



Canadian Nuclear  
Safety Commission

Commission canadienne  
de sûreté nucléaire

## Record of Decision

In the Matter of

Applicant New Brunswick Power Corporation

Subject Application to Renew the Nuclear Power  
Reactor Operating Licence for the Point Lepreau  
Nuclear Generating Station

Public Hearing Dates January 26, 2017  
May 9-11, 2017



**RECORD OF DECISION**

Applicant: New Brunswick Power Corporation

Address/Location: 515 King Street, Fredericton NB, E3B 5G4

Purpose: Application to Renew the Nuclear Power Reactor Operating Licence for the Point Lepreau Nuclear Generating Station

Application received: June 30, 2016

Dates of public hearing: January 26, 2017 (Part 1)  
May 9-11, 2017 (Part 2)

Location: Part 1: Canadian Nuclear Safety Commission (CNSC) Public Hearing Room, 280 Slater St., 14th Floor, Ottawa, Ontario  
  
Part 2: Delta Hotel Saint John, 39 King St., Ballrooms A & B, Saint John, New Brunswick

Members present: M. Binder, Chair  
D. D. Tolgyesi                      R. Velshi                      S. McEwan

Secretary: M.A. Leblanc  
Recording Secretary: M. Hornof  
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| <b>Intervenors</b>   | <b>Document Number</b> |
|--|------------------------|
| See appendix A   |                        |
| <b>Others</b>  |                        |
| Fisheries and Oceans Canada: P. Hall   |                        |
| Environment and Climate Change Canada: N. Ali and D. Kim                               |                        |
| Health Canada: D. Nsengiyumva  |                        |
| New Brunswick Emergency Measures Office: G. MacCallum,<br>R. Shepard and C. Goodfellow |                        |
| Natural Resources Canada: J. Adams and J. Hénault                                      |                        |

**Licence:** Renewed

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## 1.0 INTRODUCTION

1. New Brunswick Power Corporation (NB Power) has applied to the Canadian Nuclear Safety Commission<sup>1</sup> for the renewal of its Nuclear Power Reactor Operating Licence (PROL) for the Point Lepreau Nuclear Generating Station (PLNGS) located on the Lepreau Peninsula, approximately 40 kilometers southwest of Saint John, New Brunswick. The current operating licence, PROL 17.04/2017, expired on June 30, 2017. NB Power has applied for a renewal of its licence for a period of five years. On June 15, 2017, the Commission renewed the PROL for PLNGS.<sup>2</sup> This *Record of Decision* provides the detailed reasons for that decision.
2. The PLNGS site consists of a single 705-megawatt Canada Deuterium Uranium-6 (CANDU-6) pressurized heavy water reactor and the Solid Radioactive Waste Management Facility (SRWMF). The SRWMF is used for the storage of radioactive waste, including used fuel, which is produced at the PLNGS site.
3. NB Power holds a single licence for all activities at the PLNGS site, including the possession of nuclear substances and prescribed equipment. The reactor at the PLNGS returned to commercial operation in 2012 following completion of reactor refurbishment.
4. In September 2016, up to \$75,000 in funding to participate in this licensing process was made available to Indigenous groups, not-for-profit organizations and members of the public through the CNSC's Participant Funding Program (PFP). A Funding Review Committee (FRC), independent of the CNSC, recommended that up to \$108,462 in participant funding be provided to six applicants. These applicants were required, by virtue of being in receipt of the funding, to submit a written intervention and make an oral presentation at Part 2 of the public hearing commenting on NB Power's application. One PFP recipient withdrew its PFP request prior to Part 2 of the public hearing.

### Issues

5. In considering the application, the Commission was required to decide:
  - a) what environmental assessment review process to apply in relation to this application
  - b) if NB Power is qualified to carry on the activity that the licence would authorize

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<sup>1</sup> The *Canadian Nuclear Safety Commission* is referred to as the "CNSC" when referring to the organization and its staff in general, and as the "Commission" when referring to the tribunal component.

<sup>2</sup> CNSC Summary Record of Decision – New Brunswick Power Corporation, "Application to Renew the Nuclear Power Reactor Operating Licence for the Point Lepreau Nuclear Generating Station", June 15, 2017.

- c) if, in carrying on that activity, NB Power 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.

### Public Hearing

6. The Commission, in making its decision, considered information presented for a two-part public hearing held on January 26, 2017 in Ottawa, Ontario and on May 9 to 11, 2017 in Saint John, New Brunswick. The public hearing was conducted in accordance with the *Canadian Nuclear Safety Commission Rules of Procedure*.<sup>3</sup> During the public hearing, the Commission considered written submissions and heard oral presentations from NB Power (CMD 17-H2.1, CMD 17-H2.1A, CMD 17-H2.1B and CMD 17-H2.1C) and CNSC staff (CMD 17-H2, CMD 17-H2.A, CMD 17-H2.B and CMD 17-H2.C). The Commission also considered oral and written submissions from 94 intervenors (see Appendix A for a list of interventions). The hearing was webcast live via the CNSC website, and video archives are available for a three-month period following the hearing. A *Summary Record of Decision* was issued on June 15, 2017.

### Mandate of the Commission

7. Many intervenors provided the Commission with information about the economic impact of the PLNGS. The Commission notes that, as the regulatory authority over nuclear matters in Canada, it has no economic mandate and will not base its decisions on the economic impact of a facility. It is the health, safety and security of the public, the protection of the environment, national security, and international obligations that guide its decisions.

## **2.0 DECISION**

8. Based on its consideration of the matter, the Commission concludes that NB Power is qualified to carry on the activity that the licence will authorize. The Commission is of the opinion that NB Power, in carrying on that activity, 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,

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<sup>3</sup> Statutory Orders and Regulations (SOR)/2000-211.



the Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, renews the Nuclear Power Reactor Operating Licence issued to New Brunswick Power Corporation for the Point Lepreau Nuclear Generating Station located on the Lepreau Peninsula in New Brunswick. The renewed licence, PROL 17.00/2022, is valid from July 1, 2017 until June 30, 2022.

9. The Commission includes in the licence the conditions as recommended by CNSC staff in CMDs 17-H2 and 17-H2.B. The Commission also delegates authority for the purposes of licence conditions 3.2 and 15.2, as recommended by CNSC staff.
10. The Commission considers the environmental review that was conducted by CNSC staff to be acceptable and thorough.
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. With this decision, the Commission directs CNSC staff to report annually on the performance of NB Power and PLNGS, as part of the annual *Regulatory Oversight Report for Canadian Nuclear Power Plants* (NPP ROR). CNSC staff shall present this report at a public proceeding of the Commission, where members of the public will be able to participate.
13. The Commission directs CNSC staff to continue increased regulatory oversight in the Management System safety and control area, with annual reports to the Commission through the NPP ROR.

### **3.0 ISSUES AND COMMISSION FINDINGS**

14. In making its licensing decision, the Commission considered a number of issues and submissions relating to NB Power's qualification to carry out the licensed activities. The Commission also considered 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.
15. The Commission examined CNSC staff's assessment of NB Power's performance in all 14 safety and control areas (SCAs) and in relation to several other matters of regulatory interest over the current licence period. Details and the Commission's consideration of information submitted by NB Power in support of its licence renewal application, of CNSC staff assessments and of interventions submitted in relation to this matter are provided in the following sections of the *Record of Decision*.

### 3.1 Application of the *Canadian Environmental Assessment Act, 2012*

16. In coming to its decision, the Commission was first required to determine whether an Environmental Assessment (EA) under the *Canadian Environmental Assessment Act, 2012*<sup>4</sup> (CEAA 2012), was required.
17. The application submitted by NB Power is for a PLNGS licence renewal. The Commission notes that a licence renewal is not a designated project under CEAA 2012.
18. The Commission notes that a previous EA was carried out in 2003 under the *Canadian Environmental Assessment Act*<sup>5</sup> in conjunction with the maintenance of, and the modifications made to, the SRWMF. CNSC staff informed the Commission that CNSC reviews of ongoing reporting from NB Power confirmed that activities and predictions at the PLNGS were consistent with the 2003 EA.
19. The Commission considered the completeness and adequacy of the EA that CNSC staff conducted under the NSCA for this licence renewal. CNSC staff findings included, but were not limited to:
  - NB Power maintained adequate environmental protection programs that met CNSC requirements.
  - NB Power conducted the most recent environmental risk assessment (ERA) using appropriate methodology and sufficiently conservative data, with the ERA showing that human health and the environment remained protected.
  - The results of the CNSC's 2014 and 2015 Independent Environmental Monitoring Program (IEMP) confirmed that the public and the environment near the PLNGS remained protected from the releases from the facility.
20. Asked to comment on the adequacy of the EA that CNSC staff conducted under the NSCA for this licence renewal, the Environment and Climate Change Canada (ECCC) representative submitted that, after reviewing the EA components that were within ECCC's mandate, ECCC was satisfied that the EA was adequate for the purposes of the renewed PLNGS operations.
21. The Commission notes that the NSCA provides a strong regulatory framework for environmental protection. Whether an EA under CEAA 2012 is required or not, the CNSC regulatory framework ensures that adequate measures are in place to protect the environment and human health in accordance with the NSCA and its regulations.

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<sup>4</sup> Statutes of Canada (S.C.) 2012, chapter (c.) 19, section (s.) 52.

<sup>5</sup> S.C 1992, c. 37

22. On this basis, and based on the information examined and provided on the record for this hearing, the Commission concludes that an EA conducted under the NSCA and its regulations was appropriate for the PLNGS licence renewal application. The Commission is satisfied that an EA under CEAA 2012 was not required in this matter. Further, the Commission is satisfied that NB Power has made, and will continue to make, adequate provision for the protection of the environment throughout the proposed licence period.

### **3.2 Management System**

23. The Commission examined NB Power's Management System which covers the framework that establishes the processes and programs required to ensure that the PLNGS achieves its safety objectives, continuously monitors its performance against these objectives, and fosters a healthy safety culture. Throughout the current licence period, CNSC staff rated NB Power's performance in this SCA as "satisfactory."
24. The Commission assessed the information submitted by NB Power and CNSC staff regarding NB Power's compliance with Update no. 1 of CSA N286-05, *Management system requirements for nuclear power plants*, during the current licence period.<sup>6</sup> Furthermore, NB Power reported that CSA N286-12, *Management system requirements for nuclear facilities*,<sup>7</sup> would be fully implemented at the PLNGS by December 2017. CNSC staff confirmed the adequacy of this timeline to the Commission.
25. CNSC staff informed the Commission that CNSC compliance verification activities had identified some areas for improvement in specific areas of the PLNGS management system, including roles and responsibilities, contractor evaluation, document control, work control, storage control, procedural adherence and procedural adequacy. CNSC staff further explained that corrective actions plans (CAPs) for these areas of improvement were completed by NB Power and accepted by CNSC staff in 2015 and 2016.
26. CNSC staff submitted to the Commission that an inspection focussing on self-assessment and independent assessment at the PLNGS had identified areas for improvement in regard to documentation control, procedural adherence and procedural adequacy. CNSC staff noted that documentation control related areas for improvement had been addressed to CNSC staff's satisfaction and that the remaining areas for improvement were of low safety significance, with CNSC staff continuing to monitor the implementation of CAPs for these matters through ongoing compliance verification activities.

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<sup>6</sup> CSA N286-05, Update no. 1: *Management system requirements for nuclear power plants*, CSA Group, 2007.

<sup>7</sup> CSA N286-12, *Management system requirements for nuclear facilities*, CSA Group, 2012.

27. The Commission noted the number of procedural adequacy and adherence related CAPs and enquired about whether this was representative of an overall systematic failure of the PLNGS management system. CNSC staff acknowledged that a facility's management system affected all 14 SCAs and that NB Power's decreased performance in procedural adequacy and adherence during the current licence period resulted in actions on NB Power, including root cause analyses, CAPs and additional CNSC oversight. The NB Power representative provided detailed information about the root cause analysis that was conducted with a third-party expert for this issue. The NB Power representative also informed the Commission about how NB Power continued to address the identified management system issues and about the performance metrics used to assess the PLNGS management system. CNSC staff confirmed to the Commission's satisfaction that, overall, the PLNGS management system satisfied regulatory requirements and that CAPs were being implemented satisfactorily.
28. In response to an intervention from A. Dykeman regarding the use of procedures at the PLNGS and how these contributed to its safe operation, the Commission asked the licensee about how information regarding regulatory issues, such as those identified for procedural adequacy and adherence, were disseminated to PLNGS employees. NB Power provided the Commission with information about the regular employee and contractor meetings, as well as on-the-job reinforcement, noting that NB Power was making significant progress in ensuring that all PLNGS employees and contractors were aware of, understood and used these established procedures.

### *3.2.1 Quality Management*

29. The Commission assessed the adequacy of NB Power's PLNGS Quality Assurance Program. NB Power submitted that the Quality Assurance Program ensured that safety-related equipment, systems and structures were performing according to the stated requirements over the course of their service lifetime. NB Power also submitted that it used self-assessments, benchmarking, an independent Nuclear Oversight Group and two external oversight groups – the Nuclear Safety Review Board and the Corporate Nuclear Oversight Team – to ensure that the requirements and objectives of the PLNGS Management System were being achieved.
30. Asked to submit additional information regarding external oversight of NB Power's operations, the NB Power representative provided the Commission with information about the roles of the Corporate Nuclear Oversight Team, the Nuclear Safety Review Board, the internal NB Power Nuclear Oversight Group, as well as about the oversight provided through the World Association of Nuclear Operators, noting that these multiple layers of internal and external oversight ensured that the PLNGS remained a safe and robust station. The NB Power representative also informed the Commission that external reviews were generally consistent in the identification of best practices and areas that required improvement. The Commission is satisfied with the information provided on this point.

31. Based on the information provided on the record for this hearing, the Commission is satisfied that NB Power has an appropriate Quality Assurance Program in place at the PLNGS. The Commission expects CNSC staff to continue its monitoring of NB Power's implementation of CAPs in regard to procedural adequacy and adherence throughout the proposed licence period.

### 3.2.2 *Organization*

32. The Commission reviewed the information submitted by NB Power regarding its organizational structure at the PLNGS, noting the key activities that NB Power used to effectively implement PLNGS processes. NB Power submitted that the PLNGS organizational structure identified the high level responsibilities and authorities of the positions associated with its operations and that its Plan of Establishment included the total complement of positions needed to support the facility's safe operation. NB Power also submitted that, through extensive hiring and multi-year staffing plans, NB Power was ensuring the continuity of knowledge and skills throughout the life of the PLNGS.
33. NB Power submitted that, as part of its overall organizational improvement plan, PLNGS leadership development programs and learning and development activities were increased and improved throughout the current licence period. NB Power also noted that the PLNGS change management process was significantly improved, strengthened and streamlined during the current licence period.
34. NB Power provided the Commission with information on its management of contractors, noting the specific technical, quality and training requirements that contractors had to meet. NB Power explained that its contractor management programs ensured that the work of contracted personnel conformed to the standards and expectations as defined in the PLNGS Management System.
35. The Commission considered the information submitted by CNSC staff regarding NB Power's organization and areas of improvement that were identified through CNSC compliance activities. CNSC staff reported that it had assessed NB Power's CAPs to address all of the identified areas for improvement and determined them to be satisfactory. CNSC staff confirmed to the Commission's satisfaction that the areas of improvement did not present a safety risk and that the CAPs would continue to be monitored during the proposed licence period.
36. The Commission enquired about NB Power's strategies for knowledge transfer and succession planning. The NB Power representative provided information on its succession planning initiative, noting that NB Power was well prepared for the upcoming retirements through its graduate hiring program. In regard to knowledge transfer, the NB Power representative stated that benchmarking to improve knowledge transfer processes at the PLNGS was recently carried out. The Commission was satisfied with the information provided on this point.

37. Based on the information provided, the Commission is satisfied that NB Power has an appropriate organizational structure in place at the PLNGS to ensure continued safety of persons and the environment throughout the proposed licence period.

### *3.2.3 Facility Management*

38. The Commission examined the information provided by NB Power in regard to facility management at the PLNGS. NB Power submitted that the SAP® software package, *Work Clearance Applications*, was used for PLNGS configuration management and provided detailed information about configuration control improvements that were made during the current licence period. NB Power also provided information regarding configuration control improvement initiatives planned for the proposed licence period.
39. The Commission assessed the adequacy of NB Power's business continuity programs at the PLNGS, developed to minimize disruptions in the event of natural, human or technical threats. NB Power provided information about its risk assessment and management processes, as well about the PLNGS Pandemic Response and Emergency Response Plans, noting that NB Power worked with the New Brunswick Emergency Measures Organization (NBEMO) and various levels of government to ensure the safety of the public through its business continuity programs. CNSC staff confirmed the information provided by NB Power, noting that NB Power was adequately prepared to maintain or restore critical business functions in the event of disabling circumstances.
40. The Commission requested additional details about NB Power's pandemic emergency and business continuity planning. The NB Power representative provided additional information about how the PLNGS business continuity plans would maintain or restore critical business functions during an emergency at the PLNGS, noting that the pandemic emergency plan was a corporate-wide plan and was being updated. The Commission was satisfied with the information provided.
41. Based on the information provided, the Commission is satisfied that NB Power has adequate programs in place for configuration management and business continuity management at the PLNGS.

### *3.2.4 Safety Culture*

42. The Commission assessed the adequacy of NB Power's safety culture at the PLNGS. NB Power reported that nuclear safety was a primary focus at the PLNGS and that NB Power challenged itself to continuously improve in this area. NB Power also provided information about the processes NB Power used to evaluate its safety culture, including comprehensive assessments in 2014 and 2016 showing a healthy PLNGS nuclear safety culture and noting that the PLNGS safety culture was validated by an industry

award. NB Power further provided information on areas for improvement that were identified during these assessments and reported to the Commission that implementation plans had been developed for each of those areas of improvement. CNSC staff confirmed this information, providing the Commission with details about CNSC assessments of the PLNGS safety culture during the current licence period. CNSC staff further confirmed that NB Power had a variety of effective mechanisms to implement recommendations from its internal and CNSC safety culture assessments.

