were adjusted during the transition to SSS (pool).
62. Regarding the Periodic Inspection Program (PIP) and AMP, the Commission is satisfied that Hydro-Québec has developed these programs during the current licence period in accordance with the regulatory documents REGDOC-2.6.3,⁶ CSA N291⁷ and CSA N286, to take into account systems that have been withdrawn and equipment that will be withdrawn once SSS (dry) has been achieved, anticipated to be in 2020. The Commission is of the opinion that monitoring by CNSC staff confirmed the programs' compliance and that the certified individuals are competent, have a good understanding of the tasks to be performed and perform such tasks in accordance with procedures. The Commission acknowledges that Hydro-Québec must submit its action plan to correct the minor

⁶ REGDOC-2.6.3, *Aging management* (March 2014).

⁷ N291, *Requirements for safety-related structures for nuclear power plants*, CSA Group (2015).

deficiencies identified during an inspection of these programs, but believes that follow-up by CNSC staff will ensure that Hydro-Québec remains compliant with regulatory requirements for the requested licence period.

63. The Commission is satisfied with the maintenance program in place at Gentilly-2 to ensure that Hydro-Québec is managing the work and maintenance procedures adequately, taking into account the current situation at Gentilly-2. The Commission requests that CNSC staff continue to perform regulatory follow-up on this program.
64. The Commission is also satisfied that Hydro-Québec maintains a chemical control program that takes into account the current situation at Gentilly-2. The Commission notes that CNSC staff is of the opinion that Hydro-Québec has implemented its chemical control program adequately during the current licence period and that the personnel assigned to this program is qualified and has adequate procedures to carry out the work.
65. The Commission asked Hydro-Québec for the reasons for the drop in the preventive maintenance completion ratio in 2015. A Hydro-Québec representative explained that the drop in the preventive maintenance completion ratio is due to revisions and streamlining of the maintenance program. Since the program was streamlined in 2015, the preventive maintenance completion ratio has returned to a value similar to what was produced prior to 2015.
66. The Commission asked about the content and limitations of the AMP. A Hydro-Québec representative explained that the AMP, which was assessed by CNSC staff, oversees monitoring of critical SSCs. This involves monitoring, surveillance rounds and preventive and corrective maintenance to determine if equipment is aging. The program also includes the PIP, which measures vibration, erosion and corrosion of systems in operation. The systems that are still operational at present are all covered by this program.
67. The Commission considers that Hydro-Québec has adequate programs to ensure the effectiveness of the SSCs still in operation at the Gentilly-2 facilities. The Commission is of the opinion that the information submitted shows that the SSCs of the Gentilly-2 facilities that are required during the SSS (pool) milestone will remain fit for service and will operate safely. The Commission also believes that Hydro-Québec has complied with the requirements of its licence with respect to the maintenance area during the current licence period. The Commission expects Hydro-Québec to continue to maintain compliance and that CNSC staff will continue its regulatory oversight.

3.7 Radiation Protection

68. To evaluate the adequacy of the provisions for protecting the health and safety of persons, the Commission considered the past performance of Hydro-Québec in the area of radiation protection. The Commission also considered the radiation program in effect at the Gentilly-2 facilities to ensure that both radiation doses to persons and contamination are monitored, controlled and kept as low as reasonably achievable

(ALARA), given the social and economic factors⁸. CNSC staff informed the Commission that its assessment of this SCA at Gentilly-2 focused on the following specific areas:

- application of ALARA
- worker dose control
- radiation protection program performance
- radiological hazard control
- estimated dose to public

69. CNSC staff rated Hydro-Québec's performance in this SCA as "satisfactory" for the current licence period.
70. The Commission examined the information presented by Hydro-Québec and CNSC staff regarding the Radiation Protection Program in place at Gentilly-2 to protect the health of workers and the public, as well as the environment against the possible effects of ionizing radiation from operations at the Gentilly-2 facilities. The Commission acknowledges that Hydro-Québec has revised the program, which was developed when the plant was in operation, to align it with Hydro-Québec's revised management system program and to support the future radiological activities to be carried during the requested licence period. Hydro-Québec emphasized that doses to workers and the public are kept as low as reasonably achievable, taking into account social and economic factors, through the following activities:
- personnel training
 - measurement and monitoring of radiological risks
 - contamination control
 - feedback from the nuclear industry
 - trend analysis of various indicators
71. The Commission is of the opinion that the radiation protection program for the Gentilly-2 facilities is adequate and that the various compliance audits conducted by CNSC staff confirmed that Hydro-Québec had adequately implemented its radiation protection program by meeting regulatory requirements. CNSC staff will continue its regulatory oversight to ensure compliance of the implementation of the revised radiation protection program at Gentilly-2 in the future.
72. Regarding collective doses during the current licence period, the Commission considers that they are commensurate with the radiological activities that have been completed, and the Commission has no concerns about the highest collective dose in 2014 due to the higher amount of radiological work, such as drainage and drying of moderator and coolant circuits, the transfer of purification resins to the solid radioactive waste management facility (SRWMF) and the transfer of used fuel from the storage pool to the used fuel dry storage facility (UFDSF), since the collective dose has decreased since the

⁸ Please see CNSC regulatory enforcement guide G-129, amendment 1, *Keeping Radiation Exposures and Doses "As Low As Reasonably Achievable (ALARA)"*.

significant reduction in maintenance work on systems that is required by the end of operation. The Commission is confident that Hydro-Québec is making the necessary efforts, such as ALARA plans, to ensure that its workers are protected from ionizing radiation at the Gentilly-2 facilities.

73. The Commission considers that the fact that no worker has received a radiation dose exceeding the regulatory annual dose limit to nuclear workers of 50 millisieverts (mSv) during the current licence period and that on average 96 percent of the doses received by workers were at a level at or below the regulatory annual dose limit to the public of 1 mSv, is a good indication of Hydro-Québec's performance in this SCA.
74. The Commission also considers that Hydro-Québec's performance was satisfactory during the current licence period since the average effective dose varied between 0.11 and 1.20 mSv and the maximum dose received by a worker was 8.5 mSv in 2011, which was below the regulatory dose limit to nuclear energy workers of 50 mSv per year. There has also been no regulatory dose limit exceedance, and the 2 mSv action level was attained on only one occasion in 2011. The Commission is satisfied that the necessary measures have been taken to avoid the recurrence of such an event.
75. The Commission is of the opinion that the targeted inspections by CNSC staff have confirmed that Hydro-Québec was complying with regulatory requirements for the control of alpha radiation and radiation risks at Gentilly-2, and that Hydro-Québec has made the appropriate corrections to the areas for improvement that were noted.
76. The Commission is also of the opinion that the public is protected from ionizing radiation, as demonstrated by the estimated annual dose of radiation received by representative members of the public residing near the Gentilly-2 site for the current licence period, which varied between 0.0015 and 0.005 mSv, which is less than 1 percent of the regulatory annual dose limit for the public of 1 mSv.
77. Given the established or planned mitigation measures and safety programs to control radiological risks, the Commission is of the opinion that Hydro-Québec has made, and will continue to make adequate provisions for the protection of the health and safety of persons and the environment. The Commission is satisfied with the measures taken by Hydro-Québec to minimize the exposure of workers and members of the public as much as possible, and notes that the doses received by workers and estimated doses to the public are well below regulatory limits.

3.8 Conventional Health and Safety

78. Conventional health and safety covers the implementation of a program to manage workplace safety hazards. This program is mandatory for all employers and employees in order to reduce the risks associated with conventional (non-radiological) hazards in the workplace. CNSC staff reviewed Hydro-Québec's performance in this area, focusing on performance, practices and awareness. CNSC staff rated Hydro-Québec's performance in this SCA as "satisfactory" for the current licence period.