43. Asked to provide results of the latest PLNGS nuclear safety culture surveys, the NB Power representative submitted that the surveys, conducted every two years, showed confidence amongst PLNGS employees in the mechanisms that had been implemented to report safety concerns. However, the NB Power representative stated that a gap was identified in the mechanism that was used to transmit information from the management level to the workers in the plant. The NB Power representative provided the Commission with CAPs that NB Power took to correct this issue, metrics that were used to measure progress in this regard and stated to the Commission's satisfaction that there had been significant improvements in this regard.
44. In their interventions, several unions, nuclear-related organizations and NB Power employees submitted that NB Power was very receptive in addressing and ensuring the resolution of safety issues that arose at the PLNGS. In the Commission's consideration of these interventions, the Commission requested additional information on the topic of raising safety issues at the PLNGS. The NB Power representative informed the Commission that there was a low threshold for the reporting of issues at the PLNGS and that site staff regularly used the multiple mechanisms through which they could report these issues or concerns.
45. Further on this topic, the Commission called for comments regarding the concern in PEACE-NB's intervention that the PLNGS had a history of bullying in the workplace. The NB Power representative provided the Commission with information on this matter, stating that NB Power had a respectful workplace policy with zero-tolerance for bullying. The Commission is satisfied with the information provided on this point.
46. The Commission considered the interventions from members of local communities, unions, local businesses and PLNGS staff that commended NB Power on the high safety culture standards at the PLNGS, ensuring the continuous safety of its operations and staff. The Commission noted that several intervenors were companies with contractors at the PLNGS and that these intervenors submitted that they had very good working relationships with NB Power.
47. Based on the information examined for this hearing, the Commission is satisfied that NB Power has maintained and will continue to maintain a strong safety culture at the PLNGS.

48. The Commission wishes to note that, based on the information submitted for this hearing, the Commission is satisfied that NB Power provides PLNGS staff and contracted personnel with adequate opportunity and support to report safety issues and to refuse unsafe work without the fear of bullying or retribution.

### 3.2.5 Conclusion on Management System

49. On the basis of the information provided on the record for this hearing, the Commission concludes that NB Power has appropriate organization and management structures in place and that the operating performance at the PLNGS in the current licence period provides a positive indication of NB Power's ability to adequately carry out the activities under the proposed renewed licence.
50. The Commission notes its concerns with the management system-related deficiencies that were identified through CNSC compliance verification activities during the current licence period. The Commission expects NB Power to implement CAPs as described during this hearing throughout the proposed licence period and expects CNSC staff to continue increased regulatory oversight in this SCA, with annual reports to the Commission through the NPP ROR.
51. The Commission is, overall, satisfied that the PLNGS management system-related deficiencies noted during CNSC inspections do not amount to a risk to the health and safety of persons or the environment and that the implementation of the management system related-CAPs will continue to support safe operations at the PLNGS.

## 3.3 Human Performance Management

52. The Commission assessed NB Power's human performance management programs which encompass activities that enable effective human performance through the development and implementation of processes that ensure that PLNGS staff are sufficient in number in all relevant job areas and have the necessary knowledge, skills, procedures and tools in place to safely carry out their duties. During the current licence period, CNSC staff rated NB Power's performance in this SCA as "satisfactory."
53. The Commission examined the information submitted by NB Power regarding the PLNGS human performance program and the integration of P-119, *Policy on Human Factors*<sup>8</sup> into PLNGS processes. NB Power also provided information on its Human Performance Steering Committee and the CAPs related to human performance management that were implemented throughout the licence period. NB Power submitted that it used departmental clock resets<sup>9</sup> as learning and communication tools

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<sup>8</sup> CNSC Regulatory Policy P-119, *Policy on Human Factors*, October 2000.

<sup>9</sup> "Departmental clock resets" are an event tracking tool. These indicate any event that resets the departmental event-free site clock, helping to track and to establish lessons learned for these events.



at the PLNGS and that, through increased oversight and reinforcement of specific human performance tools, department clock resets in 2015 were reduced by 50% in comparison with resets in 2014.

54. CNSC staff reported that a 2013 PLNGS human performance program inspection resulted in corrective actions that were adequately addressed by NB Power during the current licence period. CNSC staff also noted that NB Power performed a focussed human performance program self-assessment in 2014 that validated the program's consistency with industry standards. CNSC staff reported to the Commission's satisfaction that NB Power had committed to carrying out a human performance program self-assessment at least once per licence period, with program documentation updated accordingly.

### 3.3.1 Personnel Training

55. The Commission considered the information submitted by NB Power about its personnel training programs, noting that the programs at the PLNGS were compliant with REGDOC-2.2.2, *Personnel Training*<sup>10</sup> and that training oversight was provided by three committees. NB Power submitted details about training process improvement initiatives that were carried out throughout the current licence period, as well as industry strengths that were identified in the PLNGS training programs. NB Power also reported that it was recognized by industry for its dedication to fostering on-the-job learning of its employees.
56. CNSC staff confirmed the information provided by NB Power and reported that NB Power's Systematic Approach to Training- (SAT-) based system met the specifications of REGDOC-2.2.2. CNSC staff provided the Commission with information on personnel training compliance verification activities that were carried out at the PLNGS throughout the current licence period, reporting that overall, NB Power had implemented training programs in accordance with its SAT-based training system. CNSC staff noted that, although NB Power's CAPs for its Fuel Handling Operator Training program had been reviewed and accepted by CNSC staff in May 2016, a 2017 inspection identified additional areas of improvement for this program. CNSC staff confirmed to the Commission's satisfaction that NB Power would provide CNSC staff with quarterly updates on the improvements being implemented for the Fuel Handling Operator Training program and that annual updates would be provided to the Commission through the NPP ROR.
57. The Commission examined numerous interventions from individuals who presented information about the training provided to PLNGS employees and contractors. The Commission notes that all of these intervenors were of the opinion that PLNGS employees and contractors were provided with more than adequate training to carry out their duties safely.

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<sup>10</sup> CNSC Regulatory Document REGDOC-2.2.2, *Personnel Training*, December 2016.

58. The Commission considered the information provided in several interventions, including those from first responder organizations, community businesses, municipalities, unions and individuals, respecting collaborative training initiatives that they carried out with PLNGS personnel. The Commission notes its satisfaction with this practice and encourages NB Power to continue its collaboration with various stakeholders in PLNGS training initiatives.
59. Having examined all of the information provided on the record for this hearing, the Commission is satisfied that NB Power has appropriate training programs in place at the PLNGS and meets the objectives of REGDOC-2.2.2. The Commission expects CNSC staff to continue its monitoring of NB Power's progress in addressing the identified corrective actions.

### 3.3.2 Certification and Examinations

60. NB Power informed the Commission about the SAT-based Certified Staff Training Program at PLNGS, noting that it met the specifications of CNSC RD-204, *Certification of Persons Working at Nuclear Power Plants*<sup>11</sup> and that PLNGS had a 10-year plan for the certification of three staffing streams. NB Power also reported that the Management Development Program at the PLNGS was developed in order to ensure the continued progress of PLNGS employees through the program. CNSC staff confirmed the information provided by NB Power and further informed the Commission that NB Power maintained a sufficient number of certified personnel for all certified positions at the PLNGS throughout the licence period.
61. In regard to certification examinations, NB Power provided the Commission with detailed information about how its programs met the specifications in RD-204 and reported that PLNGS had started reporting the results of Personnel Certification Examinations as specified in REGDOC-3.1.1, *Quarterly Report on Nuclear Power Plant Personnel*.<sup>12</sup> CNSC staff informed the Commission that an inspection focusing on simulator exams was conducted during the current licence period, with four areas for improvement identified and subsequent corrective actions completed by NB Power to the satisfaction of CNSC staff. CNSC staff confirmed that NB Power was compliant with all CNSC requirements in regard to certification examinations.
62. The Commission examined the intervention from an individual, L. Belding, and requested additional details about the scenarios considered during licensed control room operator simulator training. The intervenor provided the Commission with detailed information regarding the frequency of simulator training and the wide variety of conditions for which PLNGS staff trained, including severe accidents and extreme weather situations. The Commission was satisfied with the information provided on this point.

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<sup>11</sup> CNSC Regulatory Document RD-204, *Certification of Persons Working at Nuclear Power Plants*, February 2008.

<sup>12</sup> CNSC Regulatory Document REGDOC-3.1.1, *Quarterly Report on Nuclear Power Plant Personnel*, April 2016.

63. Based on the information presented during this hearing, the Commission is satisfied that NB Power has appropriate training and certification programs in place at PLNGS. The Commission is also satisfied that NB Power's programs meet the objectives of RD-204, with quarterly reporting to the CNSC in accordance with REGDOC-3.1.1.

### 3.3.3 Human Factors

64. The Commission assessed the information provided by NB Power regarding its adherence to minimum shift complement (MSC) requirements. NB Power reported that a PLNGS MSC validation analysis was carried out during the current licence period and that an analysis was also carried out against G-323, *Ensuring Presence of Sufficient Qualified Staff at Class I Nuclear Facilities: Minimum Staff Complement*.<sup>13</sup>
65. CNSC staff reported that, during the current licence period, NB Power added an Emergency Response Team (ERT) to its MSC, providing NB Power additional emergency response capacity. The Commission expressed satisfaction with the addition of the ERT to the MSC and enquired about whether the ERT had operational responsibilities at the PLNGS. NB Power confirmed that the primary responsibility of the ERT was the response to medical, fire, nuclear and hazardous materials events, not PLNGS operations.
66. The Commission assessed the Fitness for Duty Program at the PLNGS which included hours of work, workplace wellness, relationships in the workplace, prevention programs and several employee assistance programs. NB Power reported that its Fitness for Duty Program included a Continuous Behaviour Observation Program which provided guidance to employees, contractors and supervisors to detect negative behavioural changes. CNSC staff confirmed the information provided by NB Power.
67. Asked for additional information on the Continuous Behaviour Observation Program, the NB Power representative explained that the program trained NB Power employees to look for aberrant behaviour to ensure that this behaviour did not negatively impact the PLNGS, noting that a variety of resources is made available to employees should such aberrant behaviours be identified. The Commission further enquired as to the effectiveness of the program. The NB Power representative explained how program effectiveness was measured through the PLNGS corrective action system and trending. Several intervenors, who were also PLNGS employees, explained to the Commission the workings and effectiveness of the Continuous Behaviour Observation Program, noting that they were encouraged to report fitness for duty or safety issues.
68. CNSC staff reported that, during the current licence period, NB Power controlled the hours of work and shift schedules of its workers in accordance with approved procedures and that certified staff was in full compliance with PLNGS limits on hours

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<sup>13</sup> CNSC Regulatory Guide G-323, *Ensuring Presence of Sufficient Qualified Staff at Class I Nuclear Facilities: Minimum Staff Complement*, August 2007.

of work. CNSC staff further reported that NB Power had measures in place to manage worker fatigue to comply with CNSC requirements. CNSC staff also informed the Commission that the recently-published REGDOC-2.2.4, *Fitness for Duty: Managing Worker Fatigue*,<sup>14</sup> as well as REGDOC-2.2.4, *Fitness for Duty*<sup>15</sup> (under development), would apply to NB Power's programs for the PLNGS during the proposed licence period, with the associated implementation plan and timeline accepted by CNSC staff and detailed in the LCH.

69. The Commission further enquired about NB Power's management of fitness for duty concerns related to drug and alcohol impairment. The NB Power representative explained that, through the PLNGS fitness for duty monitoring programs, NB Power had adequate measures in place to manage these fitness for duty concerns, with additional guidance in this regard forthcoming through the next volume of REGDOC-2.2.4. CNSC staff confirmed that NB Power's programs in this regard met CNSC staff expectations. The Commission is satisfied with the information provided on this point.
70. In response to the concerns raised in an intervention from G. Dalzell about the appropriateness of 12-hour shifts at the PLNGS, the NB Power representative explained that the PLNGS had implemented 12-hour shifts in the 1990s and therefore had a lot of experience in this area. The NB Power representative also provided information about the PLNGS fatigue monitoring program and submitted that, although NB Power was of the opinion that 12-hour shifts were adequate and that they were an industry standard, NB Power was evaluating the adequacy and safety of 12-hour shifts as part of the implementation of REGDOC-2.2.4. CNSC staff confirmed the information provided by NB Power, explaining that CNSC staff considered 12-hour shifts to be safe.
71. Noting that many intervenors focussed on the technical safety improvements that were made at the PLNGS as part of the Fukushima Action Plan, the Commission called for comments on the role of human factors in ensuring that these technical improvements were effective in improving safety at the facility. CNSC staff agreed with the intervenors, that the technical improvements implemented at the PLNGS were important to improving its safety, but noted that without adequate consideration from the human factors perspective, these safety improvements would not be nearly as effective. The Commission agreed with this assessment and was satisfied with the consideration given to human factors in the implementation of technical safety improvements at the PLNGS.
72. Following its examination of the information provided on the record for this hearing, the Commission is satisfied that the MSC at the PLNGS meets the specifications of G-323 and that NB Power had and will maintain an adequate Fitness for Duty program in place at the PLNGS.

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<sup>14</sup> CNSC Regulatory Document REGDOC-2.2.4, *Fitness for Duty: Managing Worker Fatigue*, March 2017.

<sup>15</sup> CNSC Regulatory Document REGDOC-2.2.4, *Fitness for Duty*, under development.

### 3.3.4 Conclusion on Human Performance Management

73. Based on its consideration of the information presented on the record for this hearing, the Commission concludes that NB Power has appropriate programs in place and that current efforts related to human performance management provide a positive indication of NB Power's ability to adequately carry out the activities under the proposed licence.
74. The Commission considered the information provided by NB Power and CNSC staff and is satisfied that the minimum requirements for qualified and certified staff are being met at the PLNGS. The Commission expects NB Power to continue the implementation of identified improvements and corrective actions for Fuel Handling Operator training programs at PLNGS and expects annual updates in this regard provided by CNSC staff through the NPP ROR.
75. The Commission anticipates the implementation of the following REGDOCs at the PLNGS during the current licence period:
  - REGDOC-2.2.4, *Fitness for Duty: Managing Worker Fatigue*
  - REGDOC-2.2.4, *Fitness for Duty* (covering areas such as medical and psychological fitness for duty, including drug and alcohol testing, under development)

## 3.4 Operating Performance

76. The Commission examined operating performance at the PLNGS, which includes an overall review of the conduct of the licensed activities and the activities that enable effective performance as well as improvement plans and significant future activities at PLNGS. Throughout the current licence period, CNSC staff rated NB Power's performance in the operating performance SCA as "satisfactory."
77. The Commission notes that NB Power's *Navigating for Excellence Handbook* for the PLNGS was admitted into the record during this hearing and is publicly available for review.

### 3.4.1 Conduct of Licensed Activity

78. The Commission evaluated NB Power's Operations Program, which is comprised of standards, process and procedures to ensure the safety of the public and the environment, as well as high levels of equipment reliability during both normal and accident conditions. NB Power provided detailed information about its Operating Policies and Principles (OP&Ps) and reported that nuclear safety was paramount to NB Power, with the defence-in-depth concept adopted at the PLNGS to ensure that there were multiple overlapping engineering, administrative and people-based barriers to ensure safety. NB Power also reported that, throughout the current licence period, steady progress had been made towards minimizing reactivity management events, and

that a PLNGS Reactivity Oversight Committee had been established.

79. CNSC staff confirmed the information provided by NB Power and submitted that CNSC compliance verification activities showed that the PLNGS was operated safely and that NB Power implemented CNSC-approved programs in accordance with PLNGS licence requirements. CNSC staff also reported that NB Power appropriately managed unplanned transients at the PLNGS during the current licence period and that these did not present a risk to nuclear safety, human health or the environment.
80. The Commission reviewed how NB Power used operating experience to improve its operating performance. NB Power submitted that it used
- an Operating Experience Program, which provided an opportunity to capitalize on lessons learned from both the PLNGS and industry
  - a Corrective Action Program Health Index performance metric to evaluate performance improvement
  - a Corrective Action Program
  - trending to identify degrading or potentially degrading station conditions
81. Regarding operating performance in terms of reactor power and outages, the NB Power representative informed the Commission that the forced loss rate<sup>16</sup> at the PLNGS was improving significantly, from 19.86% in 2015 to 2.48% in 2016.
82. NB Power informed the Commission about its procedure-development and verification process at the PLNGS, noting that this process was subject to continuous improvement activities. On this topic, CNSC staff reported that areas for improvement of procedural adequacy and adherence at PLNGS were identified during the current licence period and that two directives were issued to NB Power. CNSC staff also provided details regarding its regulatory oversight in regard to the directives, noting that, although the areas for improvement were identified as potentially safety significant, they did not present an immediate risk to the health and safety of persons or the environment. CNSC staff submitted that the implementation of CAPs on this issue would continue until NB Power satisfies all CNSC requirements.
83. The Commission noted NB Power's commitment to top-quartile performance and excellence at the PLNGS and requested additional information about how NB Power would achieve this goal. The NB Power representative submitted that the PLNGS was already meeting top-quartile performance in many areas of its operations and provided information about areas that still required improvement. The NB Power representative explained that NB Power had established goals and associated metrics for PLNGS operations and that these metrics were assessed against performance on an annual basis, with improvements implemented to operations if the goals were not met.

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<sup>16</sup> Forced loss rate is defined as "Operating period forced loss rate is defined as the ratio of the unplanned energy losses during a given period of time, considering only the operating period, to the reference energy generation minus energy losses corresponding to planned outages and their possible unplanned extensions, during the same period, expressed as a percentage." Source: IAEA, <https://www.iaea.org/PRIS/Glossary.aspx>.

The NB Power representative also informed the Commission that NB Power's commitment to excellence applied to CNSC ratings in the 14 SCAs, with NB Power continually striving for "fully satisfactory" ratings. The Commission was satisfied with NB Power's commitment in this regard.

84. Having examined the information submitted for this hearing, the Commission is satisfied that the PLNGS was operated and will continue to be operated safely. The Commission expresses satisfaction with NB Power's continuous improvement plans for PLNGS operations and encourages NB Power to continue its efforts in this regard.

#### 3.4.2 Reporting and Trending

85. The Commission assessed the information submitted by CNSC staff regarding NB Power's continued adherence to the specifications of S-99, *Reporting Requirements for Operating Nuclear Power Plants*<sup>17</sup> until December 2014, and REGDOC-3.1.1, *Reporting Requirements for Nuclear Power Plants*<sup>18</sup> for the balance of the current licence period. The Commission noted that CNSC staff did not identify any nuclear safety-related regulatory issues from NB Power's reports.
86. Based on the information provided, the Commission is satisfied that NB Power met all reporting parameters as specified in S-99 and currently meets the parameters of REGDOC-3.1.1 and that no safety-related regulatory issues were reported by NB Power during the current licence period.

#### 3.4.3 Outage Management Performance

87. The Commission considered the adequacy of NB Power's Outage Management Process, which was used to manage planned outages at PLNGS. NB Power submitted information on planned outage cycles, noting that safety and quality were top priorities in outage planning to ensure successful outage execution and that the next outages were planned for 2018 and 2020. The Commission also considered the information from NB Power about the determination of outage scope, planning and scheduling and notes that PLNGS had recently implemented CSA N290.11-13, *Requirements for reactor heat removal capability during outage of nuclear power plants*.<sup>19</sup> The Commission notes that NB Power successfully completed its latest planned outage in April 2017.

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<sup>17</sup> CNSC Regulatory Standard S-99, *Reporting Requirements for Operating Nuclear Power Plants*, March 2003.

<sup>18</sup> CNSC Regulatory Document REGDOC-3.1.1, *Reporting Requirements for Nuclear Power Plants*, Version 2, April 2016.

<sup>19</sup> N290.11-13, *Requirements for reactor heat removal capability during outage of nuclear power plants*, CSA Group, 2013.

88. CNSC staff confirmed the information provided by NB Power and submitted that NB Power performed all safety-related outage undertakings in accordance with CNSC-approved procedures during the current licence period. CNSC staff further reported NB Power conducted all appropriate follow-up actions for forced unplanned outages at NB Power during the current licence period.
89. Based on the information provided by NB Power and CNSC staff, the Commission is satisfied that planned outages were performed appropriately throughout the licence period and that NB Power had adequate procedures in place to carry out planned outages during the proposed licence period. The Commission is also satisfied that follow-up for forced outages was carried out and will continue to be carried out appropriately, meeting the objectives of N290.11-13.

#### 3.4.4 Safe Operating Envelope

90. The Commission examined the information provided by NB Power and CNSC staff regarding the PLNGS Safe Operating Envelope (SOE). NB Power provided information about how the specifications of CSA N290.15, *Requirements for the safe operating envelope for nuclear power plants*<sup>20</sup> were met at the PLNGS throughout the current licence period.
91. CNSC staff confirmed the information provided by NB Power and submitted that in 2015, CNSC staff carried out an inspection focussing on NB Power's PLNGS SOE program, resulting in minor SOE maintenance findings. CNSC staff reported that NB Power was adequately addressing these findings, with ongoing compliance monitoring by CNSC staff.
92. Based on the information provided for this hearing, the Commission is satisfied that NB Power has an appropriate SOE program in place at the PLNGS that meets the specifications of N290.15. The Commission expects CNSC staff to continue monitoring NB Power's progress in addressing the SOE-related inspection findings.

#### 3.4.5 Accident Management and Recovery

93. The Commission assessed the detailed information provided by NB Power regarding severe accident management and recovery programs at the PLNGS. NB Power submitted that the PLNGS was using G-306, *Severe Accident Management Programs for Nuclear Reactors*<sup>21</sup> and that an implementation plan for REGDOC-2.3.2, *Accident Management*<sup>22</sup> would be submitted to CNSC staff in September 2017. The Commission also considered the information provided by NB Power about

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<sup>20</sup> N290.15, *Requirements for the safe operating envelope for nuclear power plants*, CSA Group, 2010.

<sup>21</sup> CNSC Regulatory Guide, *Severe Accident Management Programs for Nuclear Reactors*, May 2006.

<sup>22</sup> CNSC Regulatory Document REGDOC-2.3.2, *Accident Management*, version 2, September 2015.



- its programs to support and manage severe events and accidents, including the Severe Accident Management Guidelines (SAMGs)
  - Abnormal Plant Operating Procedures (APOPs)
  - the Incident Command System
  - the Emergency Response Organization
  - the Level II probabilistic safety assessment (PSA)
  - the emergency mitigating equipment (EME) implemented at the PLNGS in response to Fukushima Action Plan
94. CNSC staff confirmed the information provided by NB Power and provided the Commission with information about safety improvements that were made to the PLNGS during refurbishment activities. CNSC staff also submitted that a 2013 inspection of NB Power's SAMG documentation showed that it met the objectives of G-306.
95. CNSC staff submitted that a 2013 inspection of NB Power's APOPs showed a need for APOP improvement. CNSC staff provided the Commission with information on the CAP that NB Power submitted to CNSC staff in 2014, and explained that the remaining areas of improvement were of low safety significance and that CNSC staff was satisfied with the progress being made to address the corrective actions.
96. Based on the information provided by NB Power and CNSC staff, the Commission is satisfied that NB Power has adequate programs in place at NB Power to manage and respond to design basis, beyond design basis and severe accident events at the PLNGS, with its program meeting the specifications of G-306. The Commission expects CNSC staff to continue its monitoring of NB Power's CAP for the improvement of the PLNGS APOPs, with annual reporting to the Commission on NB Power's progress in this regard through the NPP ROR.
97. The Commission notes NB Power's commitment to implement REGDOC-2.3.2 at the PLNGS as soon as practicable.
98. The Commission acknowledges interventions regarding severe accident management from several intervenors including the Canadian Environmental Law Association (CELA), Greenpeace Canada, G. Dalzell and S. Nijhawan. The issues submitted in these interventions are considered by the Commission in section 3.11, *Emergency Management and Fire Protection* of this decision.

#### 3.4.6 Conclusion on Operating Performance

99. Based on the above information, the Commission concludes that the operating performance at the PLNGS during the current licence period provides a positive indication of NB Power's ability to carry out the activities under the proposed licence.

100. The Commission wishes to note its consideration of interventions from the Passamaquoddy First Nation, Mi'gmawe'l Tplu'tawnn Incorporated (MTI), the Maliseet Nation of New Brunswick, Sipekne'katik, CELA, Greenpeace Canada, PEACE-NB, New Clear Free Solutions, G. Dalzell, S. Nijhawan and other individuals, which expressed concerns about the safety of PLNGS operations.
101. The Commission also notes that other intervenors, including community organizations, local businesses, individuals, unions and industry groups expressed confidence in the safety and operating performance of the PLNGS, noting that NB Power had a comprehensive plan for continuous improvement in this regard.
102. On the basis of its review of the above information, the Commission is satisfied that NB Power will continue to ensure that appropriate operation performance-related programs are in place at the PLNGS to ensure the health and safety of persons and the environment.
103. The Commission is satisfied with CNSC staff's plans to include NB Power's SOE documentation in the PLNGS LCH under the proposed licence condition 3.1. The Commission reaffirms that, since the SOE is part of the PLNGS licensing basis, changes to the SOE documentation that may reduce safety margins will require Commission approval.
104. The Commission expects NB Power to continue its progress in addressing CNSC inspection findings related to operating performance and CNSC staff to continue its monitoring of the related CAPs, with annual updates to the Commission through the NPP ROR.

### **3.5 Safety Analysis**

105. The Commission assessed safety analysis at the PLNGS, which includes a systematic evaluation of the potential hazards associated with the conduct of the licensed activity or the operation of a facility, and considers the effectiveness of preventive measures and strategies in reducing the effects of such hazards. Safety analysis supports the overall safety case for the PLNGS. CNSC staff reported that, throughout the current licence period, the PLNGS was operated safely and within licence limits, with NB Power's performance in this SCA rated as "satisfactory" by CNSC staff.
106. The Commission noted the opinion in the intervention from S. Nijhawan that CANDU reactors were not safe and should not be licensed, and asked for comments on this matter. CNSC staff provided information on this matter, noting that approximately 10% of the world's nuclear reactors were CANDU reactors and that they were all operating safely. The Commission is satisfied with the information provided on this point.

107. In regard to the concern about CANDU reactor positive void reactivity raised by PEACE-NB, CNSC staff provided the Commission with detailed information about how positive void reactivity was not a CANDU design flaw, that it allowed for the use of natural uranium providing considerable safety benefits, and provided information about how the positive void reactivity of CANDU reactors was managed to ensure safety. The Commission agrees with CNSC staff's assessment of this issue and is satisfied with the information provided on this point.
108. In response to S. Nijhawan's intervention, the Commission enquired about how CNSC staff ensured that safety analyses were carried out and reviewed by personnel with the appropriate credentials. CNSC staff provided detailed information regarding the credentials required for NB Power staff, CNSC staff and third-party reviewers in this regard, noting that this information was captured in the CNSC's regulatory framework. The NB Power representative concurred with the information provided by CNSC staff and provided additional details on this topic. The Commission was satisfied with the information provided on this point.
109. NB Power informed the Commission that all analytical, scientific and design computer programs used at PLNGS to support safety analyses, including those used by contractors, were compliant with CSA N286.7, *Quality Assurance of analytical, scientific and design computer programs for nuclear power plants*.<sup>23</sup> NB Power also informed the Commission that MAAP4-CANDU version of the MAAP-CANDU software was used for severe accident simulation at the PLNGS.
110. The Commission asked for comments regarding updates and improvements that have been made to the MAAP-CANDU software since its first release. CNSC staff provided the Commission with this information, noting that the program had undergone significant upgrades since its first release and that the International Atomic Energy Agency (IAEA) had recently validated and benchmarked the MAAP-CANDU software against several other severe accident scenarios. CNSC staff provided the Commission with additional information regarding the validation process for severe accident simulation programs, explaining that these had to be reviewed against national and international codes and standards, including N286.7. The Commission is satisfied that MAAP-CANDU is a valid severe accident simulation program and appropriate for use by NB Power for safety analysis.
111. The Commission notes that the safety concerns submitted in S. Nijhawan's intervention for this hearing were discussed in a Commission public meeting item dedicated to those concerns during the March 8, 2017 Commission meeting.<sup>24</sup> The Commission further notes that, during this hearing, S. Nijhawan indicated that additional references to research and information discussed in his interventions would be provided to the Commission. Until such time as this information is submitted to the Commission through appropriate intervention procedures, the Commission is of the

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<sup>23</sup> N286.7, *Quality assurance of analytical, scientific and design computer programs for nuclear power plants*, CSA Group, 2016.

<sup>24</sup> *Minutes of the Canadian Nuclear Safety Commission (CNSC) held on March 8, 2017.*

view that no new information was brought forth in the intervention submitted for this hearing in regard to the safety concerns that were discussed on March 8, 2017 and considers the matter of these safety issues closed unless new and credible information is brought forth. Furthermore, the Commission remains satisfied that the passive autocatalytic recombiners (PARs) installed in all Canadian NGS, including the PLNGS, are adequate and fit for purpose.<sup>25</sup>

### 3.5.1 Deterministic Safety Analysis

112. NB Power provided the Commission with detailed information on the deterministic safety analyses and processes at the PLNGS, noting that the *PLNGS Safety Report*<sup>26</sup> provided a summary of the deterministic analyses that were performed by NB Power. NB Power also provided the Commission with information on how events were selected for the analyses and how identified changes were incorporated into the PLNGS design process, with any changes that impacted the safety case analyzed, documented and included in the *PLNGS Safety Report*. CNSC staff confirmed that the 2016 *PLNGS Safety Report* was accepted by CNSC staff in April 2017.
113. Regarding NB Power's implementation of REGDOC-2.4.1, *Deterministic Safety Analysis*<sup>27</sup> in place of RD-310, *Safety Analysis for Nuclear Power Plants*,<sup>28</sup> NB Power informed the Commission that an implementation plan was submitted to CNSC staff in July 2016. CNSC staff confirmed this information and provided the Commission with additional details in this regard, noting that REGDOC-2.4.1 would be fully implemented at the PLNGS by July 1, 2017. CNSC staff also submitted that NB Power would conduct updated deterministic safety analyses in accordance with REGDOC-2.4.1 during the proposed licence period.
114. Based on the information provided on the record for this hearing, the Commission is satisfied that NB Power's current deterministic safety analysis for the PLNGS is adequate and that PLNGS has large safety margins.

### 3.5.2 Probabilistic Safety Assessment

115. The Commission assessed the information provided by NB Power about its Probabilistic Safety Assessment (PSA) Program. NB Power reported that, as part of the refurbishment project, a Level II PSA, compliant with REGDOC-2.4.2, *Probabilistic Safety Assessment (PSA) for Nuclear Power Plants*,<sup>29</sup> was carried out for the PLNGS. NB Power also reported that these PSA results were summarized in the *PLNGS Safety*

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<sup>25</sup> *Minutes of the Canadian Nuclear Safety Commission (CNSC) held on March 8, 2017*, Paragraph 40.

<sup>26</sup> The *PLNGS Safety Report* was last revised and issued to the CNSC in June 2016, in accordance with NB Power's LCH for PLNGS for the current licence period.

<sup>27</sup> CNSC Regulatory Document REGDOC-2.4.1, *Deterministic Safety Analysis*, May 2014.

<sup>28</sup> CNSC Regulatory Document RD-310, *Safety Analysis for Nuclear Power Plants*.

<sup>29</sup> CNSC Regulatory Document REGDOC-2.4.2, *Probabilistic Safety Assessment (PSA) for Nuclear Power Plants*, May 2014.

*Report* and that they demonstrated compliance with prescribed overall plant safety goals for the frequency of severe core damage and large radiological releases from the PLNGS reactor containment building. CNSC staff confirmed the information provided by NB Power, reporting that the PLNGS PSA Program was revised to ensure that it met the objectives of REGDOC-2.4.2, with a full implementation by July 1, 2017, and that the program satisfied regulatory requirements.

116. The Commission examined the detailed information provided by CNSC staff on NB Power's first PSA submission in 2008, based on the parameters of S-294, *Probabilistic Safety Assessment for Nuclear Power Plants*, as well as on the 2016 PSA update. CNSC staff reported that the updated PLNGS result for the Level 1 PSA (severe core damage frequency – SCDF) for all contributors was 3.40E-5 events per reactor-year and that the result for the Level 2 PSA (large release frequency – LRF) for all contributors was 6.27E-6 per reactor-year. As such, CNSC staff confirmed that both the Level 1 and Level 2 PSAs were well within the safety limits of 1E-4 and 1E-5 events per reactor-year, respectively. CNSC staff also reported that NB Power submitted its *PSA Summary Report* to CNSC staff in 2016 and that it met the parameters of S-294. The Commission also reviewed the information submitted by CNSC staff comparing the 2008 and 2016 PSA results and reasons for increases and decreases, noting the results for individual PSA components
117. Regarding the increases from 2008 to 2016 in SCDF and LRF for internal floods, CNSC staff explained that more accurate information was used to recalculate the flood risk at the PLNGS in 2016, resulting in a slightly increased flood risk. NB Power confirmed this information and provided additional details about the comprehensive assessment that was carried out in this regard. CNSC staff confirmed to the Commission's satisfaction that, even with this increase, NB Power met the PSA limits and targets for internal floods at the PLNGS.
118. In considering the interventions from New Clear Free Solutions, Greenpeace Canada, G. Dalzell and PEACE-NB, the Commission asked for clarification on the CNSC's regulatory requirements for PSA. CNSC staff submitted that the CNSC required a licensee to submit PSA methodology including proposed limits and targets. CNSC staff further explained that NB Power submitted this methodology to the CNSC, with the limits in line with the internationally adopted standard INSAG-12,<sup>30</sup> that CNSC accepted the methodology and that it was part of NB Power's licensing basis.
119. CNSC staff provided additional information regarding the role of a PSA, noting that PSAs did not represent a pass/fail scenario, and explained that, internationally, the regulatory expectation of licensees was to submit a PSA methodology to the regulator. CNSC staff also explained that, since the PSA methodology was part of the licensing basis, CNSC staff held the licensee accountable to the methodology through regulatory oversight activities and that the licensee was also held accountable for the implementation of identified enhancements and improvements. The NB Power

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<sup>30</sup> INSAG-12, *Basic Safety Principles for Nuclear Power Plants 75-INSAG-3 Rev. 1*, International Atomic Energy Agency, 1999.

representative submitted that NB Power was committed to improvement through the continuous assessment of vulnerabilities at the PLNGS and improvements that could be made in that regard. CNSC staff added that the NB Power LCH specifically reflected the expectation that a licensee shall meet the specifications of REGDOC-2.4.2, which included the implementation of corrective actions and compensatory measures when a PSA target was not met, and provided the Commission with additional information in this regard. Asked about whether NB Power satisfied all the regulatory requirements for PSA at the PLNGS, CNSC staff confirmed that NB Power did meet all PSA requirements. The Commission is satisfied with the information provided in this regard.

120. In response to the CANDU Owners Group's (COG) intervention, the Commission asked for comment on the process by which Fukushima Action Items (FAIs) were developed and how it was determined that these would, in fact, improve nuclear safety and emergency preparedness. The COG representative provided detailed information on the methodology that was followed to identify improvements following the Fukushima Daiichi accident and how those improvements were assessed by industry and by regulators following their implementation. The Commission was satisfied with the information provided on this matter.
121. The Commission asked for comments in regard to the intervention from PEACE-NB that suggested that mathematical errors were made in the PLNGS safety assessments. CNSC staff submitted that there were several internationally-accepted methods to carry out safety assessment calculations and that the errors, as suggested by the intervention, were not errors and that CNSC staff was satisfied that the calculations were done correctly. The Commission is satisfied that mathematical errors were not made in the PLNGS safety analysis calculations.

### Seismicity

122. The Commission considered the detailed information provided by NB Power and CNSC staff about the 2016 seismic PSA (SPSA) results for PLNGS, which met the safety limits for both SCDF and LRF. NB Power submitted that the SPSA did not identify potential vulnerabilities at the PLNGS that challenged safety objectives. CNSC staff explained that SPSAs were not carried out by industry in 2008 and that, in 2016, CNSC staff accepted NB Power's SPSA methodology, with CNSC staff finding that it met the parameters of S-294.
123. The Commission also considered the detailed 2008 and 2016 PSA-based seismic margin assessment (SMA) results provided by NB Power and CNSC staff, noting that a review level earthquake (RLE) for the PLNGS was one with a peak ground acceleration (PGA) of 0.344g,<sup>31</sup> representing a 1 in 10,000 year earthquake. CNSC staff also reported that the 2016 PSA-based SMA studies submitted by NB Power were of good quality, complete and prepared following CNSC-accepted methodology.

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<sup>31</sup> Units of 'g' refer to acceleration du to gravity.

124. CNSC staff emphasized that the RLE was not a licence requirement or a safety goal and provided further information regarding the 0.344g RLE, noting that it was used as a stress test for the PLNGS, and that the purpose of examining systems, structures and components (SSC) at the RLE was to identify areas of improvement with respect to seismic safety and to test overall seismic capability. NB Power provided detailed information regarding its calculation of seismic capacity of the PLNGS as it related to failure analysis, noting that an increased seismic capacity represented stronger structures and equipment.
125. In regard to the decrease in the PSA-based SMA results for high consequence low probability failure (HCLPF) LRF from 0.42g in 2008 to 0.35g in 2016, CNSC staff also provided details about the reasons for this decrease, including results from additional studies that were carried out for the PLNGS. CNSC staff reported that, even with this decrease, the HCLPF for LRF at the PLNGS met the RLE of 0.344g and that the decrease did not represent a safety risk.
126. The Commission considered the location of safety-related equipment at the PLNGS. NB Power submitted that this equipment was located at various locations above ground level at the PLNGS and that detailed modeling and finite element analysis was performed to determine how the equipment and building would be affected during an RLE. NB Power further reported that the seismic response at each floor elevation for safety-related equipment was accounted for in the SPSA.
127. Referencing the New Clear Free Solutions intervention, the Commission asked about the assertion that CNSC staff changed the PLNGS SPSA safety limits during the current licence period. In its intervention, New Clear Free Solutions further submitted that these safety limits formed part of the licensing basis approved by the Commission in the 2011 *Record of Proceedings, Including Reasons for Decision*<sup>32</sup> (2011 Decision) and could therefore be changed only by a decision of the Commission. CNSC staff informed the Commission that, during the current licence period, no changes were made to the PLNGS licensing basis which included a design basis<sup>33</sup> earthquake at 0.2g, adding that the PLNGS satisfied all licensing requirements in this regard. CNSC staff also explained that, during the current licence period, there had been no changes to the PSA safety limits accepted by the Commission as stated in the 2011 decision and that NB Power met all safety limits in terms of SCDF and LRF.