79. The Commission considered the information presented by Hydro-Québec and by CNSC staff concerning this particular control area. CNSC staff noted that Hydro-Québec was compliant during the field rounds performed while the plant was in operation (2011) and that Hydro-Québec met regulatory health and safety expectations and has complied with the *Occupational Health and Safety Act*⁹ during the current licence period.
80. However, the Commission expressed concerns about the high rate of accident severity during the current licence period. CNSC staff clarified that despite the high severity rate in 2011, Hydro-Québec has demonstrated good performance during inspections conducted by the CNSC staff and that no compliance deviation was found. A Hydro-Québec representative emphasized that its performance in this regard is improving. The Commission agrees that Hydro-Québec maintains several standards, guidelines, frameworks and working methods to establish the safety mechanisms that must be in place in the execution of any work at Gentilly-2. The Commission also notes that Hydro-Québec has a health and safety management system and has set up the training and audits required to measure the effectiveness of such measures to protect workers at Gentilly-2. Despite the high rate of accident severity, the Commission considers that Hydro-Québec has implemented the necessary measures to improve its performance in this SCA, and the Commission encourages continuous improvement in this particular area. The Commission is of the opinion that the measures in place at Hydro-Quebec and the regulatory monitoring are adequate to manage the occupational safety hazards at Gentilly-2.
81. The Commission asked whether the contractor performance is included in the performance data for this particular area. A Hydro-Québec representative indicated that the performance in the specific field of conventional health and safety does not include data from contractors performing work at Gentilly-2. CNSC staff told the Commission that the definitions of performance indicators related to conventional health and safety in REGDOC-3.1.1 are clear, but there may be variations in the calculation, which produces differences in the metrics from one licensee to another. However, the variations are still in compliance with regulatory requirements.
82. Given the information submitted, the Commission considers that the conventional health and safety of workers have been adequately protected throughout the current licence period. It also considers that the health and safety of persons will continue to be adequately protected during the proposed licence period.

3.9 Environmental Protection

83. Environmental protection covers Hydro-Québec programs to identify, control and monitor all releases of radioactive and hazardous substances and to minimize the effects on the environment which may result from the licensed activities. Environmental protection includes effluent and emissions control, environmental monitoring and estimation of doses to the public, fish impingement and entrainment, and thermal

⁹ Compilation of Quebec Laws and Regulations, CQLR c S-2.1

emissions. CNSC staff rated Hydro-Québec's performance in this SCA as "satisfactory" for the current licence period.

Environmental Monitoring

84. The Commission assessed the environmental monitoring measures at Gentilly-2. The Commission is satisfied that Hydro-Québec has adapted the environmental monitoring methods to the evolving new status of the Gentilly-2 facilities during the current licence period. The Commission expects Hydro-Québec to adapt its environmental monitoring plans to achieve SSS (dry) in order to adapt to residual environmental risks. The Commission notes that CNSC staff and the Ministère du Développement durable, de l'environnement et de la lutte contre les changements climatiques (MDDELCC) were informed in detail of the development of these adapted environmental monitoring measures, and these measures comply with the applicable regulatory requirements.
85. The Commission notes that the monitoring methods required for SSS (pool), namely those related to the atmospheric dispersion of emissions, liquid effluent discharges and those associated with the waste facility, are being maintained. The Commission considers that, as there was no liquid or gas radiological release above the prescribed limits during the current licence period, the revisions to the environmental monitoring plans are appropriate, and the operation and decommissioning activities at the Gentilly-2 facilities have had no significant impact on the environment.
86. The Commission also considers that the positive results of regulatory oversight conducted by the CNSC staff are a good indication of Hydro-Québec's ability to maintain an appropriate environmental protection program. The minor deficiencies identified have been adequately addressed.
87. Regarding the concerns of the intervenor F. Caron on the independence of the Independent Environmental Monitoring Program (IEMP), the Commission requested more information on the orientation of the program. CNSC staff explained that since Hydro-Québec's environmental monitoring program is very complex and of considerable breadth and depth, the CNSC IEMP is more limited and is used for independent auditing of the effects of Gentilly-2 activities on the environment. The Commission notes that the CNSC IEMP independently verified through an independent sampling and analysis process, that the public and the environment in the vicinity of the Gentilly-2 facilities are protected and that there is no likely impact on health. The Commission believes that Hydro-Québec's environmental protection program is preserving the health of persons and protecting the environment given that the IEMP results are compatible with the results presented by Hydro-Québec.
88. In its submission, Northwatch is concerned that environmental monitoring will be reduced under the facilities' new status. A Hydro-Québec representative explained that the environmental monitoring program and environmental radiological monitoring program have been adapted to SSS (pool), which is in a transitional state, based on the prevailing risk at that time and that still prevails today. Hydro-Québec will modify its environmental monitoring programs to adapt them to the different risks that will be

associated with the next milestone, SSS (dry). CNSC staff explained that some monitoring systems have been shut down since the emissions measured from these systems have ceased since SSS (pool) was achieved. The Commission believes that this reduction in environmental monitoring systems at Gentilly-2 will not result in a decline in the level of protection provided by Gentilly-2; this reduction in systems is also adjusted to the risks. The Commission is of the opinion that the adequacy of environmental monitoring will be ensured via continued monitoring by CNSC staff of the monitoring systems that are still operational and required, and by the regulatory oversight of the proposed changes to the programs.

89. In its submission, the Grand Council of the Waban-Aki Nation indicated that it did not find the content of the monitoring program and mitigation measures established as a result of the environmental impact study completed by Hydro-Québec. This intervenor noted that the *Record of Proceedings, Including Reasons for Decision*¹⁰ dated November 8, 2006 indicates that CNSC staff committed to ensuring that stakeholders are consulted before the finalization stage of the environmental assessment monitoring program. The intervenor asked for a copy of the monitoring program and to be consulted with respect to the program. CNSC staff explained that the CEEA environmental assessment monitoring program had been accepted and finalized, and gave information about the remaining aspect of monitoring. Since the environmental impact study in 2006, there have been no changes in the impacts; the impact has been reduced by the decrease in activities at the Gentilly-2 facilities. CNSC staff confirmed that the monitoring program was shared with the Grand Council of the Waban-Aki Nation since it filed its submission, and follow-up with this group confirmed that it has no concerns in this regard.

Management System

90. The Commission is satisfied that the environmental management system at Gentilly-2, which was audited by CNSC staff, meets the requirements of CSA N286 and ISO-14001 principles¹¹ and that the environmental objectives established by Hydro-Québec in recent years as part of the environmental management system, have been achieved.
91. The Commission is satisfied that Hydro-Québec documents all events that could have an impact on the environment in reports for corrections or improvements, pursuant to regulatory standard S-99¹² and, since June 2015, REGDOC-3.1.1. The Commission is also satisfied that CNSC staff are working closely with the MDDELCC in Quebec to ensure that the public is adequately protected against non-radiological releases into the environment. The Commission notes that there has been no release of hazardous substances from Gentilly-2 that could pose an unacceptable risk to the environment or to the public during the current licence period, which is a good indication of Hydro-Québec's ability to protect the environment throughout the proposed licence period.

¹⁰ *Record of Proceedings, Including Reasons for Decision*, Application for renewal of the Gentilly-2 nuclear power reactor operating licence, hearing of November 7–8, 2006.

¹¹ ISO-14001, *Environmental management systems – Requirements with guidance for use*, International Organization for Standardization (2015).

¹² CNSC regulatory document S-99, *Reporting requirements for operating nuclear power plants*.

Derived Release Limits

92. The Commission noted that the radiation dose for the general public in the vicinity of the Gentilly-2 facility during the current licence period remained below 1 percent of the prescribed annual dose limit for the general public of 1 mSv, and that Hydro-Québec's goal is to keep radiological releases below 1 percent of the value of each of the derived release limits (DRL). Regarding the DRL, the Commission noted that Hydro-Québec has completed a review of the DRL at Gentilly-2, and no changes were made to the DRL during the current licence period. However, Hydro-Québec has indicated its intention to revise the DRL for the requested licence period. The Commission requested additional information on the need for this revision. A Hydro-Québec representative explained that the DRL are revised to ensure they remain relevant to the status of Gentilly-2. The Hydro-Québec representative added that Hydro-Québec intends to amend the DRL during the requested licence period since there was a change in the type of farming which is undertaken by one of the critical groups in the vicinity of the site; Hydro-Québec wants to ensure that the DRL values are as relevant as possible.

Releases

93. The Commission considered the information submitted by Hydro-Québec and by CNSC staff concerning radiological and non-radiological releases from the Gentilly-2 facility during the current licence period. The Commission also considered the information submitted by Hydro-Québec and CNSC staff on the reduced heating of water discharged into the discharge canal and the significant decline in water pumped from the St. Lawrence River.
94. The Commission is satisfied that the monitoring carried out by Hydro-Québec and by CNSC staff has confirmed that releases into the environment are properly controlled and meet regulatory requirements, and that the dose received by the public near the Gentilly-2 facilities remained below 1 percent of the annual dose limit to the public (1 mSv). The Commission considers that continuous monitoring by CNSC staff of the environmental and radiological monitoring programs will verify whether Hydro-Québec continues to adequately control emissions from the Gentilly-2 facilities.
95. In its submission, the Council of the Huron-Wendat Nation expressed concerns about the adverse effects on fish and fish habitat from water pumping at Gentilly-2. The Commission requested more information on the intake and discharge of water at the facility, and the effects on fish. A Hydro-Québec representative explained that the flow of discharged water should remain stable and low compared to when the power station was in operation. The Hydro-Québec representative indicated that impingement has been reduced by a factor of 10 since SSS (pool) was achieved, and there has been no fish impingement since the beginning of 2016. The Hydro-Québec representative explained that Hydro-Québec holds discussions with MDDELCC during regular meetings. The Hydro-Québec representative stated that there is no impact. If an event were to occur, Hydro-Québec would have discussions with MDDELCC and CNSC staff. CNSC staff indicated that they are performing studies and evaluating the studies submitted by Hydro-Québec to determine the environmental risks. The fish impingement trend seems to be

decreasing, having been estimated at 36 kilograms (kg) in 2015 compared to 180 kg in 2014.

96. The Council of the Huron-Wendat Nation and the Grand Council of the Waban-Aki Nation asked for the results of Hydro-Québec's self-assessment of the impacts of existing water intake on the impingement of and damage to the fish community, since this information was not available at the time of filing their submissions. CNSC staff explained that Hydro-Québec was required to complete a self-assessment using the methodology on the Department of Fisheries and Oceans website. The results of the evaluation were forwarded to CNSC staff in February 2016; an analysis by CNSC staff of the results of the self-assessment confirmed that the assessment was completed in accordance with the NSCA and the *Fisheries Act*,¹³ and that authorization under subsection 35(2) of the *Fisheries Act* is not required. CNSC staff indicated during the public hearing that it will formulate a response containing the results of the self-assessment for the Council of the Huron-Wendat Nation, the Waban-Aki Nation and members of the public who express an interest in this subject.
97. The Commission is satisfied that a self-assessment of the impacts of existing water intake at Gentilly-2 on the impingement and entrainment of biomass and fish was complemented by Hydro-Québec and reviewed by CNSC staff in accordance with the new *Fisheries Act*, and that an authorization under subsection 35(2) of the *Fisheries Act* is not required. The Commission requests that CNSC staff provide the results of the self-assessment to interested parties. The Commission emphasizes that Hydro-Québec must report the impingement of endangered species or serious damage that arises during the operation of the Gentilly-2 facilities. CNSC staff confirmed that monitoring will be continuous during the requested licence period.
98. In its submission, Northwatch reported that the concentration of tritium around the waste management facility areas continues to be a major concern, despite the fact that the concentration is well below the Health Canada limit of 7,000 Bq/L.¹⁴ The Commission requested more information on this issue, including whether the concentration of tritium in the soil will decrease now that operations have stopped. A Hydro-Québec representative responded that Hydro-Québec continues to monitor tritium concentrations in the soil surrounding the Gentilly-2 facilities (beyond the exclusion zone), and that safety studies for facilities show that there is no impact to the environment and the public since the doses were well below regulatory limits. CNSC staff noted that the shutdown of the reactor and withdrawal of its systems also eliminated the major share of tritium releases from the facility, although the continued operation of the radioactive waste storage areas will remain a potential limited and known source of airborne radioactive waste. Tritium concentrations in seepage and ground water around the radioactive waste storage areas remain stable or are declining to about 500–1000 Bq/L, below the limit of 7,000 Bq/L established by Health Canada for drinking water. The Commission notes the concerns of the intervenor and is of the opinion that the monitoring program for airborne

¹³ R.S.C. (1985), c. F-14.¹

tritium emissions and in rainwater, seepage water and groundwater that will be maintained during decommissioning activities will ensure the protection of public and the environment.

Conclusion

99. Based on the information submitted by Hydro-Québec and by CNSC staff, the Commission is of the opinion that Hydro-Québec continues to implement and maintain an environmental protection program that meets the requirements of the regulatory document REGDOC-2.9.1.
100. The Commission is of the opinion that Hydro-Québec has appropriate measures in place to protect the health of workers and the public against the possible effects of radiological emissions and radioactive waste.
101. During the current licence period, CNSC staff conducted several regulatory oversight activities in this SCA. The Commission is of the opinion that the results of such regulatory oversight are a good indication of Hydro-Québec's ability to maintain an environmental protection program; the minor deficiencies identified have been adequately addressed.
102. The Commission requests that Hydro-Québec's self-assessment of the impacts of the existing water intake at Gentilly-2 on the impingement and entrainment of biomass and fish be provided to interested parties, including the Council of the Huron-Wendat Nation and the Waban-Aki Nation.

3.10 3.10 Emergency Management and Fire Protection

103. The emergency management and fire protection SCA covers emergency preparedness and response measures for emergencies and non-routine conditions planned by Hydro-Québec at the Gentilly-2 facilities. This includes conventional emergency preparedness and response, nuclear emergency management and fire protection and firefighting. CNSC staff rated Hydro-Québec's performance in this SCA as "satisfactory" for the current licence period.

Emergency Management

104. The Commission is of the opinion that current emergency procedures at Gentilly-2, which were examined and approved by CNSC staff and which have been temporarily adjusted to reflect the current state of the facilities, are adequate.
105. The Commission is confident that the monitoring conducted by CNSC staff was able to confirm that Hydro-Québec's Emergency Plan (EP), which enables coordination of emergency management measures between the Gentilly-2 site and external organizations such as Organisation régionale de la sécurité civile (ORSC) de la Mauricie et du Centre-du-Québec, is adequate and that employees required to respond during deployment of the EP are trained. The Commission acknowledges that the EP and the various Hydro-Québec emergency management programs for Gentilly-2 must evolve with the activities

carried out at the facility, but notes that compliance will be assessed by CNSC staff to ensure they remain adequate. The Commission considers that the drill planned by Hydro-Québec in the fall of 2016 will confirm the effectiveness of the revised EP currently underway to adapt to the situation at Gentilly-2 facilities.

106. The Commission requested a status update of the revision of the Emergency Response Program. CNSC staff responded that the revised Hydro-Québec Emergency Response Program has been received and its review is being completed. The emergency response program was amended in accordance with the reduction in risks. Its preliminary evaluation has shown that the new program meets the requirements of REGDOC-2.10.1. What remains now is to formalize the response to Hydro-Québec. Following this, CNSC staff undertake to verify compliance of the revised Emergency Response Program following Hydro-Québec's emergency drill planned for later in 2016.
107. The Commission asked whether the reduced risk at the Gentilly-2 facilities will affect – and how – the need for pre-distribution of stable potassium iodide tablets (KI). A Hydro-Québec representative explained that the Organisation régionale de la sécurité civile de la Mauricie et du Centre-du-Québec is responsible for determining the KI tablets pre-distribution requirements based on the risks at the Gentilly-2 facilities, and that a decision on the revised emergency planning is expected shortly. A representative from ORSC Mauricie/Centre-du-Québec confirmed that the ORSC plans to notify the public soon.¹⁵
108. Based on its consideration of the information submitted by Hydro-Québec and CNSC staff, the Commission is of the opinion that Hydro-Québec has the necessary measures in place to respond to emergency situations that might occur during the activities at the Gentilly-2 facilities, to ensure the safety of workers, the public, the environment, assets and Hydro-Québec property.
109. The Commission is also satisfied that Hydro-Québec is complying with CNSC emergency management requirements, and urges Hydro-Québec and CNSC staff to work together to establish the revised emergency measures program to reflect the current status of the Gentilly-2 facilities.