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<sup>32</sup> CNSC Record of Proceedings, Including Reasons for Decision – New Brunswick Power Nuclear Corporation, *Request for Approval to Reload Fuel and Restart the Point Lepreau Nuclear Generating Station, and Application to Renew the Power Reactor Operating Licence for the Point Lepreau Nuclear Generating Station*, (NB Power RoD), 2012.

<sup>33</sup> The “design basis” is defined as the range of conditions, according to established criteria, that the facility must withstand without exceeding authorized limits for the planned operation of safety systems.

128. In reference to the assertion made in the New Clear Free Solutions intervention that the PLNGS RLE was 0.4g in 2008 and that it was decreased to 0.344g during the current licence period, CNSC staff explained that, in 2008 the RLE was, in fact, 0.3g and was increased to 0.344g following the most recent seismic analyses using internationally-accepted methodology. CNSC staff noted that NB Power had demonstrated additional seismic capacity of the PLNGS at 0.4g in 2008 and that this was not a licensing requirement. NB Power concurred with the information provided by CNSC staff, confirming that the safety analysis at the PLNGS was performed using accepted methodology and that the PLNGS met all safety requirements. The Commission is satisfied with the information provided on this point.
129. In response to the intervention from New Clear Free Solutions, the Commission called for clarification on whether a third-party review of the PLNGS SPSA and of the SMA-based PSA were carried out. The NB Power representative provided detailed information about the third-party reviews that had been carried out in this regard and noted that a PSA Summary was posted on the NB Power website. The Commission is satisfied that the appropriate internal reviews by CNSC staff and NB Power, as well as third-party reviews were carried out in this regard.
130. Based on the information provided, the Commission finds that CNSC staff's analysis of the PSA for PLNGS is adequate and that the PSA demonstrates that NB Power meets the SCDF limit of 1E-4 per reactor-year and LRF limit of 1E-5 per reactor-year for the PLNGS from all contributors: internal events, internal flood, internal fire and seismic PSAs.
131. The Commission appreciates the detailed PSA-related information provided by NB Power and CNSC staff for this hearing. The Commission is of the opinion that PSAs are one of multiple tools used for safety analysis at PLNGS and are used in a complementary manner to deterministic safety analysis and the defence-in-depth concept. Furthermore, the Commission notes that the main benefits of PSAs are to identify dominant risk contributors, safety improvement opportunities and the comparison of options for reducing risk.
132. The Commission is satisfied that the PLNGS licensing basis in regard to seismic capacity of a 0.2g design basis earthquake was not modified during the current licence period and remains as approved in the Commission's 2011 licence renewal decision on this matter. Further, the Commission wishes to note that, in its 2011 decision, the Commission acknowledged that

“Based on the above information, the Commission is satisfied that the PLNGS meets the required safety goals.”<sup>34</sup>

and that the Commission was referencing an RLE of 0.3g and not 0.4g. The Commission was satisfied with the safety limits (goals) as stated and that represented the probability of a 1 in 10,000 year earthquake.

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<sup>34</sup> NB Power RoD, October 6, 2011, and December 1 and 2, 2011, Paragraph 65.



133. The Commission wishes to make it clear that the design basis earthquake of 0.2g forms part of the PLNGS licensing basis approved by the Commission in this decision. The Commission is satisfied with the explanation provided by CNSC staff in regard to the PLNGS design basis earthquake and is satisfied that the design basis of 0.2g is appropriate, that PLNGS is meeting regulatory requirements and that the results are indicative of overall seismic safety at the PLNGS. The Commission is also satisfied, based on the information presented during this hearing, that an RLE of 0.344g for the PLNGS is adequate for this licence renewal.
134. Furthermore, the Commission states that, while NB Power demonstrated during the 2011 hearing that a large release of fission products from the PLNGS would be prevented at 0.4g, this was not, and is not, a licensing requirement. A 0.4g earthquake is representative of a 1 in 100,000 year earthquake and the Commission expresses agreement with the following statement from the Commission's 2011 decision,

“CNSC staff noted that there was no requirement to qualify the facility (the PLNGS) against an earthquake of one in 100,000 years.”<sup>35</sup>

Notwithstanding, the Commission notes its expectation for NB Power to pursue its continuous improvement efforts in this regard during the proposed licence period.

### 3.5.3 Criticality Safety

135. NB Power informed the Commission about its procedures and guidance at the PLNGS for in- and ex-core criticality control of nuclear fuel. NB Power noted that since only natural and depleted uranium were used at PLNGS, there were no criticality concerns in light water or air due to the fuel's low fissile content and that nuclear fuel was segregated from heavy water at all times. CNSC staff confirmed this information.
136. Based on the information provided the Commission is satisfied that PLNGS is maintaining appropriate programs for to ensure criticality safety at PLNGS.

### 3.5.4 Severe Accident and Hazard Analysis

137. The Commission assessed the information provided by NB Power regarding severe accident analyses that were undertaken at PLNGS to evaluate residual risk. NB Power submitted that a total of 47 severe accident cases were analyzed and that these supported part of the basis for SAMGs at the PLNGS as described in by REGDOC-2.3.2 and in section 3.4.5 of this *Record of Decision*. NB Power provided the Commission with details on reactor-specific processes included in the postulated events, design modifications to enhance defence-in-depth provisions, the effect of harsh environmental factors, the mitigation of radiological consequences and additional

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<sup>35</sup> NB Power RoD, October 6, 2011, and December 1 and 2, 2011, Paragraph 63.

design features installed at PLNGS in response to the *CNSC Integrated Action Plan on the Lessons Learned from the Fukushima Daiichi Nuclear Accident* (Fukushima Action Plan).<sup>36</sup>

138. CNSC staff provided the Commission with information on NB Power's Fire Hazard Assessment (FHA) and Fire Safe Shutdown Analysis (FSSA) which were revised during the current licence period to conform with the specifications of CSA N293-07, *Fire protection for nuclear power plants*.<sup>37</sup> CNSC staff reported that, although several minor improvements to the FHA and FSSA were identified as being merited, CNSC staff was satisfied that NB Power was addressing these through a CAP and that the objectives of N293-07 were being met.
139. The Commission assessed NB Power's closure of Fukushima Action Items (FAIs) during the current licence period. NB Power submitted that all industry-wide FAIs had been addressed and closed during the current licence period, with five outstanding PLNGS-specific FAIs related to emergency response and accident mitigation. CNSC staff confirmed the information provided by NB Power, explaining that these outstanding FAIs did not present a risk to the health and safety of persons or the environment and that CNSC staff would continue to monitor these FAIs in the proposed licence period.
140. The Commission considered interventions from G. Dalzell, S. Nijhawan, CELA and several other organizations and asked about how FAIs would improve safety at the PLNGS. CNSC staff stated that international benchmarking of safety improvements confirmed that the additional safety systems underwent extensive testing to ensure their functionality and that Canada was a leader in this regard. The Canadian Nuclear Society representative submitted that the Canadian Nuclear Society was of the opinion that Canadian nuclear operators and the CNSC were well ahead of the international community in terms of these safety improvements and that they greatly improved the safety of Canadian NGS. The Commission was satisfied with the information provided in this regard.
141. On the basis of the information provided, the Commission is satisfied that the severe accident and hazard analyses performed by NB Power were adequate to evaluate and further mitigate residual risks at the PLNGS.
142. The Commission is satisfied that NB Power has adequately addressed industry-wide FAIs and encourages NB Power to continue its efforts in addressing the PLNGS-specific FAIs. The Commission expects CNSC staff to provide annual updates on the status of the PLNGS-specific FAIs during the NPP ROR.

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<sup>36</sup> *CNSC Integrated Action Plan on the Lessons Learned from the Fukushima Daiichi Nuclear Accident*, CNSC, 2013.

<sup>37</sup> N293-07, *Fire protection for nuclear power plants*, CSA Group, 2007.

*3.5.5 Management of Safety Issues (including Research and Development Programs)*

143. The Commission considered the information provided by NB Power and CNSC staff regarding the procedures and processes used at PLNGS for the identification and management of safety-related issues. NB Power provided details on how new information and emerging issues revealed by operating experience, research and development (R&D) initiatives and performance analysis were tracked and managed at the PLNGS. CNSC staff confirmed the information provided by NB Power, explaining that NB Power reported on its R&D activities annually in conformance with REGDOC-3.1.1 and that NB Power continued to maintain a robust R&D capability to address emerging issues.
144. CNSC staff also provided the Commission with detailed information regarding four Category 3 CANDU Safety Issues (CSIs) that were open at PLNGS, noting that these open CSIs did not present a safety concern and represented technical areas where additional research was required. The Commission notes that CSIs were also discussed in detail at the March 8, 2017 Commission meeting<sup>38</sup> and finds that CSIs are being addressed adequately by NB Power for the PLNGS.
145. In its intervention, COG provided the Commission with information regarding the Electric Power Research Institute (EPRI) Nuclear Technology Transfer Award that was awarded to an NB Power employee. The Commission commended NB Power on its commitment to innovation in the nuclear field.
146. The Commission invited comments about the research that the intervenor RESD Inc. had done regarding the fitness for service of PLNGS fuel channels. CNSC staff responded that CNSC specialists in this field were tracking this research to ensure that CNSC staff remained aware of all of the latest research and knowledge in this field. CNSC staff stated, however, that it was of the opinion that fuel channels at the PLNGS were fit for service. The NB Power representative concurred with CNSC staff, stating that the fuel channel model used at the PLNGS was conservative and that this research provided additional data to ensure its robustness. The Commission appreciated the information provided in this intervention. The Commission is satisfied that the fuel channel model used by NB Power is adequate and that the PLNGS fuel channels are fit for service.
147. Based on the information provided, the Commission is satisfied that NB Power has an adequate program in place for the management of emergent safety issues. The Commission also expresses its satisfaction that NB Power has a well-developed research and development program that supports research innovation.

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<sup>38</sup> *Minutes of the Canadian Nuclear Safety Commission (CNSC) held on March 8, 2017.*

### *3.5.6 Conclusion on Safety Analysis*

148. On the basis of the information presented, the Commission concludes that the systematic evaluation of the potential hazards and the preparedness for reducing the effects of such hazards is adequate for the operation of the facility and the activities under the proposed licence. The Commission finds that NB Power's safety analysis program for the PLNGS meets regulatory requirements and that NB Power has adequate preventive measures and strategies in place and PLNGS to ensure the protection of workers, members of the public and the environment and that the facilities at PLNGS meet safety requirements.
149. The Commission expects NB Power to continue its implementation of REGDOC-2.4.1 and to work with industry partners to develop a whole-site PSA for the PLNGS.
150. The Commission wishes to make it clear that the design basis earthquake of 0.2g forms part of the PLNGS licensing basis approved by the Commission in this decision. The Commission is also satisfied that a 0.344g RLE for the PLNGS is appropriate for this licence renewal.
151. The Commission expresses the view that, although specific vulnerabilities assessed in a PSA are proprietary, a licensee should be as transparent as possible in the public availability of non-proprietary or non-sensitive PSA information.

### **3.6 Physical Design**

152. The Commission considered the physical design of facilities at PLNGS, including the activities to design the systems, structures and components to meet and maintain the design basis of the facility. The design basis is the range of conditions, according to established criteria, that the facility must withstand without exceeding authorized limits for the planned operation of safety systems. CNSC staff rated NB Power's performance in this SCA as "satisfactory" throughout the current licence period.
153. NB Power informed the Commission that the physical design of the PLNGS incorporated a defence-in-depth approach with multiple redundant safety systems in place to ensure continuous safety. NB Power provided detailed information about the five layers of defence-in-depth applied to the PLNGS nuclear fuel program, the four PLNGS special safety systems and the two-group concept applied in the PLNGS design that protect the facility against common cause and external events.

### 3.6.1 Design Governance

154. The Commission assessed the adequacy of the PLNGS Design Configuration process. NB Power submitted that the PLNGS programs and procedures complied with N291-08, *Requirements for safety-related structures for CANDU nuclear power plants*,<sup>39</sup> as well as all relevant regulatory requirements. NB Power also provided the Commission with information on improvements that were being made to the Design Configuration process and submitted information about the detailed design change control requirements had been implemented at PLNGS.
155. NB Power informed the Commission that the PLNGS was compliant with N290.12-14, *Human factors in design for nuclear power plants*.<sup>40</sup> CNSC staff confirmed this information, reporting that it was satisfied with the program used by NB Power for incorporating human factors in the design activities at the PLNGS.
156. NB Power provided the Commission with details about the Environmental Qualification program at the PLNGS, noting that it had been implemented and maintained in accordance with N290.13-05, *Environmental Qualification for CANDU Nuclear Power Plants*.<sup>41</sup> CNSC staff confirmed to the Commission that it was satisfied with the Environmental Qualification program implemented at PLNGS.

#### Pressure Boundary Program

157. The Commission assessed the information provided by NB Power and CNSC staff about the pressure boundary program at the PLNGS. NB Power submitted that PLNGS was compliant with N285.0-12/N285.6, *General requirements for pressure-retaining systems and components in CANDU nuclear power plants/Material standards for reactor components for CANDU nuclear power plants*.<sup>42</sup> CNSC staff confirmed this information.
158. NB Power submitted that an implementation plan for the PLNGS transition to N290.0-11, *General requirements for safety systems of nuclear power plants*<sup>43</sup> would be submitted to CNSC staff in September 2017. NB Power also submitted that an implementation schedule for N290.14-15, *Qualification of pre-developed software for use in safety-related and control applications in nuclear power plants*<sup>44</sup> at PLNGS would be submitted to CNSC staff by June 2018. CNSC staff confirmed that it was satisfied with this approach.

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<sup>39</sup> N291-08, *Requirements for safety-related structures for CANDU nuclear power plants*, CSA Group, Update 2, 2014.

<sup>40</sup> N290.12-14, *Human factors in design for nuclear power plants*, CSA Group, 2014.

<sup>41</sup> N290.13-05, *Environmental Qualification for CANDU Nuclear Power Plants*, CSA Group, Update 1, 2009.

<sup>42</sup> N285.0-12/N285.6, *General requirements for pressure-retaining systems and components in CANDU nuclear power plants/Material standards for reactor components for CANDU nuclear power plants*, CSA Group, 2012.

<sup>43</sup> N290.0-11, *General requirements for safety systems of nuclear power plants*, CSA Group, 2011.

<sup>44</sup> N290.14-15, *Qualification of pre-developed software for use in safety-related and control applications in nuclear power plants*, CSA Group, 2015.

159. Addressing the issue of the acceptable limit of likelihood of failure for pressure boundary components at the PLNGS, CNSC staff informed the Commission that inspections showed that the pressure boundary program at the PLNGS provided adequate mechanisms to maintain the fitness for service of pressure boundary components from all susceptible degradation mechanisms. The Commission was satisfied with the information provided on this point.
160. Based on the information provided for this hearing, the Commission concludes that the programs that NB Power has in place for design governance at the PLNGS are adequate and satisfy the parameters of the applicable codes and standards. The Commission expects NB Power to submit implementation plans for N290.0-11 and N290.14-15 as detailed above.

### 3.6.2 System and Components Design

161. The Commission considered the adequacy of the design of PLNGS systems and components. In regard to the PLNGS electrical power system design, CNSC staff submitted that NB Power maintained an adequate electrical power system at the PLNGS throughout the current licence period, with one area of improvement identified in regard to two out of three 250V DC battery banks not meeting maintenance requirements in 2016. CNSC staff confirmed that NB Power had implemented a CAP in this regard and that CNSC staff would conduct ongoing compliance verification during the proposed licence period.
162. CNSC staff reported to the Commission that NB satisfied all regulatory requirements in regard to PLNGS instrumentation and control design.
163. CNSC staff informed the Commission that NB Power was implementing an aging management program for cables at the PLNGS and that CNSC staff would continue to monitor NB Power's progress in the implementation of these programs throughout the proposed licence period, with updates to the Commission in the annual NPP ROR.

### Fire Safety and Fire Protection Systems

164. The Commission considered the adequacy of the Fire Protection Program at the PLNGS, with NB Power explaining that PLNGS met IRC-10NBC, *National Building Code of Canada 2010*,<sup>45</sup> IRC-10NFC, *National Fire Code of Canada 2010*,<sup>46</sup> and N293-12, *Fire protection for nuclear power plants*.<sup>47</sup>

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<sup>45</sup> IRC-10NBC, *National Building Code of Canada 2010*, National Research Council, 2010.

<sup>46</sup> IRC-10NBF, *National Fire Code of Canada 2010*, National Research Council, 2010.

<sup>47</sup> N293-12, *Fire protection for nuclear power plants*, CSA Group, 2012.

165. NB Power also informed the Commission that the station design took into account the potential for fire as it related to all forms of safety and noted that the design considered the Fire Probabilistic Safety Assessment. The Commission also evaluated the detailed information provided by NB Power in regard to fire system and equipment performance, fire prevention and the PLNGS ERT.
166. CNSC staff reported that a code compliance review at PLNGS confirmed NB Power's adherence with the referenced fire-related codes and standards and noted that fire protection systems at NB Power were also in conformance with associated National Fire Protection Association Standards. CNSC staff further confirmed that third party reviews of NB Power's proposed station modifications that had the potential to impact fire protection satisfied CNSC requirements.

#### Seismic Qualification

167. CNSC staff submitted that the PLNGS fragility analysis showed that the system, structures and components (SSCs) constituting the Safe Shutdown Equipment List had a HCLPF PGA above the RLE of 0.344g with two minor exceptions where the HCLPF was 0.2g and for which acceptable CAPs were implemented.
168. Asked to comment on the risk represented by the two components that had an HCLPF of 0.2g, CNSC staff provided additional information on the two components, noting that they were outside the reactor containment building and did not present a safety risk. CNSC staff explained that the PLNGS design basis earthquake was 0.2g and all safety-significant equipment met the design basis, which was the regulatory requirement. CNSC staff submitted to the Commission's satisfaction that NB Power had committed to analyze the potential significance of these components and the implementation of potential improvements.
169. On the basis of the information provided for this hearing, the Commission is satisfied that the systems and components design programs at NB Power are adequate and meet the specifications of the appropriate codes and standards.