Fire Protection

110. According to the information submitted, the Commission is of the opinion that Hydro-Québec has a fire protection and prevention program (FPP) that complies with CSA standard N293 to minimize the risk of the public's exposure to radioactive emissions that

¹⁵ Since the hearing held on May 5, 2016, l'Organisation régionale de la sécurité civile de la Mauricie et du Centre-du-Québec issued a press release on May 26, 2016 informing the public of the abolition of the external nuclear emergency response plan for the Gentilly-2 nuclear power plant (PMUNE-G2) and associated protective measures, including measures concerning the taking of iodine tablets (KI), as it was determined that the nuclear facility no longer is a risk to neighbouring populations. Experts have established that there was no possible accident with health effects beyond the exclusion zone of 1 km from the nuclear facility. Under these conditions, the emergency planning zone, which was set at 8 km, can be abandoned. Considering that no accidents with radioactive iodine releases can occur, the Mauricie/Centre-du-Québec public health department also confirmed that stable iodine tablets are now useless.

may be caused by a fire,¹⁶ and that Hydro-Québec's compliance with this program will continue to be audited by CNSC staff.

111. The Commission requested additional information about the response team (the Industrial Fire Brigade or IFB) currently at Gentilly-2. A Hydro-Québec representative explained that an external company offers the response team service. This team is made up of individuals who have received firefighter training and who underwent an integration phase that included training and coaching in the field to familiarize them with the Gentilly-2 environment. The Hydro-Québec representative reiterated that the response team is onsite at all times.
112. Considering the information submitted by Hydro-Québec and CNSC staff, the Commission is satisfied that Hydro-Québec has a dedicated industrial fire brigade with certified professional firefighters onsite at all times to protect personnel and meet response needs, and that the response tactics and dedicated equipment of the response team is in all respects compatible with those of the City of Bécancour Fire Department. The Commission is of the opinion that the joint exercises and training completed during the current licence period, and confirmed by CNSC staff as adequate, provide assurance of Hydro-Québec's ability to respond to a fire at the Gentilly-2 site.

Conclusion

113. The Commission is satisfied that Hydro-Québec's various current emergency management and fire protection programs meet the regulatory requirements and expectations of the CNSC. The Commission notes that the regulatory oversight of CNSC staff will be maintained during the next licence period and that personnel will verify the amendments to the Emergency Management and Fire Protection programs in accordance with the regulatory requirements.
114. Based on the above information, the Commission believes that the fire protection measures and emergency management preparedness programs in place or planned for the Gentilly-2 facility are adequate to protect the health and safety of persons and the environment.

3.11 Waste Management

115. The waste management SCA covers the licensee's site-wide waste management program. CNSC staff assessed Hydro-Québec's performance regarding waste characterization, waste reduction, waste management practices and decommissioning plans. CNSC staff rated Hydro-Québec's performance in this SCA as "satisfactory" for the current licence period.
116. Hydro-Québec explained that the waste facility at Gentilly-2, located inside the protected envelope of the nuclear facility and of the flood protection dyke, has three distinct areas, namely:

¹⁶ CSA N293

- the radioactive waste storage area (RWSA)
 - the solid radioactive waste management facility (SRWMF)
 - the used fuel dry storage facility (UFDSF)
117. Based on its assessment of the information submitted by Hydro-Québec and by CNSC staff, the Commission believes that the Gently-2 waste facility is safe, having several monitoring mechanisms in place to ensure site safety and protection of the environment.
118. The Commission also considers that Hydro-Québec has a waste management process that complies with the regulatory requirements and that frames the management of residual matter, residual hazardous waste and waste containing nuclear substances.
119. The Commission is of the opinion that waste transferred to the waste management facility during this licence period was carried out diligently and in accordance with the applicable regulatory requirements. The Commission is satisfied that Hydro-Québec has kept the CNSC and MDDELCC informed through monthly environmental information and waste management reports.
120. The Commission is of the opinion that Hydro-Québec has produced a waste management strategy adapted to the decommissioning context and that applies to the proposed licence period. The Commission is of the opinion that the design of CANSTOR modules is adequate for storage of long-term fuel. The Commission expects that the construction of two new CANSTOR modules will be completed in accordance with the applicable standards and regulatory requirements, and will be audited by CNSC staff to confirm compliance.
121. Regarding the inspections of the Gently-2 waste management facility that were performed by CNSC staff annually during the current licence period, the Commission is satisfied that CNSC has indeed confirmed the licensee met regulatory requirements. The Commission is confident that ongoing monitoring by CNSC staff will confirm that Hydro-Québec is maintaining its performance in this SCA throughout the requested licence period.
122. The Commission is of the opinion that Hydro-Québec has submitted an adequate transition plan to comply with the new waste management standard N292.0 CSA.¹⁷ The Commission is assured that CNSC staff will continue to monitor enforcement of this standard by Hydro-Québec.
123. In its submission, the Council of the Huron-Wendat Nation expresses concerns about the transfer and offsite management of waste from Gently-2. The Commission asked whether there is a plan in place for the transfer of waste stored at Gently-2 to another waste management facility. A Hydro-Québec representative indicated that radioactive waste from Gently-2 will be stored onsite and that a transfer plan does not exist at present. The Hydro-Québec representative stated that if a site for the long-term storage of

¹⁷ N292.0, *General principles for the management of radioactive waste and irradiated fuel*, CSA Group (2014).

radioactive waste is selected, studies and consultations would precede the transfer. Hydro-Québec intends to work with Canada's nuclear industry to find a storage solution for low- and intermediate-level radioactive waste.

124. In his submission, F. Caron mentioned the lack of information on the plant currently being decommissioned, Gentilly-1, located near Gentilly-2, in particular on the possibility of decommissioning both reactors at the same time. The Commission asked whether the Gentilly-1 and Gentilly-2 licensees are coordinating their decommissioning efforts. A Hydro-Québec representative responded that Hydro-Québec regularly communicates with the Gentilly-1 facility licensee, namely Canadian Nuclear Laboratories, to make them aware of their decommissioning plans. CNSC staff indicated that no studies on pairing the decommissioning of both facilities have been completed, but that CNSC staff will ensure the safety and protection of the environment at all times, whether or not the licensees choose to decommission at the same time. CNSC staff also explained the differences between the two sites, indicating that the characteristics and volumes of waste are different. The Commission notes that the Gentilly-1 and Gentilly-2 sites have two separate licensees, and that the choice to coordinate decommissioning of both facilities is up to them. The Commission encourages the licensees to proceed with decommissioning to reduce the impacts on people and the environment.
125. In his submission, F. Caron expresses concerns regarding the used resin storage enclosures. The Commission requested more information on the effect of the storage location on the deterioration of the enclosures. A Hydro-Québec representative explained that resins are stored in the SRWMF in sealed enclosures that prevent leakage into the environment. The cylinders are sampled once a year to confirm their water-tightness and to make sure they are not pressurized. Studies were conducted during the construction of the SRWMF to confirm that this storage method is safe and secure, and that freezing and thawing have no impact on the deterioration of resins - this is confirmed annually. During sampling, Hydro-Québec measures low concentrations of carbon-14 inside the cylinders, which was expected at the time of their design. This does not constitute a risk to the environment, since carbon-14 remains inside the cylinder. If the concentration increases beyond the expected levels, Hydro-Québec can purify the air inside the cylinder. So far, concentrations have been low, meaning air purification has not been required, and Hydro-Québec does not anticipate having to do so in the medium term. CNSC staff reported having no concerns for the safety of persons and the environment for the term of the licence. CNSC staff conduct inspections to verify the fitness of containers and regulatory oversight will be maintained for the requested licence period. The carbon-14 phenomenon is well known.
126. In its submission, Northwatch indicates that the decommissioning process adopted by Hydro-Québec does not adhere to international practices and does not meet the requirements of the International Atomic Energy Agency (IAEA). CNSC staff explained that the practice of deferred decommissioning is consistent with the approaches that are proposed internationally by the IAEA. The IAEA guidance document entitled

*Decommissioning of Facilities*¹⁸ proposes two strategies for decommissioning, either immediate decommissioning or deferred decommissioning. This is also consistent with the regulatory guide G-219 CNSC¹⁹ and the document CSA N294²⁰. CNSC staff have no concerns regarding the choice of decommissioning strategy.