#### *3.6.3 Site Characterization*

170. The Commission considered the adequacy of the processes used to describe the distinguishing characteristics, qualities, physical features and environment of the PLNGS site. NB Power informed the Commission that site characterization information for the PLNGS was included in the 2016 *PLNGS Safety Report* and provided the Commission with additional information about the updated information in the *PLNGS Safety Report*.

171. CNSC staff reported to the Commission that, as required by FAIs 2.1.1 and 2.1.2, NB Power submitted its other High Wind Assessment (HWA) and site-specific Probabilistic Tsunami Hazard Assessment (PTHA) in June 2015. CNSC staff submitted that the PTHA showed that tsunamis were not a significant concern for the PLNGS and that, following reviews by CNSC staff, Natural Resources Canada (NRCan) and Environment and Climate Change Canada (ECCC), the related FAIs were closed in March 2016. The Commission is satisfied that these FAIs were adequately addressed by NB Power.
172. The Commission considered NB Power's updated *Assessment of Other External Hazards for Point Lepreau Site*, which was previously issued in 2008. CNSC staff reported that NB Power's analysis of possible external hazards that had not been assessed by the PSA Program was found to be adequate and accepted by CNSC staff.
173. In its consideration of several interventions, including those from G. Dalzell, New Clear Free Solutions and PEACE-NB, the Commission requested additional information on how NB Power carried out its screening of external hazards during the PLNGS hazard assessment. The NB Power representative provided details about the international standards and guidelines used to establish hazards screening criteria, followed by information on the qualitative and quantitative assessments that were carried out. NB Power submitted that the assessments identified five types of events that required additional consideration and that a comprehensive analysis of hazards combinations was also carried out, leaving the seismic hazard as the only credible external hazard to the PLNGS. The Commission is satisfied with the information provided on this point and agrees with the assessment that the seismic hazard remains the only credible external hazard to the PLNGS.

#### Site-Specific Seismic Hazard Assessment

174. The Commission examined the information provided by NB Power and CNSC staff regarding the site-specific seismic hazard assessment (SSSHA) that the Commission required NB Power to complete as part of the 2011 PLNGS licence renewal.<sup>48</sup> The Commission notes that the final SSSHA included a probabilistic seismic hazard assessment as well as a paleoseismology investigation, and that a summary of the assessment was posted on NB Power's website in December 2014. The Commission also acknowledges that NB Power's assessments in this regard were accepted by CNSC staff and underwent third-party review.
175. NB Power provided the Commission with detailed information about the SSSHA findings in regard to the PLNGS design basis. NB Power submitted that design spectra was slightly increased at higher frequencies and that, although research had shown that frequency aspects of an earthquake did not damage plant structure or equipment,

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<sup>48</sup> CNSC Record of Proceedings, Including Reasons for Decision – New Brunswick Power Nuclear Corporation, *Request for Approval to Reload Fuel and Restart the Point Lepreau Nuclear Generating Station, and Application to Renew the Power Reactor Operating Licence for the Point Lepreau Nuclear Generating Station*, 2011.



NB Power was conducting research into the impact of these frequencies.

176. In regard to beyond design basis assessment, NB Power submitted that the SSSHA showed that the magnitudes of very rare earthquakes that were unlikely to occur over the lifetime of PLNGS were larger than historically regarded as credible. As such, an interim seismic risk assessment was carried out which showed that the risk to the PLNGS due to seismic events was acceptably low. NB Power also reported that a seismic site response analysis showed that attenuation in the PGA seismic response was present at the PLNGS site, reducing the PGA from 0.575g to 0.344g.
177. The Commission asked for information on evidence of possible ground liquefaction near the PLNGS site and how this was considered in the SSSHA. NB Power provided details of the paleoseismology study that was conducted during the current licence period and explained the areas where liquefaction features were found, noting that there was no evidence of liquefaction features near the PLNGS. NB Power also informed the Commission that the liquefaction features were studied and considered in the SSSHA, with a third-party expert panel validating NB Power's approach on this issue. The Commission was satisfied with the information provided in this regard.
178. Asked to comment on his third-party review of NB Power's SSSHA, Dr. John Adams from NRCan submitted that NB Power's assessment represented a rigorous estimate of the seismic hazard at the PLNGS, with the 0.344g RLE being of a larger size than that considered in the *National Building Code of Canada, 2010*. The Commission expressed appreciation for Dr. Adams' third-party review of the SSSHA and enquired about whether the review would be made public. Dr. Adams submitted that NRCan would allow the release of the report publicly, with NB Power and CNSC staff confirming the future public release of the report.
179. The Commission enquired about why fragility analysis, rather than the conservative deterministic failure margin, was used for the SSSHA. The NB Power representative provided information on both methods, explaining that, although fragility analysis was more resource-intensive, it provided NB Power with more detailed seismic characterization information. CNSC staff confirmed the information provided by NB Power, noting that fragility analysis was accepted by international and CSA Group standards.
180. Based on the information presented on the record for this hearing, the Commission is satisfied that adequate characterization was carried out for the PLNGS site.
181. The Commission notes its satisfaction with the SSSHA that was carried out for the PLNGS and concludes that it fulfilled the Commission's direction in the 2011 Decision. The Commission expects the third-party review of the site-specific SHA to be released to the public as soon as practicable.

### 3.6.4 Conclusion on Physical Design

182. On the basis of the information presented, the Commission concludes NB Power continues to implement and maintain an effective design program at the PLNGS and that the design of PLNGS is adequate for the operation period included in the proposed licence. The Commission is satisfied with CNSC staff's assessment of the adequacy of the physical design of the PLNGS.

### 3.7 Fitness for Service

183. Fitness for Service covers activities that are performed to ensure that the systems, structures and components (SSCs) at PLNGS continue to effectively fulfill their intended purpose. CNSC staff rated NB Power's performance in this SCA as "satisfactory" throughout the current licence period.

#### 3.7.1 Equipment Fitness for Service

184. The Commission considered the information provided by NB Power and CNSC staff regarding the fitness for service of equipment at the PLNGS. NB Power reported that its equipment reliability processes were governed by RD/GD-210, *Maintenance Programs for Nuclear Power Plants*<sup>49</sup> and met the specifications of N286-12. NB Power also provided detailed information about its Equipment Reliability Improvement Plan (ERIP) which addressed an analysis that was carried out based on INPO AP-913, *Equipment Reliability Process Description*<sup>50</sup> and was intended to meet the objectives of REGDOC-2.6.3, *Aging Management*.<sup>51</sup> CNSC staff confirmed the information provided by NB Power and submitted that the ERIP was accepted by CNSC staff.
185. CNSC staff provided the Commission with detailed information regarding several equipment problems encountered at the PLNGS during the current licence period, noting that these were monitored through ongoing regulatory oversight activities and reported to the Commission through regular status reports on power reactors. CNSC staff confirmed to the Commission that CNSC's compliance verification activities showed that NB Power had procedures in place to monitor the fitness for service of equipment at the PLNGS to support the continued safe operation for the proposed licence period. The Commission is satisfied with CNSC staff's assessment in this regard.

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<sup>49</sup> CNSC Regulatory Document/Guidance Document RD/GD-210, *Maintenance Program for Nuclear Power Plants*, 2012.

<sup>50</sup> INPO AP-913, *Equipment Reliability Process Description*, Revision 1, Institute of Nuclear Power Operators, 2001.

<sup>51</sup> CNSC Regulatory Document REGDOC-2.6.3, *Aging Management*, 2014.

186. Based on the information presented on the record for this hearing, the Commission is satisfied that NB Power has adequate process in place to ensure that the equipment at the PLNGS will remain fit for service throughout the current licence period.

### 3.7.2 Maintenance

187. The Commission considered the adequacy of NB Power's PLNGS maintenance programs. NB Power provided the Commission with detailed information on its *ME-1, Establish Maintenance Programs* process for PLNGS SSCs, noting that these consisted of requirements, measures, policies, methods, activities and procedures for maintaining SSCs.
188. NB Power informed the Commission about the PLNGS maintenance organization which supported equipment fitness for service requirements. NB Power also reported on preventive maintenance at the PLNGS, explaining that an electronic feedback process for all types of maintenance was implemented in 2015, allowing the continuous improvement of the maintenance program through the application of operational experience.
189. CNSC staff confirmed the information provided by NB Power and reported that NB Power met the expectations of RD/GD-210 throughout the current licence period. CNSC staff reported that with a preventive maintenance completion ratio of 86%, NB Power had a maintenance program that adequately controlled the number of open corrective maintenance activities and maintained PLNGS SSC performance, with NB Power meeting regulatory expectations in this regard.
190. In its submission, NB Power addressed the maintenance backlog at PLNGS, noting that work activities were categorized and prioritized based on the industry standard INPO AP-928, *Work Management Process Description*.<sup>52</sup> NB Power provided the Commission with detailed information regarding its efforts to reduce maintenance backlog at PLNGS during the current licence period. CNSC staff submitted data about the PLNGS maintenance backlog and preventive maintenance deferrals to the Commission, noting that these were new performance indicators and reportable under REGDOC-3.1.1. CNSC staff reported that it would continue to verify the implementation of these improvement measures, with updates to the Commission through the annual NPP ROR.
191. The Commission requested additional information on the status of the PLNGS maintenance backlog, as raised in the intervention from G. Dalzell. CNSC staff submitted that the maintenance backlog for 2016 had been reduced to below industry average, with safety significant maintenance issues taking precedence over other maintenance issues. CNSC staff also reported that the maintenance backlog continued to decrease during 2017 and indicated satisfaction with the actions taken by NB Power to address the PLNGS maintenance backlog. NB Power confirmed the information

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<sup>52</sup> INPO AP-913, *Work Management Process Description*, Revision 3, Institute of Nuclear Power Operators, 2010.

provided by CNSC staff and provided the Commission with information on the outstanding maintenance backlog as well as the corrective actions that were taken to reduce the PLNGS maintenance backlog. The information provided satisfies the Commission on this point.

192. The Commission assessed the system health monitoring process at the PLNGS. NB Power provided information about and the objectives of the *ME-2, Monitor and Manage System Health* process at PLNGS which applied to select PLNGS SSCs PLNGS, including all safety-significant systems. NB Power also reported that it was continuously improving the PLNGS system health monitoring process to align with best practices over the next three to four years.
193. CNSC staff provided the Commission with details about compliance verification activities carried out to evaluate PLNGS system health monitoring process during the current licence period that resulted in two action notices. CNSC staff further reported that a follow-up inspection in 2015 found that the governance for the PLNGS system health monitoring process was not fully compliant with regulatory requirements and that its implementation was not fully effective, resulting in a “below expectations” rating for maintenance in 2015. CNSC submitted that a CAP was put in place to address this issue and that NB Power had committed to complete the CAP by the end of 2017, with ongoing compliance verification by the CNSC. CNSC staff informed the Commission that it was of the opinion that the areas for improvement did not present a safety risk.
194. Regarding the implementation of the system health monitoring process CAP at the PLNGS, the Commission requested additional information on the significance of this issue in relation to this licence renewal application. The NB Power representative provided the Commission with details on the corrective actions taken to improve the PLNGS system health monitoring process, noting that significant improvements had been realized in this regard. CNSC staff reported that NB Power had implemented satisfactory corrective actions to address this issue and that, while the ratings were not finalized, preliminary information showed that NB Power would achieve a “satisfactory” rating in this area for 2016. CNSC staff also provided the Commission with information on the outstanding actions items that had to be completed by NB Power, explaining that these actions did not present a safety risk and that CNSC staff was satisfied with NB Power’s plans for action closure.
195. After considering the information provided on the record for this hearing, the Commission is satisfied that NB Power has adequate maintenance programs in place at PLNGS for the proposed licence period.
196. The Commission is satisfied that the PLNGS maintenance backlog does not present a safety risk but expects NB Power to continue its efforts in reducing the PLNGS maintenance backlog during the proposed licence period.

197. The Commission fully expects that NB Power resolves the areas for improvement related to the system health monitoring process at the PLNGS in accordance with the CAP that was put in place in this regard, with annual reporting to the Commission by CNSC staff through the annual NPP ROR.

### 3.7.3 Reliability

198. The Commission assessed NB Power's PLNGS reliability program. NB Power reported that RD/GD-98, *Reliability Programs for Nuclear Power Plants*<sup>53</sup> had been implemented at the PLNGS during the current licence period and that the PLNGS met the objectives of RD/GD-98. NB Power also submitted that the PLNGS Mandatory Surveillance Program assured that systems important to safety met specific reliability criteria and that a self-assessment was completed in 2015 to improve this program. CNSC staff confirmed the information provided by NB Power.
199. CNSC staff reported that NB Power's PLNGS reliability program continued to meet regulatory requirements and that NB Power reported to the CNSC annually on the performance of its reliability program, in conformance with REGDOC-3.1.1. CNSC staff provided the Commission with additional information regarding compliance verification activities conducted in regard to the PLNGS reliability program during the current licence period, noting that two minor inspection findings resulted in the implementation of CAPs that were being monitored through the CNSC compliance verification program.
200. Asked to provide additional information about the metrics used to measure reliability at the PLNGS, the NB Power representative explained that the Equipment Reliability Index was the primary indicator used by NB Power in this regard and provided the Commission with information on other indicators that were also used. CNSC staff confirmed this information and stated to the Commission's satisfaction that NB Power reported to the CNSC on the PLNGS reliability metrics in accordance to the specifications of REGDOC-3.1.1.
201. Based on the information presented, the Commission is satisfied that NB Power has implemented an adequate reliability program at PLNGS.
202. The Commission notes NB Power's efforts in regard to the PLNGS reliability program improvements and encourages NB Power to continue the implementation of additional planned improvements.

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<sup>53</sup> CNSC Regulatory Document/Guidance Document RD/GD-98, *Reliability Programs for Nuclear Power Plants*, 2012.

### 3.7.4 Aging Management

203. The Commission examined the information submitted by NB Power and CNSC staff regarding the PLNGS aging management program. NB Power provided information about PLNGS activities that addressed aging management and about plant life management studies that were carried out by NB Power throughout the current licence period.
204. NB Power reported to the Commission that the PLNGS complied with RD-334, *Aging Management for Nuclear Power Plants*<sup>54</sup> and that REGDOC-2.6.3, *Aging Management*,<sup>55</sup> would be fully implemented in July 2017. NB Power also noted that its primary heat transport feeders were inspected in accordance with Clause 13 of N285.4-09, *Periodic inspection of CANDU nuclear power plant components*.<sup>56</sup>
205. CNSC staff confirmed the information provided by NB Power and submitted that, for the implementation of REGDOC-2.6.3, NB Power had developed an integrated aging management program. CNSC staff reported that NB Power implemented adequate processes to ensure the continued health of safety-significant SSCs and that the PLNGS aging management program satisfied regulatory requirements.
206. Based on the information provided, the Commission is satisfied that NB Power has an appropriate aging management plan in place at the PLNGS.

### 3.7.5 Chemistry Control

207. NB Power informed the Commission about the PLNGS chemistry control program, noting that the program applied to all PLNGS systems that supported chemistry control. NB Power reported that all elements of the PLNGS chemistry control program were governed by N286-05.
208. CNSC staff reported to the Commission that NB Power reported on its Chemistry Index and Chemistry Compliance Index on a quarterly basis in accordance with REGDOC-3.1.1. CNSC staff provided the Commission with information regarding steam generator blowdown sulphate concentrations that rose above NB Power's internal action level in 2012 and required a forced plant outage. CNSC staff reported that this issue was fully resolved in 2014 and that, overall, satisfactory chemistry performance was maintained throughout the current licence period at the PLNGS.
209. Asked to provide additional details about the PLNGS chemistry control program, the NB Power representative informed the Commission that the quality assurance program processes for chemistry control were maintained in the PLNGS management system, with N286-05 embedded into these processes. The NB Power representative also

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<sup>54</sup> CNSC Regulatory Document RD-334, *Aging Management for Nuclear Power Plants*, 2011.

<sup>55</sup> CNSC Regulatory Document REGDOC-2.6.3, *Aging Management*, 2014.

<sup>56</sup> N285.4-09, *Periodic inspection of CANDU nuclear power plant components*, CSA Group, 2009.

provided the Commission with information about actions that would be taken in the event that action levels were reached. CNSC staff confirmed this information and provided additional information about CNSC regulatory oversight for the PLNGS chemistry control program. The Commission was satisfied with the information provided on this point.

210. Based on the information provided by NB Power and CNSC staff, the Commission is satisfied that NB Power has maintained and will continue to maintain an adequate chemistry control program in place at the PLNGS.

### 3.7.6 Periodic Inspection and Testing

211. NB Power provided the Commission with detailed information about the PLNGS periodic inspection programs for pressure retaining systems and components, and their supports. NB Power reported that all original equipment and components at the PLNGS underwent the required initial inspections and now underwent periodic inspections in conformance with N285.5-08, *Periodic inspection of CANDU nuclear power plant containment components*.<sup>57</sup>
212. CNSC staff confirmed the information provided by NB Power regarding its implementation of appropriate periodic inspection programs at PLNGS and reported that a 2014 inspection found that NB Power conducted periodic activities in accordance with approved programs and that NB Power satisfied regulatory requirements and expectations in this regard. CNSC staff also confirmed NB Power complied with N285.4-09 for inspection of the primary heat transport and auxiliary systems, feeders and steam generators. The Commission notes NB Power's submission that implementation plans to support the alignment of PLNGS periodic inspection programs to N285.4-14<sup>58</sup> and N285.5-13<sup>59</sup> would be submitted to the CNSC staff by October 31, 2017.
213. NB Power informed the Commission that in-service examination and testing of the PLNGS reactor building was in compliance with N287.7-08, *In-service examination and testing requirements for concrete containment structures for CANDU nuclear power plants*.<sup>60</sup> CNSC staff provided the Commission with details of the 2014 PLNGS reactor building leakage rate test, noting that the leak rate was 0.69% volume of free air per day, below the limit of 1.0% volume per day. The Commission notes NB Power's plans to submit implementation plans for its transition to N287.7-10 to the CNSC by October 31, 2017.

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<sup>57</sup> N285.5-08, *Periodic inspection of CANDU nuclear power plant components*, CSA Group, 2008.

<sup>58</sup> N285.4-14, *Periodic inspection of CANDU nuclear power plant components*, CSA Group, 2014.

<sup>59</sup> N285.5-13, *Periodic inspection of CANDU nuclear power plant components*, CSA Group, 2013.

<sup>60</sup> N287.7-08, *In-service examination and testing requirements for concrete containment structures for CANDU nuclear power plants*.

214. Based on the information provided, the Commission is satisfied that NB Power has adequate processes and programs in place to support safe operations at the PLNGS.
215. The Commission expects NB Power to submit implementation plans to the CNSC and to implement the updated standards at PLNGS as detailed in the information provided on the record for this hearing.

### *3.7.7 Conclusion on Fitness for Service*

216. Based on the information provided on the record for this hearing, the Commission is satisfied with NB Power's programs for the inspection and life-cycle management of key safety systems at the PLNGS. Based on the above information, the Commission concludes that the equipment as installed at the PLNGS is fit for service and that appropriate programs are in place to ensure that the equipment remains fit for service throughout the current licence period.

## **3.8 Radiation Protection**

217. As part of its evaluation of the adequacy of the measures for protecting the health and safety of persons, the Commission considered the past performance of NB Power in the area of radiation protection. The Commission also considered how the PLNGS radiation protection program ensured that both radiation doses to persons and contamination were monitored, controlled and kept as low as reasonably achievable (ALARA), with social and economic factors taken into consideration. Throughout the current licence period, CNSC staff rated NB Power's performance in this SCA as "satisfactory."
218. The Commission considered the information provided by NB Power and CNSC staff to assess whether the PLNGS radiation protection program satisfied the requirements of the *Radiation Protection Regulations*.<sup>61</sup> NB Power submitted that it was committed to the continuous improvement of the PLNGS radiation protection program and provided information in this regard, including the 2016 revision and improvement of program documentation. CNSC staff submitted that, throughout the current licence period, NB Power implemented an appropriate and effective radiation program at the PLNGS that satisfied regulatory requirements.
219. CNSC staff reported that NB Power improved its use of radiation protection performance indicators during the current licence period and that, in accordance with REGDOC-3.1.1, NB Power began submitting formal quarterly reports on safety performance indicators to the CNSC in 2015, with no safety significant results or adverse trends observed.

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<sup>61</sup> SOR/2000-203.



220. The Commission asked NB Power about how the PLNGS radiation protection manager fit into the overall organization. The NB Power representative explained that the radiation protection manager reported to the health and safety manager at the PLNGS; however, improvements to the PLNGS radiation protection program included radiation protection becoming a standalone group during the proposed licence period. The Commission was satisfied with the information provided and strongly encourages that the standalone radiation protection group be established at the PLNGS as soon as practicable.

### *3.8.1 Application of ALARA*

221. The Commission assessed the information submitted by NB Power and CNSC staff regarding the application of ALARA at the PLNGS. NB Power submitted that, as per the ALARA principle, individual and collective doses were well below regulatory and administrative limits throughout the current licence period and that ALARA planning was performed for all work conducted at the PLNGS.
222. CNSC staff provided the Commission with information about the ALARA Committee at the PLNGS, which was responsible for integrating ALARA into planning, scheduling and work control at the PLNGS, and about NB Power's 5-year ALARA plan. CNSC staff reported that an inspection in February 2016 showed that NB Power's ALARA program satisfied regulatory requirements and expectations.
223. Based on the information considered for this hearing, the Commission is satisfied that the ALARA concept is adequately applied to all PLNGS activities.

### *3.8.2 Worker Dose Control*

224. NB Power provided the Commission with detailed information regarding the average and maximum effective doses to workers at the PLNGS and reported that doses to all workers at the PLNGS, which included both NB Power personnel and contractors, were below regulatory limits throughout the current licence period. NB Power also informed the Commission that action levels<sup>62</sup> at the PLNGS were not exceeded during the current licence period, indicating that the PLNGS operated safely and in accordance with radiation and environmental protection programs.
225. CNSC staff confirmed that the PLNGS radiation protection program was implemented effectively to ensure that doses to workers remained below regulatory limits and provided the Commission with additional information regarding worker doses during the current licence period.

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<sup>62</sup> The *Radiation Protection Regulations* define an action level as a specific dose of radiation or other parameter that, if reached, may indicate a loss of control of part of a licensee's radiation protection program and triggers a requirement for specific action to be taken.

226. CNSC staff reported that a 2016 inspection focussed on worker dose control showed that some PLNGS work control documentation required more detail regarding work activities in order to ensure that potential exposure conditions were identified and that appropriate protective measures were implemented. CNSC staff confirmed to the Commission's satisfaction that these improvements were implemented by NB Power during the current licence period.
227. In its consideration of the intervention from CELA, the Commission requested information on radiological risk guidance provided to nuclear energy workers (NEW) in an emergency situation. CNSC staff responded that on-site workers were appropriately trained on the radiological exposure risks that they would face and the actions that they may have to carry out during an emergency. CNSC staff also provided the Commission with information about current NEW dose limits during an emergency and explained that the CNSC was in the process of reducing these limits to align with IAEA recommendations. The Commission was satisfied with the information provided on this point.

### 3.8.3 Radiological Hazard Control

228. The Commission assessed NB Power's identification and control of existing and potential radiological hazards during work activities at the PLNGS. NB Power submitted that the use of alarm monitors, enhanced contamination control measures and contamination monitoring zones were used to monitor for radiation and contamination, to prevent the spread of contamination and to control workers' doses. CNSC staff confirmed the information provided by NB Power, submitting that radiological hazards were being monitored and controlled appropriately at the PLNGS.
229. NB Power reported that an annual compliance report was submitted to CNSC staff for the use of nuclear substances and radiation devices at the PLNGS, in conformance with NB Power's current operating licence. NB Power also reported that sealed sources were leak tested in accordance with the *Nuclear Substances and Radiation Devices Regulations*<sup>63</sup> and that the PLNGS had designated staff trained and qualified in the transport and packaging of radioactive material.
230. CNSC staff reported to the Commission that NB Power had implemented an adequate alpha monitoring and control program at PLNGS that satisfied regulatory requirements and provided the Commission with information about enhancements that NB Power made to this program during the current licence period.
231. On the basis of the information provided for this hearing, the Commission is satisfied that NB Power is, and will continue to, adequately identify and control radiological hazards at the PLNGS.

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<sup>63</sup> SOR/2000-207.

### 3.8.4 Control of Dose to the Public

232. The Commission considered the effectiveness of NB Power's programs to prevent uncontrolled releases of contaminants or radioactive materials to the public from the PLNGS site. NB Power submitted that the dose to the public was maintained at well below the regulatory limit of 1 mSv per year,<sup>64</sup> throughout the current licence period. NB Power also noted that new derived release limits<sup>65</sup> (DRL) were calculated during the current licence period to achieve conformance with N288.1-14, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*.<sup>66</sup>
233. CNSC staff confirmed the information provided by NB Power, explaining that the maximum annual effective dose to a member of the public resulting from PLNGS operations during the current licence period was 0.61 µSv, 0.061% of the regulatory limit.
234. In response to an intervention from the Passamaquoddy Nation, the Commission called for CNSC staff to address the statement that "there is no safe low level of radiation" and that cancer-related deaths in the aftermath of the Fukushima accident were directly attributable to radiation doses. CNSC staff informed the Commission that, although the context and source of that statement could not be determined, this was an issue that was thoroughly studied, with both the World Health Organization and the United Nations Scientific Committee on the Effects of Atomic Radiation independently determining that cancer was not induced at levels that would be expected from a normally operating NGS or from an accident with doses even significantly above background levels, such as the Fukushima accident. CNSC staff also provided additional information in regard to the relation of dose to cancers in both workers and members of the public. The Commission was satisfied with the information provided in this regard.
235. Based on the Commission's assessment of the information provided for this hearing, the Commission is satisfied that NB Power is adequately controlling radiological doses to the public.

### 3.8.5 Conclusion on Radiation Protection

236. Based on the information provided on the record for this hearing, the Commission concludes that, given the mitigation measures and safety programs that are in place to control radiation hazards, NB Power provides, and will continue to provide, adequate

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<sup>64</sup> The regulatory dose limit for a member of the public is 1 mSv (1,000 µSv) per year and the natural background dose is estimated between 2 mSv – 5 mSv (2,000 µSv – 5,000 µSv) per year.

<sup>65</sup> The DRL for a given radionuclide is the release rate that would result in an annual committed effective radiation dose of 1 mSv to the most exposed group of the public (also known as the critical receptor) for that nuclear substance.

<sup>66</sup> N288.1-14, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*, CSA Group, 2014.

protection to the health and safety of persons and the environment throughout the proposed licence period.

237. The Commission is satisfied that NB Power's radiation protection program at the PLNGS meets the requirements of the *Radiation Protection Regulations*.
238. The Commission expresses satisfaction with NB Power's commitment to continuous improvement with its radiation safety program and encourages NB Power to continue its efforts in this regard during the proposed licence period.

### **3.9 Conventional Health and Safety**

239. The Commission examined NB Power's implementation of a conventional health and safety program at the PLNGS, which covers the management of workplace safety hazards. The conventional health and safety program is mandated by provincial statutes for all employers and employees to minimize risk to the health and safety of workers posed by conventional (non-radiological) hazards in the workplace. This program includes compliance with applicable labour codes and conventional safety training. Throughout the current licence period, CNSC staff rated NB Power's performance in this SCA as "fully satisfactory."
240. NB Power provided the Commission with detailed information regarding its conventional health and safety program, reporting that the PLNGS fully complied with the *New Brunswick Occupational Health and Safety Act*,<sup>67</sup> with WorkSafe NB the provincial authority mandated to oversee the Act in New Brunswick. NB Power also reported on program improvements identified through self-assessments during the current licence period. CNSC staff confirmed that NB Power maintained a conventional health and safety program at the PLNGS in accordance with regulatory requirements and that NB Power continued to achieve a high level of personnel safety at the PLNGS.
241. NB Power submitted that the PLNGS consistently achieved top-quartile performance in conventional health and safety, had a goal of zero industrial safety events and had exceeded 5.5 million person-hours without a lost-time accident. NB Power reported that its shared commitment to safety model expected all employees to take part in health and safety at the PLNGS and provided additional information regarding how PLNGS achieved this milestone.
242. CNSC staff provided the Commission with additional details regarding the PLNGS accident severity, accident frequency and industrial safety accident rates. CNSC staff noted that the results of these performance indicators were very low in comparison with other workplaces in Canada and were an indicator of a well-established conventional health and safety program.

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<sup>67</sup> *Occupational Health and Safety Act* (S.N.B. 1983, c. O-0.2).

243. The Commission considered the information provided by NB Power regarding conventional health and safety practices and awareness at the PLNGS. NB Power provided information about the importance of management commitment and responsibility, employee responsibility, personnel safety and the 'safety first' priority in all activities at PLNGS. CNSC staff confirmed the information provided by NB Power, noting that NB Power's emphasis on safety was reflected in the PLNGS *Nuclear Safety Manual*.
244. Asked about the role and responsibilities of the PLNGS health and safety manager, the NB Power representative explained that the employee in this position was responsible for health and safety programs across the PLNGS. The NB Power representative further stated that the safety culture at the PLNGS emphasized that every employee was responsible for their own safety and attributed employee commitment to health and safety to the strong PLNGS safety record.
245. Upon request from the Commission, the International Brotherhood of Electrical Workers, Local 37 representative and also the Co-Chair of the PLNGS on-site Joint Health and Safety Committee (JHSC) provided detailed information on the overall operation of the JHSC, including monthly meetings as mandated by WorkSafe NB, and on the resolution of safety concerns at the PLNGS. The NB Power representative provided additional details about its shared commitment to safety at the PLNGS through the JHSC. The Commission was satisfied with the information provided about the JHSC.
246. The Commission considered interventions from unions, industry organizations and individuals that submitted information about health and safety training for contractors working at the PLNGS site and requested additional comment in this regard. All of the intervenors that provided responses in this regard to the Commission stated that, prior to allowing personnel to work at the PLNGS site, NB Power ensured that they were appropriately trained or provided their personnel with high quality health, safety and radiological protection training. The NB Power representative confirmed that NB Power evaluated a contractor's program to determine whether it met the rigours of the PLNGS program and that, if the contractor's program was found to be insufficient, the contracted employees had to complete PLNGS-specific health and safety training. The Commission was satisfied on this point.
247. Based on the information presented, the Commission concludes that NB Power's conventional health and safety program at the PLNGS satisfied regulatory requirements. The Commission also concludes that the health and safety of workers and the public was adequately protected during the operation of the facility for the current licence period and that the health and safety of persons will continue be adequately protected during throughout the proposed licence period.
248. The Commission considered the interventions from unions with employee members at the PLNGS, noting the high level of collaboration and mutual respect between the unions and NB Power in regard to worker health and safety. The Commission

encourages this continued collaboration during the proposed licence period.

### 3.10 Environmental Protection

249. The Commission examined NB Power's environmental protection programs at the PLNGS which identify, control and monitor all releases of radioactive and hazardous substances, and aim to minimize the effects on the environment which may result from the licensed activities. These programs include effluent and emissions control, environmental monitoring and estimated doses to the public. CNSC staff rated NB Power's performance in this SCA as "satisfactory" throughout the current licence period.
250. The Commission considered whether the PLNGS environmental protection programs adequately met the specifications of REGDOC-2.9.1, *Environmental Protection Policies, Programs and Procedures*.<sup>68</sup>

#### 3.10.1 Effluent and Emissions Control (Releases)

251. The Commission considered NB Power programs to control the release of effluent and emissions from the PLNGS to the environment. NB Power informed the Commission that the New Brunswick Department of Environment and Local Government issued the PLNGS an *Approval to Operate* in regard to releases from the facility, noting that if a non-compliance occurred, NB Power was required to submit a report to this department.
252. NB Power provided the Commission with information regarding liquid waste and gaseous waste management at the PLNGS. NB Power submitted that the releases of liquid wastes were maintained below DRLs and that emissions to the air were well below regulatory limits. NB Power also reported that it continued to improve its environmental protection programs through involvement in industry-wide organizations and initiatives. CNSC staff confirmed this information and also reported that NB Power updated its DRLs in 2012 in accordance with N288.1-08, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*.<sup>69</sup>
253. CNSC staff submitted to the Commission that the effluent and emissions control programs at the PLNGS met the requirements of the *Class I Nuclear Facilities Regulations*<sup>70</sup> and that radiological and non-radiological releases at the PLNGS remained below regulatory limits during the current licence period. CNSC staff also

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<sup>68</sup> CNSC Regulatory Document REGDOC-2.9.1, *Environmental Protection Policies, Programs and Procedures*, 2013.

<sup>69</sup> N288.1-08, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*, CSA Group, 2008.

<sup>70</sup> SOR/2000-204.

reported that NB Power had mechanisms in place to continually improve its effluent and emissions control programs at the PLNGS and that NB Power committed to implementing N288.5-11, *Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills*<sup>71</sup> by June 30, 2018.

254. On the issue of high concentrations of iron in aquatic receptors, the NB Power representative noted that groundwater in New Brunswick had very high levels of iron and that they did not present a risk to the health and safety of persons or the environment. However, to confirm that the high iron levels were due to naturally-occurring iron in the area rather than a separate issue, NB Power committed to studying the iron levels in these aquatic receptors in greater detail during the proposed licence period. The Commission was satisfied with NB Power's response on this matter and NB Power's commitment to study the iron levels in aquatic receptors.
255. On the basis of the information provided for this hearing, the Commission is satisfied that NB Power has and will continue to have adequate programs in place for the control of effluent and emissions at the PLNGS to protect the environment and meet regulatory requirements. The Commission encourages NB Power to continue its efforts of continuous improvements in this regard.

### *3.10.2 Environmental Management System*

256. The Commission assessed the information provided by NB Power and CNSC staff about the PLNGS Environmental Management System (EMS). NB Power submitted that the PLNGS EMS met the specifications of REGDOC-2.9.1. NB Power also reported that its EMS at the PLNGS was ISO 14001:2004<sup>72</sup> certified and that NB Power planned to achieve ISO 14001:2015<sup>73</sup> certification by 2018. CNSC confirmed the information provided by NB Power.
257. Based on the information provided, the Commission is satisfied that NB Power has maintained, and will continue to maintain, an adequate EMS at the PLNGS.

### *3.10.3 Environmental Assessment and Monitoring*

258. In its evaluation of EAs conducted at the PLNGS site, the Commission considered the information submitted by NB Power as well as CNSC staff's EA Report for this licence renewal. NB Power provided the Commission with detailed information regarding EAs that had been carried out at the PLNGS site throughout the history of the facility. CNSC staff submitted that the EA conducted under the NSCA in 2016 for this licence renewal showed that NB Power had made and would continue to make

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<sup>71</sup> N288.5-11, *Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills*, CSA Group, 2011.

<sup>72</sup> ISO 14001:2004, *Environmental Management Systems*, International Organization for Standardization, 2004.

<sup>73</sup> ISO 14001:2015, *Environmental Management Systems*, International Organization for Standardization, 2015.

adequate provision for the protection of the environment and persons.

259. CNSC staff reported that an inspection of NB Power's environmental monitoring program in 2014 showed that the control, monitoring and reporting of environmental releases at the PLNGS were adequate and in compliance with regulatory requirements.
260. The Commission examined NB Power's radiation environmental monitoring program (REMP). NB Power submitted that the REMP assessed the radiological impact of all operations at the PLNGS site and that the average dose to the critical groups<sup>74</sup> remained well below the regulatory limit of 1 mSv per year. CNSC staff confirmed this information and provided additional details about the estimated doses to critical groups, noting that NB Power maintained and would continue to maintain radiological doses to the public well below the regulatory dose limits.
261. CNSC staff submitted that NB Power's REMP for the PLNGS complied with all applicable federal and provincial regulatory requirements. CNSC staff also reported on NB Power's commitment to revise and update its REMP in accordance with N288.4-10, *Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills*<sup>75</sup> by November 30, 2017 and N288.5-11 by June 30, 2018.
262. Asked if the environmental monitoring data for the PLNGS was posted publicly, the NB Power representative submitted that the environmental monitoring report and a high-level summary of radiation emissions to the environment since the beginning of PLNGS operations was available on the NB Power website. The NB Power representative also stated that NB Power had engaged with First Nations to provide them with additional information about environmental monitoring in the vicinity of the PLNGS. The Commission was satisfied with the public availability of the PLNGS environmental monitoring information.
263. Regarding the adequacy of NB Power's radiological monitoring stations near the PLNGS site, the NB Power representative explained that, although most of the monitoring stations were near the PLNGS site, NB Power also had monitoring stations at much greater distances from the PLNGS and that the results from these stations were included in NB Power's environmental monitoring report. The Health Canada (HC) representative provided additional information on monitoring stations that the Canadian Radiological Monitoring Network had in distant locations, including Charlottetown, PE. The Commission is satisfied with the information provided on this point and is of the opinion that the locations of environmental monitoring stations are adequate.

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<sup>74</sup> A critical group is defined as a uniform or reasonably homogeneous group of people whose characteristics (such as habits, location or age) cause them to be representative of the more highly exposed individuals, receiving the highest effective dose or equivalent dose (as applicable) than other groups in the exposed population.