127. In its submission, Northwatch questions the long-term management plan for low- and intermediate-level radioactive waste. A Hydro-Québec representative explained that a waste management strategy was forwarded to CNSC staff in 2010, and this strategy was recently revised to adapt to the new situation leading to decommissioning. The revised strategy was submitted to CNSC staff in March 2016. The Commission asked whether the decommissioning strategy is available to the public. CNSC staff explained that, under the *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*, Canada publishes a report detailing the radioactive waste management strategies of the national nuclear cycle; this report, published every three years, can be found on the CNSC website. CNSC staff explained that the role of the CNSC is not to select the long-term waste management method but rather to ensure that waste is managed safely by ensuring that both people and the environment are protected.
128. In its submission, the Northwatch intervenor expresses concerns on the choice of spent fuel management through the use of CANSTOR modules. The Commission requested more information about CANSTOR modules and their performance thus far. A Hydro-Québec representative explained that the first CANSTOR modules were manufactured in the mid-1990s and that their performance has been monitored ever since. Their useful life is limited to 50 years; however, this useful life could be extended considering their performance thus far, and by adjusting the maintenance program. The structures are behaving well and are subject to regular monitoring. CNSC staff added that the CNSC audits the performance of CANSTOR modules as part of its Gentilly-2 inspection and audit program, and the modules are subject to an aging management program. These enclosures and their performance are also discussed in the report to the *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*. The design of CANSTOR modules was verified by CNSC staff before construction, and they show no signs of failure. Following the Fukushima Daiichi accident, Hydro-Québec had to reassess the design and performance of all its facilities; no changes to CANSTOR modules were identified as necessary. The Commission asked whether it is possible to transfer fuel from a CANSTOR module to another module if the CANSTOR module cannot be used. CNSC staff explained that the CANSTOR modules were designed with the capacity to remove fuel, if required. The clusters are the same for all CANDU type reactors, therefore, the fuel can be transferred to any CANDU spent fuel storage method. The Commission asked how CANSTOR modules compare to other fuel storage methods used in Canada. CNSC staff explained that fuel storage methods in Canada are conceptually similar. Safety is maintained at all times. It is up to the licensee

¹⁸ General Safety Requirements (GSR) Part 6, *Decommissioning of Facilities*, IAEA (2007).

¹⁹ G-219, *Decommissioning planning for licensed activities* (2000).

²⁰ N294, *Decommissioning of facilities containing nuclear substances*, CSA Group (2009, R2014).

to determine the method and demonstrate that the selected method complies with regulatory requirements.

129. The Commission requested more information about the volume of heavy water stored at the Gentilly-2 site. A Hydro-Québec representative explained that part of the heavy water inventory was sold and the other part is being stored. There are intentions to try to recycle the inventory that remains on the site.
130. Based on this information and considerations, the Commission considers that Hydro-Québec manages waste safely at the Gentilly-2 facility, as demonstrated by its performance throughout the current licence period, the results of the CNSC assessment of the control measures proposed in Hydro-Québec's licence application, and by the fact that the activities related to the management of Gentilly-2 waste facilities will remain essentially the same for the requested licence period.

3.12 Security

131. Security covers the programs required to implement and support the security requirements stipulated in the legislation, relevant regulations and in the licence. This includes compliance with the applicable provisions of the *General Nuclear Safety and Control Regulations*²¹ and the *Nuclear Security Regulations*²². CNSC staff rated Hydro-Québec's performance in this SCA as "satisfactory" for the current licence period.
132. The Commission examined the information submitted by Hydro-Québec and by CNSC staff concerning this SCA. The Commission considers that Hydro-Québec's Core Discharge Status (CDS) Security Program, which includes information on the physical security of the facility and its protected area, and that was revised to adapt to the activities currently carried out at the site, is adequate.
133. The Commission acknowledges that Hydro-Québec will have to adjust its security program with the transfer of spent fuel from the pools to the CANSTOR modules, but it is confident that the audit performed by staff of this revised program will ensure compliance.
134. Regarding Hydro-Québec's compliance in this area, CNSC staff informed the Commission that Hydro-Québec has established physical protection systems and a security program which are equivalent to those of high-security nuclear facilities, and these physical protection measures meet or exceed measures in place for radioactive waste management facilities in Canada. The Commission is of the opinion that Hydro-Québec has established an appropriate infrastructure, retardant barriers, access and identification controls, procedures, systems, devices and deployment of security personnel allowing it to meet the requirements of its security program. The Commission is also satisfied that Hydro-Québec has in place a satisfactory corrective maintenance program for critical security systems and devices.

²¹ SOR/2000-202.

²² SOR/2000-209.

135. The Commission also considers that Hydro-Québec has effective measures to prevent theft or sabotage of the nuclear matter used, stored or transported, as demonstrated during inspection and compliance audit activities by CNSC staff during the current licence period. These measures include intrusion detection systems, CANSTOR modules to store the spent fuel, the spent fuel storage pool located inside the protected area of Gentilly-2, physical barriers in place along the perimeter of protected areas and retardant barriers that allow the response force to respond effectively in cases of attempted theft or sabotage of nuclear matter at these locations.
136. As for the access controls at the Gentilly-2 plant, the Commission asked whether the security measures in place to restrict access to the site will remain the same as during the plant's operation. A Hydro-Québec representative confirmed that access to the site remains the same and that no changes in security procedures regarding access to the site are anticipated. The Commission considers that Hydro-Québec maintains restricted access to the site as part of its access control program.
137. The Commission was informed that Hydro-Québec ensures that trained and adequately equipped nuclear security officers are present at the Gentilly-2 facility, and that a response MOU with Sûreté du Québec heightens site security. The Commission considers that the security drills required every 30 days in accordance with the *Nuclear Security Regulations*²³ have adequately demonstrated that the security personnel training program is satisfactory. The Commission considers the use of the site as a tactical training venue to be acceptable, which benefits the CNSC Performance Testing Program and Canadian high security nuclear facilities as a whole.
138. Regarding the Gentilly-2 cyber security program, the Commission noted that this program remains important even during decommissioning, as it includes digital equipment related to physical security, safeguards and emergency measures. The Commission is of the opinion that this program is an important aspect of protection against cyber-sabotage.
139. The Commission requested further information on the cyber security information missing from the LCH. CNSC staff identified the systems that are still vulnerable to cyber-sabotage attacks and explained that Hydro-Québec must demonstrate that these safety and security systems, emergency measures and international guarantees which remain in force for Gentilly-2 meet the requirements of CSA N290.7²⁴. If CNSC staff identify shortcomings in their review of this information, Hydro-Québec shall prepare a timetable accepted by CNSC staff for addressing the shortcomings to ensure this program complies with CSA N290.7. Despite the fact that Hydro-Québec must assess the compliance of its cyber security program with CSA N290.7 requirements, the Commission considers that the measures currently in place and the monitoring by CNSC staff will assess whether Hydro-Québec maintains an adequate cyber-security program to protect important digital systems at the Gentilly-2 facility.

²³ SOR/2000-209

²⁴ N290.7, *Cyber-security for nuclear power plants and small reactor facilities*, CSA Group (2014).

140. Moreover, the Commission considers that Hydro-Québec's performance with respect to maintaining security at the facility has been acceptable and complies with CNSC requirements. The Commission concludes that Hydro-Québec provides for the physical security of the facility, and is of the opinion that Hydro-Québec will continue to provide for it during the proposed licence period. The Commission is also of the opinion that more attention must be paid to cyber security, as this area is becoming more important for the safe operation and overall security of nuclear power plants.

3.13 Safeguards and Non-proliferation

141. The CNSC's regulatory mandate includes ensuring compliance with measures required to implement Canada's international obligations under the *Treaty on the Non-Proliferation of Nuclear Weapons*²⁵. Pursuant to the Treaty, Canada has entered into safeguard agreements with the IAEA. The objective of these agreements is for the IAEA to provide credible assurance on an annual basis to Canada and to the international community that all declared nuclear material is for peaceful, non-explosive uses and that there are no undeclared nuclear material or activities in Canada. CNSC staff rated Hydro-Québec's performance in this SCA as "satisfactory" for the current licence period.
142. Given the information submitted by Hydro-Québec and CNSC staff on the safeguards program, the information that Hydro-Québec has provided to the IAEA and the audits of CNSC staff, the Commission is satisfied that Hydro-Québec has an effective safeguards program at Gentilly-2, consistent with the measures required by the CNSC to meet Canada's international obligations for safeguards and other measures under the *Treaty on the Non-Proliferation of Nuclear Weapons*. The Commission is also satisfied that Hydro-Québec has complied with the regulatory requirements regarding the implementation of the Safeguards and Non-Proliferation SCA at Gentilly-2, and that CNSC staff will continue to assess Hydro-Québec's performance for this purpose during the proposed licence period.

3.14 Packaging and Transport

143. This SCA encompasses the safe packaging and transport of nuclear substances and radiation devices to and from the licensed facility. The licensee must adhere to the CNSC's *Packaging and Transport of Nuclear Substances Regulations*²⁶ and Transport Canada's *Transportation of Dangerous Goods Regulations*²⁷ for all shipments leaving or entering the facility. CNSC staff rated Hydro-Québec's performance in this SCA as "satisfactory" throughout the current licence period.
144. The Commission assessed the information submitted by Hydro-Québec and CNSC staff on the qualifications of Hydro-Québec personnel, the transport program and CNSC staff auditing activities, and is satisfied that Hydro-Québec has an adequate program

²⁵ IAEA information circular, INFCIRC/140, *Treaty on the Non-proliferation of Nuclear Weapons (TNP)*, United Nations (1970).

²⁶ SOR/2015-145.

²⁷ SOR/2001-286.

encompassing the transport and packaging of nuclear substances to ensure that its operations comply with the regulations. The Commission is of the opinion that Hydro-Québec has made the necessary adjustments following the minor deficiencies identified during a packaging and transport inspection at the Gentilly-2 site in 2014.

145. Based on the above information, the Commission is satisfied that Hydro-Québec is meeting regulatory requirements regarding packaging and transport.

3.15 Environmental Assessment

146. The CNSC conducts environmental assessments (EA) under the NSCA for all projects in accordance with its mandate of protecting the environment and health of persons (the security component of the CNSC mandate is covered in the evaluation of the safety case conducted for all projects). The CNSC staff submitted to the Commission its EA information report (EA Report) describing the findings of the EA under the NSCA conducted in view of the application for a decommissioning licence filed by Hydro-Québec. The EA report focuses on elements that are currently of interest to the public or from a regulatory perspective, such as air quality, groundwater, surface water and habitat, and enforcement of the *Fisheries Act*.

147. The Commission reviewed the EA Report and the conclusions drawn by the CNSC staff in this EA under the NSCA, which include but are not limited to the following:

- According to monitoring by CNSC staff of the activities and results of the radiological environmental monitoring program at Gentilly-2, there is no release of radiological substances from the facility that could pose an unacceptable risk to the environment or the public.
- The results obtained during the current licence period show that the radiation dose for the public near the Gentilly-2 facility remained below 1 percent of the regulatory dose limit for the public (1 mSv).
- The environmental risk analysis based on the environmental monitoring indicates that Hydro-Québec adequately protects the public and the environment.
- The complete shutdown of the reactor will eliminate temperature effects in the discharge canal on the survival and reproduction of fish and will help to reduce but not completely eliminate fish impingement and entrainment.
- Tritium concentrations in groundwater and surface water are currently less than the limits for drinking water quality recommended by Health Canada. The shutdown of the reactor eliminates a major component of tritium discharges from the facility, which should result in a gradual decline in these concentrations.
- The preliminary IEMP results confirm that the public and the environment in the vicinity of Bécancour and the Gentilly-2 facility are protected and that there are no probable health effects. These results are compatible with those submitted by

Hydro-Québec confirming that the licensee's environmental protection program is protecting human health and the environment.

148. In its submission, the Grand Council of the Waban-Aki Nation wonders why the EA simply relied on Hydro-Québec's past good behaviour to assess the environmental impacts of decommissioning, rather than specific studies related to the potential impacts. CNSC staff explained that an EA under the NSCA is an examination by CNSC staff of information on the assurance of environmental protection submitted by Hydro-Québec in its licence application, additional information from annual environmental monitoring reports, results of previous environmental assessments and analysis such as the monitoring program, and environmental risk assessments and compliance audit activities. CNSC staff indicated that they also analyzed the interactions between decommissioning activities and the environment. CNSC staff confirmed that a copy of the monitoring program (IEMP) was submitted to the Grand Council of the Waban-Aki Nation following the filing of its submission, which in turn was satisfied with the information submitted and had no further questions.
149. The Commission is of the opinion that, based on the EA under the NSCA conducted for this licence application, Hydro-Québec has taken and is committed to taking appropriate measures to protect the environment and preserve human health. The Commission is also of the opinion that the reviews and assessments of Hydro-Québec's environmental protection measures, and the results of compliance audit activities conducted by CNSC staff indicate that Hydro-Québec is complying with the regulatory requirements.
150. The Commission considers that Hydro-Québec has taken and is committed to taking adequate steps to protect the environment and preserve human health in accordance with the requirements of the NSCA and its associated regulations. The Commission is confident that environmental protection and preservation of human health will not be endangered at Gentilly-2 for the proposed licence period through the compliance audit activities of CNSC staff.

3.16 Aboriginal Engagement and Public Information Program

Participant Funding Program

151. In November 2015, the CNSC announced that it was offering up to \$25,000 to assist members of the public, Aboriginal groups and other stakeholders in reviewing Hydro-Québec's application for a decommissioning licence and submitting comments to the Commission. The CNSC awarded up to \$24,840 in financial assistance through its Participant Funding Program (PFP) to the following five applicants, all of which made written submissions at the Commission hearing:
- Grand Council of the Waban-Aki Nation
 - François Caron
 - Nation Métis Québec
 - Council of the Huron-Wendat Nation
 - Northwatch

Aboriginal Engagement

152. The obligation to consult with Aboriginal groups applies when the Crown contemplates a decision or actions that may adversely affect established or potential Aboriginal ancestral or treaty rights. The CNSC, as an agent of the Crown and as Canada's nuclear regulator, recognizes and understands the importance of building relationships with Canada's Aboriginal peoples. The CNSC ensures that all of its licensing decisions under the NSCA uphold the honour of the Crown and considers Aboriginal peoples' potential or established Aboriginal and/or treaty rights pursuant to section 35 of the *Constitution Act, 1982*.²⁸
153. CNSC staff indicated that Hydro-Quebec's licence application involves activities occurring within an existing nuclear facility with restricted access and there is no proposed change to the facility's current footprint. Based on previous requests to be kept informed of activities at the Gentilly-2 facility and through CNSC staff research, CNSC staff identified the following First Nation and Métis groups that might have an interest in the application. The First Nation and Métis groups, identified by their traditional land claims in the vicinity of the Gentilly-2 site, are:
- Première Nation des Abénakis de Wôlinak
 - Première Nation des Abénakis d'Odanak
 - Grand Council of the Waban-Aki Nation
 - Huron-Wendat Nation
 - Nation Métis Québec
154. The Commission is satisfied that the Aboriginal groups who may have an interest in the licence renewal application were identified early in the review process, have been provided with information about the project, encouraged to participate in the Commission's public hearing, and to apply for funding through CNSC's Participant Funding Program. CNSC staff reported having heard no concerns from the First Nations and Métis groups identified regarding the licence application.
155. The Commission encourages Hydro-Québec and CNSC staff to uphold their commitment to continue communicating with First Nation and Métis groups with an interest in the activities at the Gentilly-2 facility carried out by Hydro-Québec and the CNSC, and related regulations.
156. CNSC staff informed the Commission that the licence application to allow Hydro-Québec to continue its activities related to the decommissioning of the Gentilly-2 nuclear facility, currently in SSS (pool), is not expected to result in any adverse impacts to any potential or established Aboriginal and/or treaty rights and, therefore, does not raise the duty to consult. The Commission notes that all of the First Nations and Métis groups

²⁸ *Constitution Act 1982, Annex B of the Canada Act 1982 (R-U), 1982, c. 11.*

identified have been encouraged to participate in the review process and voice their concerns to CNSC staff and at a public hearing on this licence application.