<sup>75</sup> N288.4-10, *Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills*, CSA Group, 2010.



264. The Commission, considering the concerns from the Maliseet Nation of New Brunswick, MTI, the Passamaquoddy Nation, CELA and Gordon Dalzell regarding radiological contamination from PLNGS operations, enquired about a path forward to alleviate some of the intervenors' concerns. The Maliseet Nation of New Brunswick representative responded that the inclusion of Maliseet Nation people in the PLNGS environmental monitoring programs would alleviate some of these concerns, noting that discussions in this regard had started with NB Power. The NB Power representative expressed NB Power's commitment to working with the Maliseet Nation. CNSC staff provided the Commission with information on how the Maliseet Nation could be included in the Independent Environmental Monitoring Program (IEMP) and about the flexible structure of the CNSC's Participant Funding Program (PFP) that could assist the Maliseet Nation, as well as all other interested Indigenous Groups, with the conduct of independent environmental studies. The Commission is satisfied with the information provided in this regard and encourages NB Power and CNSC staff to continue to work with the Maliseet Nation to address concerns about PLNGS operations and to find mechanisms to allow the Maliseet Nation to participate in environmental monitoring for the PLNGS.

#### Independent Environmental Monitoring Program

265. The Commission examined the information provided by CNSC staff in regard to the CNSC's IEMP. CNSC staff provided detailed results from monitoring that was carried out in 2016 in publicly accessible areas outside the perimeter of the PLNGS, noting that the measured radioactivity in all samples were below CNSC reference levels.<sup>76</sup> CNSC staff reported to the Commission's satisfaction that, prior to carrying out sampling for the IEMP, the CNSC had discussions with Indigenous groups in regard to the traditional Indigenous foods and medicines that should be sampled.
266. CNSC staff reported that IEMP results from 2014 and 2015 also showed that measured radioactivity in all samples were below CNSC reference levels. On this basis, CNSC staff submitted that the IEMP results confirmed that the public and the environment around the PLNGS were protected and that there were no health impacts as a result of PLNGS operations. Furthermore, CNSC staff reported that the IEMP results were consistent with NB Power environmental monitoring results.
267. Based on the information submitted by CNSC staff in the EA Report, the Commission is satisfied that the EA adequately shows that NB Power made and will continue to make adequate provision for the protection of the environment and persons at the PLNGS site.

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<sup>76</sup> CNSC reference levels are established based on conservative assumptions about the exposure scenario and using N288.1-14. On this basis, the reference level for a particular radionuclide in a particular medium represents the activity concentration that would result in a dose of 0.1 mSv per year.

268. The Commission is satisfied that NB Power's and the CNSC's environmental monitoring show that the public and the environment around the PLNGS site remain protected.
269. The Commission expects NB Power to implement the updated standards for the environmental monitoring programs at the PLNGS as per the timelines submitted during this hearing.

#### *3.10.4 Environmental Risk Assessment*

270. The Commission assessed the adequacy of the environmental risk assessment (ERA) carried out by NB Power in support of the PLNGS return to operation following refurbishment. NB Power submitted that a site-wide environmental risk assessment (ERA) was submitted to CNSC staff in 2015 and that the ERA was completed in accordance with N288.6-12, *Environmental risk assessment at Class I nuclear facilities and uranium mines and mills*.<sup>77</sup> NB Power also submitted that the results from the ERA were used to establish the basis for CSA N288.4-10 and N288.5-11.
271. CNSC staff provided the Commission with additional information about NB Power's ERA, noting that CNSC staff requested several amendments to the PLNGS thermal plume assessment and requested a more substantial analysis on the impingement and entrainment of fish resulting from PLNGS operations. CNSC staff reported that NB Power provided the additional information to the CNSC in March and November 2016, and January 2017, and that CNSC staff was satisfied that the data used in the ERA was sufficiently conservative and that the ERA showed that NB Power was implementing adequate measures for the protection of the environment.
272. In regard to the PLNGS thermal plume assessment, which was conducted by a third-party expert, CNSC staff reported agreement with the overall conclusion of the assessment that showed that it was unlikely a large area of marine habitat would be affected by a large temperature change from the cooling water discharge. CNSC staff also submitted that NB Power's implementation of N288.6-12 would include an evaluation to determine whether additional investigations were needed to confirm the thermal plume assessment results. The ECCC representative concurred with this approach following a review of NB Power's plans in this regard. CNSC staff confirmed to the Commission's satisfaction that an update on the PLNGS thermal plume assessment would be provided to the Commission during the annual NPP ROR.

#### Fish Impingement and Entrainment

273. The Commission assessed the information submitted for this hearing regarding the impingement and entrainment of fish resulting from PLNGS operations. CNSC staff

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<sup>77</sup> N288.6-12, *Environmental risk assessment at Class I nuclear facilities and uranium mines and mills*, CSA Group, 2012.

submitted that the annual losses of commercial species due to cooling water intake were less than 1% of the annual commercial landings for New Brunswick and that, on this basis, CNSC staff was of the opinion that the impacts on fish due to cooling water intake at PLNGS continued to be minimal. Asked about how an acceptable magnitude of loss was determined, CNSC staff explained that metrics included, but were not limited to, population-level dynamics, area fishing quotas and commercial landings.

274. The Commission requested additional information regarding the cooling water intake and its design features to mitigate the impingement and entrainment of fish and other marine life. CNSC staff provided the Commission with detailed information on the cooling water intake system at the PLNGS, noting that it was designed with a capacity of two reactors and that the impingement and entrainment mitigation measures in place were highly effective and specifically designed to protect the marine life found in the Bay of Fundy.
275. The Commission considered the concerns expressed by the Passamaquoddy First Nation, MTI and the Maliseet Nation in regard to the effects of the PLNGS on traditional and commercial fishing activities at the PLNGS. CNSC staff submitted information about some of the concerns expressed in these interventions, including concerns about the population levels and health of marine species including lobster, scallops and sea urchins. CNSC staff confirmed to the Commission's satisfaction that analyses showed the impact of PLNGS operations on the population and health of these species was negligible.
276. The Commission also considered the interventions submitted by several commercial fisheries, environmental groups and individuals in regard to fishing activities in the Bay of Fundy and noted that, in general, these intervenors were satisfied that the PLNGS did not have a negative effect on their fishing activities.
277. Based on the information presented on the record for this hearing, the Commission is satisfied that the ERA was carried out satisfactorily and showed that NB Power was adequately protecting the environment in the vicinity of the PLNGS site. The Commission anticipates that the updated standards will be implemented at the PLNGS as proposed during this hearing.

#### *3.10.5 Fisheries Act Authorization*

278. The Commission notes that, since operations at the PLNGS result in harm to fish that support a commercial, recreational or Indigenous fishery, a subsection 35(1) *Fisheries Act*<sup>78</sup> (FA) authorization from the Department of Fisheries and Oceans (DFO) may be required for the PLNGS. The need for an FA authorization is based on the definition of "serious harm" in the FA, which deals directly with impacts to fish rather than the general environmental protection requirements of the NSCA and CEAA 2012 which assess impacts at a population level.

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<sup>78</sup> R.S.C., 1985, c. F-14.

279. CNSC staff provided the Commission with information about the FA authorization process, noting that, as per a CNSC-DFO Memorandum of Understanding, CNSC staff would oversee NB Power's self-assessment and draft application for the FA authorization. CNSC staff reported that, based on an updated FA authorization self-assessment submitted by NB Power in January 2017, CNSC staff opined that an FA authorization would be required in accordance with subsection 35(1) of the FA. CNSC staff provided the Commission with information on the next steps in this process, including engagement with Indigenous groups and the identification of offsets. The Commission notes that it will be the DFO, not the Commission, to make decisions under the FA.
280. CNSC staff provided the Commission additional information about how NB Power mitigated the impact on fish from PLNGS operations, noting that, since there were no population-level impacts, the PLNGS was licensable under the NSCA. The NB Power representative added that the PLNGS used the best available technology to prevent the impingement and entrainment of fish and that the data that NB Power submitted for the FA authorization self-assessment was very conservative.
281. In reference to the MTI intervention, the Commission asked for comment on the unexplained fish kills in the Bay of Fundy in late 2016 and whether these were related to PLNGS operations. The NB Power representative responded that NB Power had discussed this event with the DFO and that there was no direct link to PLNGS operations. CNSC staff confirmed this information, indicating that its own review found no correlation between the fish kills and PLNGS activities.
282. Regarding the Aboriginal consultation activities that would be carried out for the FA authorization, CNSC staff informed the Commission that Aboriginal consultation would include discussion of offset policies which would be used to counterbalance residual effects of impingement and entrainment of fish. NB Power and the DFO representative confirmed the information provided by CNSC staff and confirmed their commitment to the consultation process for the FA authorization. The NB Power representatives and CNSC staff also confirmed to the Commission's satisfaction that all First Nations that intervened during this hearing would be consulted in regard to the FA authorization.
283. The Commission concludes that the environmental protection requirements of the NSCA as they relate to the protection of the environment generally are satisfied. The Commission notes that the renewal of NB Power's PROL for the PLNGS does not limit the ability of the DFO to fulfill its mandate under the FA. On this basis, the Commission is satisfied with CNSC staff's assessment in relation to the requirement for a subsection 35(1) FA authorization for the PLNGS.

### *3.10.6 Protection of the Public*

284. The Commission assessed NB Power's programs to mitigate risk to members of the public from hazardous substances discharged from the PLNGS. NB Power provided the Commission with information regarding the approvals it had obtained under provincial legislation to operate the PLNGS.
285. CNSC staff reported that an August 2015 inspection focussing on NB Power's hazardous waste management program identified several areas of improvement related to procedures and procedural adherence. CNSC staff informed the Commission that these areas of improvement did not represent a risk to the health and safety of people or the environment.
286. Based on the information provided, the Commission is satisfied that NB Power's programs to mitigate risk to members of the public from PLNGS operations are adequate. The Commission expects NB Power to adequately implement corrective actions during the proposed licence period to address the 2015 inspection findings.

### *3.10.7 Conclusion on Environmental Protection*

287. Based on the assessment of the application and the information provided on the record at the hearing, the Commission is satisfied that, given the mitigation measures and safety programs that are in place to control hazards, NB Power will provide adequate protection to the health and safety of persons and the environment throughout the proposed licence period.
288. The Commission is satisfied that the PLNGS environmental protection programs adequately meet the specifications of REGDOC-2.9.1.
289. The Commission is satisfied that the EA conducted by CNSC staff under the NSCA and the CNSC EA Report were adequate for the Commission's consideration of environmental protection for this licence renewal application.
290. The Commission is also satisfied that the measures implemented at the PLNGS are adequate for the purposes of environmental protection of marine species under the NSCA.
291. The Commission notes NB Power's commitment to develop mechanisms to include Indigenous traditional knowledge and the sampling of monitoring of traditional foods and medicines of Indigenous peoples in the PLNGS environmental monitoring programs. The Commission notes that CNSC staff includes Indigenous traditional knowledge in the IEMP sampling program and has committed to further work with Indigenous groups in this regard.

292. The Commission is satisfied with CNSC staff's assessment in relation to the requirement for a subsection 35(1) FA authorization for the PLNGS. It will be DFO that will make any decisions under the FA and the Commission expects CNSC staff to provide updates in this regard during the annual presentation of the NPP ROR.

### **3.11 Emergency Management and Fire Protection**

293. The Commission considered NB Power's emergency management and fire protection programs which cover the measures for preparedness and response capabilities implemented by NB Power in the event of emergencies and non-routine conditions at the PLNGS. This includes nuclear emergency management, conventional emergency response, and fire protection and response. Throughout the current licence period, CNSC staff rated NB Power's performance in this SCA as "satisfactory."
294. NB Power submitted that the Emergency Management Program at PLNGS was designed to manage the consequences of all events that could impact the PLNGS, NB Power employees, the public and the environment. NB Power provided the Commission with information regarding overall PLNGS emergency preparedness program, explaining that the program employed an all-hazards approach including prevention/mitigation, preparedness, response and recovery. NB Power noted that its PLNGS Emergency Management Plan was limited to emergency management on the PLNGS site, with off-site planning a provincial responsibility through the New Brunswick Emergency Measures Organization (NBEMO). NB Power reaffirmed its commitment to collaboration with the NBEMO in this regard.
295. The Commission examined the improvements that NB Power made to the PLNGS Emergency Management Program. NB Power reported that RD-353, *Testing the Implementation of Emergency Measures*<sup>79</sup> was implemented in 2013 and that in 2014, the implementation of SAT-based training for the Emergency Response Team (ERT) and Emergency Preparedness Department provided a significant enhancement to emergency-preparedness related training activities at PLNGS. CNSC staff confirmed that NB Power had implemented significant emergency management related improvements at the PLNGS during the current licence period.
296. CNSC staff provided the Commission with additional information regarding enhancements made to the PLNGS Emergency Management Program, including the acquisition of portable emergency mitigation equipment (EME), participation in the 2012 and 2015 *Exercises Intrepid* and the installation of an automated near boundary gamma detection system.
297. Several interventions from municipalities and local first responder organizations provided information regarding the coordination between NB Power and various levels of government in the event of an emergency. The Commission notes that, although some areas for improvement were identified, the interventions indicated that adequate

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<sup>79</sup> CNSC Regulatory Document RD-353, *Testing the Implementation of Emergency Measures*, 2008.

plans were in place for a coordinated response in the event of an emergency at the PLNGS.

298. Commenting on the intervention from the Point Lepreau Chief Warden, the Commission requested additional information about the Point Lepreau Warden Service. The NB Power representative provided the Commission with details about the warden service, explaining that the wardens were employed by NBEMO and provided an effective community link in the event of an emergency at the PLNGS. Asked about the area that was covered by the warden service, the NB Power representative responded that the service covered the 20-km PLNGS Emergency Planning Zone (EPZ), which included First Nations and visitors in that zone. The Commission is satisfied with the information provided on this point.

### *3.11.1 Conventional Emergency Management*

299. The Commission considered the adequacy of NB Power's conventional emergency (non-nuclear) management programs at the PLNGS. NB Power submitted detailed information regarding improvements that were made to conventional emergency management at PLNGS during the current licence period, including the establishment of a dedicated PLNGS ERT.
300. NB Power reported that the PLNGS ERT participated in multiple medical, fire, incident command and beyond-design-basis drills and exercises during the current licence period. CNSC staff confirmed the information provided by NB Power and submitted that NB Power's PLNGS conventional emergency management satisfied regulatory requirements.
301. Based on the information provided on the record for this hearing, the Commission is satisfied with NB Power's programs to manage conventional emergencies at PLNGS.

### *3.11.2 Nuclear Emergency Management*

302. The Commission considered the information submitted by NB Power and CNSC staff about nuclear emergency management at the PLNGS. NB Power provided detailed information regarding the all-hazards approach taken for nuclear emergency management at the PLNGS, including the development and maintenance of a full suite of emergency procedures. NB Power also submitted that PLNGS had a detailed on-site emergency response plan and that NB Power supported the NBEMO with the maintenance of the NBEMO's *Point Lepreau Nuclear Off-Site Emergency Plan*<sup>80</sup> (PLNGS off-site emergency plans).

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<sup>80</sup> *Point Lepreau Nuclear Off-Site Emergency Plan*, New Brunswick Emergency Measures Organization, Province of New Brunswick, March 2016.

303. CNSC staff submitted that it had reviewed NB Power's *Point Lepreau Emergency Response Plan* and was of the opinion that the plan met the expectations of RD-353 and G-225, *Emergency Planning at Class I Nuclear Facilities and Uranium Mines and Mills*.<sup>81</sup> CNSC staff submitted that inspections of NB Power's emergency plans conducted during the current licence period, as well as reviews of off-site plans, confirmed that all components of the nuclear emergency response plans were adequate and satisfied CNSC requirements.
304. NB Power indicated that REGDOC-2.10.1, *Emergency Preparedness and Response*<sup>82</sup> would be implemented during the proposed licence period, with an implementation plan to be submitted to CNSC staff by September 30, 2017. CNSC staff confirmed the information provided by NB Power, explaining that, when included in the LCH, REGDOC-2.10.1 would become a compliance verification criterion that staff would use to verify that NB Power was meeting licensing and regulatory requirements. The Commission is satisfied with this approach.
305. NB Power provided the Commission with information regarding the near boundary gamma monitoring system that was installed at PLNGS during the current licence period. NB Power explained that this system would enhance radiation monitoring during events by providing an early warning of a radiation release to the ERT and real-time radiation survey data during events, and that it would greatly reduce the potential of exposure of first responders in the event of an emergency.
306. The Commission noted the recommendation for automatic gamma monitoring at the PLNGS in CELA's intervention and asked for additional information in this regard. The NB Power representative provided the Commission with information on the in-station gamma monitoring system that was already in place, with the HC representative providing information on HC monitoring facilities outside of the PLNGS. The NB Power representative also explained how this data would be shared with the CNSC, NBEMO, HC and other organizations, both during normal operations and during an emergency.
307. The Commission examined PLNGS communication capabilities during an emergency and the coordination of these capabilities with emergency organizations and first responders. NB Power provided information in this regard, noting that communication capabilities at PLNGS had been greatly expanded and interoperability with first responders established during the current licence period.
308. The Commission considered several interventions which addressed the public notification system in the event of an emergency at the PLNGS and requested additional information on this matter. The NBEMO representative informed the Commission that the Everbridge Aware public notification system was the first level of public notification in the EPZ and stated that the system was tested at least annually. The NBEMO representative further stated that additional levels of notification included

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<sup>81</sup> CNSC Regulatory G-225, *Emergency Planning at Class I Nuclear Facilities and Uranium Mines and Mills*, 2001.

<sup>82</sup> CNSC Regulatory Document REGDOC-2.10.1, *Emergency Preparedness and Response*, 2014.



the warden service, social media and conventional media, and that the national public alerting system Alert Ready would be used to alert the public outside of the EPZ. The Commission is satisfied with the graded public notification approach used by NB Power and the NBEMO.