157. In its submission, the Council of the Huron-Wendat Nation noted that Hydro-Québec's participation activities are limited to the communities bordering the Gently-2 facility. The Commission asked whether Hydro-Québec is collaborating with all Aboriginal communities potentially practising traditional activities in the area. A Hydro-Québec representative explained that its participation activities are limited to the neighbouring communities that could have serious land claims. Hydro-Québec has contacted other Aboriginal organizations potentially having an interest in the Commission's hearing by telephone to ensure that they have all had a chance to convey their concerns to Hydro-Québec before the hearing. Hydro-Québec said it will continue to remain available to hear and answer the questions of Aboriginal nations and the public. CNSC staff explained that they communicated directly with all the Aboriginal communities that had expressed an interest in the Gently-2 site in the past to invite them to participate in this hearing of the Commission. Through its Participant Funding Program, CNSC staff also made a sum of money available to support the participation of groups and individuals interested in this matter. CNSC staff are committed to maintaining communication with Aboriginal groups currently expressing interest. CNSC staff reviewed and considered Hydro-Québec's public information and Aboriginal consultation program to be acceptable.
158. In its submission, the Council of the Huron-Wendat Nation also asked to be kept informed of changes that Hydro-Québec may make to its programs. The Commission requested clarification in this regard. CNSC staff explained that the licensee is obligated to inform the CNSC if there are any major changes or amendments. If there are changes during the requested licence period, they will be communicated to interested Aboriginal groups.
159. In its submission, the Nation Métis Quebec discusses the possibility of including citizens of the Nation to work on the Gently-2 decommissioning project. The Commission heard Hydro-Québec, which indicated that all jobs and contracts are subject to a competition and that Aboriginal groups are encouraged to apply. The Commission encourages dialogue between the licensee and the Aboriginal communities. However, the Commission finds that, as the nuclear regulatory authority in Canada, it has no economic mandate (concerning employment) and will not base its decision on the economic impacts of a facility. It is the health, safety and security of the public and the protection of the environment that guide its decisions. The Commission did note, however, that although the economic impact of a licensee is not considered as part of the Commission's mandate, the Commission does consider all aspects of a licensee's facility as a whole in its licensing decisions.

Public Information Program

160. The Public Information Program (PIP) is a regulatory requirement for licence applicants and licensed operators of Class I nuclear facilities. Paragraph 3(j) of the *Class I Nuclear*

*Facilities Regulations*²⁹ requires that licence applications include “the proposed program to inform persons living in the vicinity of the site of the general nature and characteristics of the anticipated effects on the environment and the health and safety of persons that may result from the activity to be licensed.”

161. The Commission was informed of the significant decrease in public interest concerning the activities of the Gentilly-2 plant since the plant stopped operating. The Commission is satisfied that Hydro-Québec has maintained a variety of communication tools and a public information program. The Commission encourages Hydro-Québec to continue activities to meet the decommissioning activities information needs; activities related to human health and the safety of people and the environment; anticipated or unanticipated events and other matters of interest. The Commission notes that CNSC staff will continue to verify whether Hydro-Québec maintains its commitment to continuing communication with the public.
162. CNSC staff informed the Commission that the public information program and related disclosure protocol must be in line with the public’s perception of risk and its level of interest in the licensed activities. These could be influenced by the complexity of the life cycle and activities at the nuclear facility, as well as the risks to public health and the environment, associated with the facility and activities.
163. Based on this information, the Commission is satisfied that Hydro-Québec has a specific PIP at Gentilly-2 that meets the requirements and intentions contained in the CNSC regulatory document RD/GD-99.3³⁰ and which enables the efficient communication of information on its activities to the public.

Conclusion on Aboriginal Engagement and Public Information

164. Based on the information presented above, the Commission agrees that Hydro-Québec’s public information program meets regulatory requirements and is effective in keeping Aboriginal communities and the public informed of the decommissioning of the facility and its waste management activities. The Commission encourages Hydro-Québec to maintain dialogue with the neighbouring communities.
165. The Commission appreciates the efforts of stakeholders to review the information presented at the hearing. The Commission is of the opinion that the period between the availability of the CMDs of Hydro-Québec and CNSC staff and the deadline for submissions is acceptable.
166. The Commission acknowledges the efforts made by CNSC staff with respect to the CNSC’s obligations regarding Aboriginal engagement and the legal duty to consult. The Commission considers that issuing the proposed decommissioning licence will not cause any adverse impacts to any potential or established Aboriginal or treaty rights and that the engagement activities undertaken for this licence application were adequate.

²⁹ SOR/2000-204.

³⁰ RD/GD-99.3, *Public Information and Disclosure* (March 2012).

3.17 Decommissioning Plans and Financial Guarantee

167. CNSC staff indicated that Hydro-Québec submitted a preliminary decommissioning plan and confirmation of the financial guarantees that factor in the current shutdown status versus a refurbishment. CNSC staff indicated having reviewed the preliminary decommissioning plan and having declared it to be acceptable. Confirmation of financial guarantee is currently under review by CNSC staff³¹. Hydro-Québec will have to submit a detailed decommissioning plan in 2019 to cover the dormancy phase in its entirety. The plan will be updated in accordance with regulatory requirements. A detailed plan will be developed for activities related to the decommissioning of the Gentilly-2 nuclear facility.
168. The Commission considers that the current decommissioning status is consistent with the preliminary decommissioning plan revised in 2015. The Commission notes that the plan is complete, but it will have to be revised (detailed decommissioning plan) during SSS (dry) in preparation for the dormancy milestone.
169. Hydro-Québec indicated that the Financial Guarantee Agreement signed on November 15, 2003 and amended August 13, 2010 must be amended again since the estimated costs of decommissioning have been revised following the plant's closure. Steps to amend the agreement have been initiated with the Government of Québec and the CNSC.
170. Northwatch stated that the deferred decommissioning approach planned by Hydro-Québec does not comply with internationally recommended practices and does not meet the criteria specified by the IAEA. The Commission requested more information on the subject. CNSC staff responded that the practice of deferred decommissioning is consistent with international best practices as described by the IAEA and with the Canadian CSA standard N294. CNSC staff stated that they had no concerns in this regard.
171. The Commission asked whether the approach to the decommissioning of the Gentilly-2 site is comprehensive or if this approach will vary by site. CNSC staff responded that in Canada, the regulatory approach is not prescriptive in the sense that specific obligations are not mentioned at each stage of the project. Instead, acceptability (or not) of the project will be taken into account considering the applicable legislation, regulations and standards, as well as details of the project.
172. The Commission asked why the preliminary decommissioning plan (PDP) is not available to the public. CNSC staff responded that some of the information in this document is commercially confidential. The Hydro-Québec representative responded that an abridged version of this document is available to the public. The Commission suggests that Hydro-Québec publish the abridged version of the PDP on its website.

³¹ CNSC staff confirmed that they are still in discussions with Hydro-Québec regarding certain details of the proposed financial guarantee. Once these details are finalized, CNSC staff will submit the revised financial guarantee to the Commission for approval.

173. Based on the information presented during the hearing, the Commission considers that the preliminary decommissioning plans and related financial guarantee are acceptable for the current application for licence renewal. The Commission will consider, in the context of a hearing, the expected application for amendment of the financial guarantee from Hydro-Québec when it is submitted.

3.18 Cost Recovery

174. Section 24(2)(c) of the NSCA requires that the licence application is accompanied by the prescribed fee. The *Canadian Nuclear Safety Commission Cost Recovery Fees Regulations*³² set out the specific requirements based on the activities to be licensed. CNSC staff informed the Commission that Hydro-Québec is in good standing regarding the requirements of the *Canadian Nuclear Safety Commission Cost Recovery Fees Regulations* for the Gentilly-2 facilities.
175. The Commission is satisfied that Hydro-Québec has met the requirements of the *Canadian Nuclear Safety Commission Cost Recovery Fees Regulations* for its licence application.

3.19 Nuclear Liability Insurance

176. As required under subsection 15(1) of the *Nuclear Liability Act*,³³ the “operator shall, with respect to each nuclear installation of which he is the operator, maintain with an approved insurer insurance against the liability imposed on him by this Act, consisting of:
- a) basic insurance for such term and for such amount not exceeding seventy-five million dollars as may be prescribed with respect to that nuclear installation by the Canadian Nuclear Safety Commission, with the approval of the Treasury Board, and
 - b) supplementary insurance for the same term and for an amount equal to the difference, if any, between the amount prescribed under paragraph (a) and seventy-five million dollars.”
177. CNSC staff noted that the *Nuclear Liability Act* will be repealed with the new *Nuclear Liability and Compensation Act*³⁴ (NLCA), which will come into force on January 1, 2017. In order to reflect the fact that the Gentilly-2 facility no longer operates a power reactor and that its nuclear liability limit should be reduced accordingly, the Gentilly-2 facility has been included by Natural Resources Canada in the *Nuclear Fuel Waste Management Facility Class* rather than the *Power Reactor Class* in the *Nuclear Liability and Compensation Regulations* published in Part II of the *Canada Gazette* on May 18, 2016. Therefore, when the NLCA and its regulations come into force, the new liability regime will apply to the Gentilly-2 plant, and Hydro-Québec will have to meet new nuclear liability insurance requirements.

³² SOR/2003-212.

³³ R.S.C. 1985, c. N-28.

³⁴ S.C. 2015, c. 4, s.120.

178. The Commission considered the assessment by CNSC staff of the evidence and required certificates presented by Hydro-Québec. The Commission considers that Hydro-Québec has met its obligations under the *Nuclear Liability Act*. The Commission expects Hydro-Québec to continue to discharge its obligations to comply with the *Nuclear Liability Act* and to continue doing so once the new *Nuclear Liability and Compensation Act* comes into force.

3.20 Licence Period

179. Hydro-Québec has requested a 10-year licence period (July 1, 2016 to June 30, 2026) to cover the time required to achieve SSS (dry). Hydro-Québec has committed to, when SSS (dry) is achieved, reassess the applicability of regulatory frameworks cited in the licence for the new status of the plant and its systems.
180. CNSC staff recommended a licence period of 10 years, from July 1, 2016 to June 30, 2026.
181. In its submission, Northwatch questions the proposed licence period, asking whether a shorter period would be more appropriate. A Hydro-Québec representative explained that the requested licence period corresponds to planned works at Gentilly-2. Hydro-Québec has committed to submitting a more detailed decommissioning plan before achieving SSS (dry) in 2019. CNSC staff emphasized that the existing decommissioning plan contains enough detail for the activities required to achieve SSS (dry), and would be revised in 2019 when SSS (dry) is achieved to cover the dormancy period. CNSC staff indicated that the proposed licence encompasses the activities to be completed before SSS (dry) can be achieved, in a well-defined and clear regulatory framework; the regulatory framework will remain strict. The proposed 10-year period provides assurance that there will be sufficient time to properly complete the activities of this milestone and for CNSC staff to conduct the required auditing and confirmation activities and to prepare for next milestone and accompanying licence.
182. The Commission asked whether there could be any delays on the schedule of activities planned for the requested licence period. A Hydro-Québec representative indicated the plan developed to date is essentially in line with the anticipated plan. Hydro-Québec has mechanisms and protocols in place to ensure safety and security continuously, as provided by the regulatory frameworks. Hydro-Québec anticipates that the proposed licence period will cover the transition to SSS (dry), the implementation of planned activities and positioning in dormancy, and potentially return with a new licence application based on the new status of the Gentilly-2 facility.
183. Based on the information submitted during this hearing, the Commission determined that a 10-year licence was adequate. The Commission is of the opinion that the term of the proposed licence period does not impact the effectiveness of CNSC staff's compliance program or the authority of the Commission to amend, suspend, revoke or replace the licence, including the establishment of new licence conditions at any time. The Commission requests that updates on the performance of the Gentilly-2 facility, including

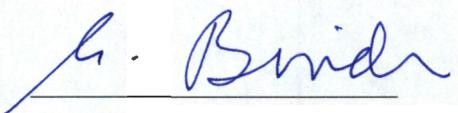
updates on the decommissioning project, be presented annually as part of public meetings of the Commission.

4.0 CONCLUSION

184. The Commission has considered the information and submissions of the applicant, all participants and CNSC staff on the record, as well as the submissions provided by the participants at the hearing.
185. The Commission is of the opinion that the applicant meets the requirements of subsection 24(4) of the *Nuclear Safety and Control Act*. More specifically, the Commission is satisfied that the applicant is qualified to carry on the activity that the proposed licence will authorize and that the applicant will make adequate provision for the protection of the environment, human health and safety and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.
186. The Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, issues the nuclear power reactor decommissioning licence to Hydro-Québec for the Gentilly-2 nuclear generating station located in Bécancour, Quebec. The issued licence PRDL 10.00/2026 is valid from July 1, 2016, to June 30, 2026.
187. The licence authorizes activities related to the decommissioning of the Gentilly-2 nuclear facility, and the operation of the waste management facilities at Gentilly-2.
188. The Commission includes in the licence the conditions recommended by CNSC staff, as set out in the draft licence attached to CMD 16-H4, with the amendment described in paragraph 9 above.
189. The Commission authorizes the following powers:
 - regarding the condition of the G.3 licence, approve requests for changes to the ownership, possession or use of land within the exclusion zone and described in the Safety Report
 - regarding the condition of licence 3.3, approve requests for changes to operations or procedures that would invalidate the limits referred to in Condition 3.2
 - regarding the condition of licence 5.2, give consent to requests for changes to the design or equipment of the nuclear facility and of the waste facility that might invalidate the operating limits set out in Condition 3.2 or pose risks of a different nature or having a higher probability of occurrence than those considered in the safety analysis and in the probabilistic safety assessment
 - regarding the condition of licence 15.1, give consent to quality , project execution, environmental protection and audit plans to be submitted by the licensee before undertaking the activities referred to in paragraph IV(v)

to the following CNSC staff members:

- The Director of the Gentilly-2/Point Lepreau Regulatory Program Division
 - Director General, Directorate of Power Reactor Regulation
 - Executive Vice-President and Chief Regulatory Operations Officer
190. The Commission notes that CNSC staff can bring any matter to the Commission as applicable. The Commission directs CNSC staff to inform the Commission on an annual basis of any changes made to the Licence Conditions Handbook (LCH).
191. The Commission asks CNSC employees to submit annual Regulatory Oversight Reports on the performance of the Gentilly-2 facilities and on the status of nuclear facility decommissioning. CNSC staff shall present these reports at public proceedings of the Commission, where they will be put on the agenda.
192. The Commission asks to be informed of the transition to autonomy of the Maintenance team in the annual report from CNSC staff.
193. The Commission expects to receive from Hydro-Québec a report on the status of decommissioning once the SSS (dry) milestone has been achieved. This report will be assessed in a public Commission meeting.
194. The Commission requests that Hydro-Québec's self-assessment of the impacts of the existing water intake at Gentilly-2 on the impingement and entrainment of biomass and fish be given to interested persons or parties, including the Council of the Huron-Wendat Nation and the Waban-Aki Nation.
195. The Commission will consider, in the context of a hearing, the expected application for amendment of the financial guarantee from Hydro-Québec when it is submitted.



Michael Binder
President,
Canadian Nuclear Safety Commission

JUN 21 2016

Date

Appendix A – Intervenors

Council of the Huron-Wendat Nation	CMD 16-H4.2
Grand Council of the Waban-Aki Nation	CMD 16-H4.3
François Caron	CMD 16-H4.4
Nation Métis Québec	CMD 16-H4.5
Northwatch	CMD 16-H4.6