309. Asked to provide additional details about the new Off-site Emergency Operations Centre (EOC), the NB Power explained that the EOC was outside of the EPZ, with the NBEMO responsible for the operation of the off-site EOC and noting that the intent was to have the off-site EOC fully operational for the 2018 *Exercise Intrepid*.
310. NB Power provided the Commission with additional information regarding the completion of FAIs related to beyond design basis events during the current licence period and explained that PLNGS EME was seismically qualified and would be functional in all situations to mitigate a severe accident. CNSC staff confirmed this information and also reported that plans for automatic data transfer from PLNGS to the CNSC EOC in the event of an emergency were well underway and would be tested during the 2018 *Exercise Intrepid*.
311. The Commission requested confirmation from NB Power that, in the event of a total station blackout, enough cooling water would be available to cool the reactor at the PLNGS. The NB Power representative responded that, in addition to the large storage capacity of water at the PLNGS site, PLNGS was surrounded by the Bay of Fundy from which water could be drawn, if required. The Commission further asked about power requirements during an emergency. The NB Power representative confirmed that extensive analyses had been conducted to confirm that NB Power could supply the electricity that was required to mitigate a beyond-design-basis accident at the PLNGS. The explanations satisfy the Commission on these points.
312. Further on Fukushima lessons learned, the Commission enquired about whether updated IAEA guidance in regard to planning and procedures in the event of a nuclear emergency will be reflected in Canada's regulatory framework. CNSC staff provided the Commission with information on how Canada's regulatory framework supported updated IAEA nuclear emergency management guidance and that HC's updated *Canadian Guidelines for Intervention During a Nuclear Emergency*<sup>83</sup> would also provide updated information in this regard that was in line with IAEA guidance. The HC representative provided the Commission with additional information on the updated guidelines, noting that they would be published in September 2017.
313. The Commission asked HC for clarification in regard to the status of the Federal Nuclear Emergency Plan (FNEP) as it pertained to the PLNGS. The HC representative provided information about HC's role and collaboration with NB Power and the NBEMO, explaining that the FNEP had been updated with post-Fukushima lessons learned and that HC was in the process of finalizing the New Brunswick-specific annex to the FNEP. In regard to emergency planning for the PLNGS, the HC representative stated that HC's review had found the off-site nuclear emergency plans indicated an

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<sup>83</sup> *Canadian Guidelines for Intervention During a Nuclear Emergency*, Health Canada, 2003.

effective response capability in the event of a nuclear emergency at the PLNGS. The HC representative also provided the Commission with details about an IAEA emergency preparedness review that Canada would be taking part in, noting that NBEMO was actively participating in that process and that the results of the review would be made public. The Commission expressed support for this IAEA review and suggested that the review results and the response to any recommendations be presented at a future Commission proceeding, if feasible.

314. NB Power provided the Commission with details on its 2015 *Exercise Intrepid*, noting that, through the exercise, each organization involved in emergency response at the PLNGS was able to fully exercise on-site and off-site emergency response plans. The Commission notes that, during the current licence period, NB Power and CNSC staff provided several updates on *Exercise Intrepid* and lessons learned through presentations at public Commission meetings and is satisfied with the information provided throughout the current licence period in this regard.
315. Addressing the issue of managing more than one emergency at one time, the NBEMO representative responded that the NBEMO has had to deal with concurrent emergencies in the past, including during the 2012 *Exercise Intrepid*, showing that the NBEMO had adequate planning and capacity in this regard. The Commission was satisfied on this point.
316. The Commission asked about NBEMO's collaboration with neighbouring emergency management organizations. The NBEMO representative provided information on its collaboration with the Nova Scotia Emergency Measures Organization, as well as the Maine Emergency Management Agency, explaining that both organizations were aware of the PLNGS off-site emergency plans and had participated in PLNGS emergency exercises.

#### NB Power's PLNGS Technical Planning Basis – Radiation Emergency

317. The Commission noted the concern expressed by CELA that NB Power's *Technical Planning Basis – Radiation Emergency* (technical planning basis)<sup>84</sup> was last updated in 2004 and enquired about its adequacy in light of lessons learned post-Fukushima. The NB Power representative explained that, because the PLNGS had recently undergone refurbishment and there was a notable increase in safety measures at the facility, including post-Fukushima improvements, the planning basis remained conservative and consistent with international guidelines. The NB Power representative also stated that the planning basis was undergoing an update to reflect the PLNGS post-refurbishment and indicated that NB Power had provided the NBEMO with the updated plan so that changes to the provincial PLNGS off-site plan could be made accordingly.

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<sup>84</sup> *Technical Planning Basis – Radiation Emergency*, Point Lepreau Generating Station, IR-78600-02, Rev. 0, NB Power, 2004.

318. CNSC staff confirmed that it was of the opinion that the 2004 PLNGS technical planning basis remained conservative and adequate for emergency management planning. CNSC staff further informed the Commission that, as part of the Fukushima Action Plan, the safety case of the PLNGS was reviewed, including the validation of the technical planning basis and PLNGS source term, with SAMG implementation becoming a licensing requirement. The NB Power representative concurred with CNSC staff, explaining that the severity of accident progression that was seen during the Fukushima accident and was previously not considered credible had, in fact, been considered in the 2004 PLNGS planning basis and, as such, NB Power maintained that the planning basis remained very conservative and adequate, even post-Fukushima.
319. The Commission requested additional information regarding the upgrades that had been done to the PLNGS since the 2004 technical planning basis was developed. The NB Power representative provided information on the upgrades that had been made to the PLNGS design and safety systems, explaining that upgrades were done both before and after refurbishment and that these safety upgrades were exercised and validated during both the 2012 and 2015 *Exercises Intrepid*.
320. Asked to respond to concerns from several intervenors including CELA, Greenpeace Canada and G. Dalzell regarding the types of accidents considered in the PLNGS technical planning basis, CNSC staff clarified that the technical planning basis included design-basis and beyond-design-basis accidents, as well as severe accident releases where fuel damage was extensive and the containment system failed.
321. Noting the intervention from CELA, the Commission asked about the source term considered in the 2004 PLNGS planning basis. The NB Power representative provided information about the source term that was considered in the event of an early containment failure, noting that it was very conservative. CNSC staff added that the PLNGS reactor core had not changed since 2004 and as such, the source term would not change in any updates to the technical planning basis. The Commission is satisfied that the source term considered in the PLNGS technical planning basis is appropriate.
322. In response to a concern in CELA's intervention that SAMGs were not appropriately considered in emergency planning, NB Power representatives and CNSC staff submitted to the Commission that SAMGs were implemented into emergency planning, had been validated during the 2012 and 2015 *Exercises Intrepid*, and provided additional information in this regard.
323. Noting that NB Power had provided the NBEMO with its draft updated PLNGS technical planning basis, the Commission enquired about whether NBEMO was satisfied with the information provided by NB Power. The NBEMO representative confirmed to the Commission's satisfaction that the NBEMO was satisfied with NB Power's technical planning basis update. The NB Power representative stated to the Commission's satisfaction that the NBEMO worked closely with NB Power to ensure a complete integration of both on-site and off-site emergency plans, and to include changes and improvements to the PLNGS in the annually-updated NBEMO emergency

off-site plans. The Commission was satisfied with the information provided in this regard.

### PLNGS Emergency Plans

324. In its consideration of CELA's recommendation for review of the adequacy of the PLNGS emergency plans and the province's readiness in the event of a nuclear emergency, and also the interventions from Greenpeace Canada, G. Dalzell and S. Nijhawan questioning the adequacy of the current EPZ, the Commission invited submissions on these topics. The NBEMO representative provided the Commission with detailed information about the current emergency planning zones, including the 4-km precautionary action zone, 12-km protective action zone and the 20-km EPZ, explaining that these zones were based on NB Power's technical planning basis. CNSC staff confirmed this information and stated that, as part of the CNSC's defence-in-depth approach to nuclear safety, CNSC staff benchmarked NB Power's emergency technical planning basis against IAEA guidance. CNSC staff further explained that the size of the EPZ was dependent on many factors and that, as such, the IAEA did not provide requirements, only suggestions. CNSC staff further stated that, based on the review of NBEMO's and NB Power's emergency planning documents, CNSC staff was satisfied that the current EPZ in the event of a severe accident at the PLNGS was adequate. The Commission was satisfied with the information submitted on this point.
325. In considering the intervention from CELA, the Commission requested information on the status of evacuation plans in the event of a nuclear emergency at the PLNGS. The NBEMO representative provided detailed information on how evacuations in the EPZ could be conducted, noting that evacuations were considered in the 2015 *Exercise Intrepid*. In regard to the adequacy of considering evacuations only in the EPZ, the NBEMO representative explained to the Commission that the NBEMO plans were flexible and adaptable, allowing evacuation beyond the 20-km zone if required and provided additional information on how the plans could be scaled up. CNSC staff confirmed this information, stating that the IAEA encouraged the leveraging of existing all-hazards plans and explained the basis on which CNSC staff was satisfied that a 20-km evacuation zone was adequate. CNSC staff also stated that IAEA guidance in this regard recognized the risk of mass evacuation versus the health risks associated with a small exposure and recommended that post-emergency radiological surveys directed evacuations.
326. The Commission asked for comment about the concerns raised by CELA in regard to shadow evacuations. The NBEMO provided information about its consideration of shadow evacuation within a 25-km zone in the PLNGS off-site plans, noting that a detailed study about population and evacuation times, including shadow evacuations, had recently been carried out and was reflected in off-site emergency plans. The Commission is satisfied with the information provided in regard to evacuation in the EPZ in the event of an emergency at the PLNGS and is satisfied that shadow evacuations had been adequately considered in the PLNGS off-site emergency plan.

327. In response to interventions from several organizations and individuals, the Commission asked about whether the marine EPZ, including fishing boats in the Bay of Fundy, was considered during emergency planning. The NB Power representative informed the Commission that it was and provided information in this regard. The NB Power representative also stated the marine response was the responsibility of the NBEMO and was considered during the 2015 *Exercise Intrepid*. The NBEMO representative confirmed this information, explaining that the NBEMO had two emergency warden zones in the Bay of Fundy and that the 2017 PLNGS off-site emergency plan would have updated information about all marine activities occurring in the marine EPZ. The Commission is satisfied that the marine EPZ is considered in the PLNGS off-site emergency plan.
328. The Commission called for information about the public availability of the PLNGS off-site emergency plans. The NBEMO representative explained the operational nature of the current plans, noting that they were developed for use by first responders. The NBEMO representative further stated that the NBEMO was creating a public-friendly version of the emergency plans, that these plans would be ready in the summer of 2017 and that they would be posted on the NBEMO website. The Commission was satisfied with this information but is of the opinion that the public should have greater access to emergency plans and requested an update on the NBEMO's public-friendly emergency plans during the presentation of the 2016 NPP Report.
329. The Commission acknowledged the CELA and Greenpeace Canada recommendations that the NBEMO should carry out more public consultation regarding the PLNGS off-site emergency plans and asked the NBEMO about whether the public was consulted on these updates. The NBEMO representative responded that the public was not consulted on the annual changes to the plans; however, should there be a major change that would affect stakeholders, the NBEMO would conduct public consultation in this regard. The Commission was satisfied with the information provided on this point and encourages the NBEMO to do as much outreach and public consultation as appropriate in this regard.
330. In reference to the recommendations in the intervention from CELA, the Commission requested additional details about NB Power recovery plans in the event of a nuclear emergency at the PLNGS. The NB Power representative explained that NB Power had done recovery planning with the NBEMO during the current licence period, including several tabletop exercises to establish the first steps of a recovery plan. The NB Power representative further reported that the 2018 *Exercise Intrepid* would include recovery planning. CNSC staff confirmed this information and further stated that REGDOC-2.10.1 included specifications for a licensee's recovery plan and that NB Power would be required to demonstrate how an emergency at the PLNGS would be managed into the recovery phase in order to meet the expectations of REGDOC-2.10.1.
331. Regarding recovery operations and the harvesting of foods in the event of a severe accident at the PLNGS, the NBEMO representative explained that the New Brunswick Department of Agriculture, Aquaculture and Fisheries maintained a database of farms,

fisheries and the allowable radiological limits for foods harvested in the vicinity of the PLNGS. The HC representative confirmed this information and stated that the coordination between federal partners, NB Power and the NBEMO was well established in this regard. The NB Power representative added that this component of emergency response and recovery was successfully exercised during the 2015 *Exercise Intrepid*.

332. The Commission enquired about discrepancies between the NBEMO's PLNGS off-site emergency plans and information submitted into the record for this hearing, as cited in the intervention from CELA. In this regard, the NBEMO representative clarified that the off-site plans were current in terms of population and public institutions in the EPZ. In regard to the Warden Zone map in the off-site plans, the NBEMO representative submitted that the warden zones had not changed in 30 years and that this map was up to date. The NBEMO representative also confirmed to the Commission that the off-site plans did consider beyond-design-basis accidents and that this would be clarified in the 2017 update to the plans. Further, the NBEMO representative explained that the 2016 plans considered by the intervenor had not yet been updated with all of the lessons learned from the 2015 *Exercise Intrepid* or recently-revised HC intervention levels due to their unavailability. The NBEMO representative confirmed to the Commission's satisfaction that the updates, omissions and required clarifications noted during this hearing would be included in the 2017 PLNGS off-site plans. The Commission is satisfied with the clarification provided in regard to the concerns raised by CELA during this hearing.
333. The Commission requested comments on the appropriateness of the fact that the NBEMO's PLNGS off-site emergency plans used concepts from the IAEA's GS-R-2<sup>85</sup> rather than the post-Fukushima GSR Part 7,<sup>86</sup> as raised in CELA's intervention. CNSC staff explained that the IAEA safety standards were recommendations, not requirements, and provided information about the updates that were made to GSR Part 7. The Commission is satisfied with the information provided in this regard and is of the opinion that the use of GS-R-2 in the NBEMO's current PLNGS off-site plans does not present a safety risk to the public or the environment. The Commission, however, encourages the implementation of concepts from GSR Part 7 as soon as practicable.
334. The Commission enquired about whether changes to REGDOC-2.10.1 would arise from the implementation of GSR Part 7 in Canada. CNSC staff responded that, since REGDOC-2.10.1 was based on GSR Part 7, changes to this REGDOC were not anticipated.
335. Addressing the topic of potassium iodide (KI) availability in the vicinity of the PLNGS and noting that NB Power met the specifications of REGDOC-2.10.1, CNSC staff provided the Commission with information about KI distribution in the EPZ and

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<sup>85</sup> IAEA Safety Standards Series No. GS-R-2, *Preparedness and Response for a Nuclear or Radiological Emergency*, International Atomic Energy Agency, 2002.

<sup>86</sup> IAEA Safety Standards Series no. GSR Part 7, *Preparedness and Response for a Nuclear or Radiological Emergency*, International Atomic Energy Agency, 2015

availability beyond the EPZ. The NBEMO representative provided the Commission additional statistics on where KI was pre-distributed and the availability of KI in alternate locations. The Commission is satisfied with the information provided on this point.

336. Based on the information submitted for this hearing, the Commission is satisfied that NB Power has appropriate emergency plans in place to protect the health and safety of persons and the environment in the event of a nuclear emergency at the PLNGS. The Commission notes, however, the lack of full transparency and public availability of emergency planning documents and directs NB Power to publicly disclose its nuclear emergency technical planning basis document, *Technical Planning Basis – Radiation Emergency* by August 2017.
337. The Commission expects NB Power to implement REGDOC-2.10.1 during the proposed licence period. The Commission also expects CNSC staff to provide updates on the new PLNGS Off-site Emergency Operations Centre during the presentation of the annual NPP ROR.
338. The Commission agrees with the CNSC staff's analysis that the PLNGS emergency planning zones, including the 20-km EPZ, are adequate for emergency planning purposes and that the NBEMO off-site plans based on NB Power's 2004 technical planning basis and more recent safety analyses are adequate. The Commission requests the status of updates and modifications made to the NBEMO off-site plans, to be presented during the annual NPP ROR.

### 3.11.3 Fire Protection

339. The Commission examined the adequacy of the PLNGS fire protection program. The Commission notes that the 2012 PLNGS licence renewal decision included a regulatory hold point pursuant to licence condition 16.4<sup>87</sup> regarding the performance of the PLNGS fire protection program and compliance with N293-07, *Fire protection in CANDU nuclear power plants*.<sup>88</sup> The Commission acknowledges that this hold point was lifted in December 2014 after NB Power satisfied all requirements in this regard.
340. NB Power provided the Commission with comprehensive details about the improvements that were made to the PLNGS fire protection program during the current licence period, including achieving compliance with N293-07. CNSC staff submitted that fire protection at the PLNGS was closely monitored by CNSC staff during the current licence period and provided details about inspections and other regulatory oversight activities which showed that, while regulatory requirements were mostly satisfied, the improvement of several fire protection program elements was required. CNSC staff submitted that it was satisfied with NB Power's response to CAPs and that

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<sup>87</sup> CNSC Record of Proceedings, Including Reasons for Decision – New Brunswick Power Nuclear Corporation, *Request for Approval to Reload Fuel and Restart the Point Lepreau Nuclear Generating Station, and Application to Renew the Power Reactor Operating Licence for the Point Lepreau Nuclear Generating Station*, Paragraph 174.

<sup>88</sup> N293-07, *Fire Protection in CANDU nuclear power plants*, CSA Group, 2007.

the areas of improvements did not present safety risks. CNSC staff further submitted that it would continue to monitor NB Power's performance in this regard through ongoing compliance verification activities and that meetings with NB Power were held approximately every six weeks in regard to this issue.

341. NB Power reported that N293-12<sup>89</sup> was implemented at the PLNGS in August 2016 and that it continued its participation in the technical committee for N393-13, *Fire protection for facilities that process, handle, or store nuclear substances*. NB Power submitted information regarding additional multiple analyses and audits that directed the improvements made to the PLNGS Fire Protection Program during the current licence period. CNSC staff confirmed its satisfaction with NB Power's increased efforts in this regard during the current licence period.
342. The Commission called for submission regarding the remaining improvements that had been identified for the PLNGS fire protection program. The NB Power representative provided the Commission with detailed information regarding improvements that were identified for the PLNGS fire protection program, reporting that these were matters of continuous improvements, that the PLNGS fire protection program met regulatory requirements and that improvements were addressed through benchmarking and CAPs.
343. NB Power also provided the Commission with information about the PLNGS ERT's extensive fire protection training during the current licence period, noting that NB Power operated a fire training grounds at the PLNGS and collaborated with the Saint John Fire Department in regard to SAT-based training activities. CNSC staff reported that several inspections focussed on NB Power's ERT at the PLNGS were carried out during the current licence period showed that the fire protection capabilities were continuously improving at the PLNGS through more frequent drills and training and program enhancements.
344. NB Power submitted that several mutual aid agreements had been established with local fire departments including the Musquash Volunteer Fire Department and the Saint John Fire Department. NB Power also provided information on how the mutual aid agreements allowed local firefighters to participate in training, drills and exercises at the PLNGS and that annual exercising of the agreements demonstrated their effectiveness. NB Power submitted that these emergency-response mutual aid agreements had been identified as an international best practice. Asked to comment on this collaboration with NB Power, the City of Saint John and Musquash Volunteer Fire Department representatives submitted that this collaborative approach to emergency training and management resulted in better planning and preparation in the response process.
345. Based on the information provided, the Commission is satisfied that NB Power has an adequate fire protection program in place at the PLNGS that meets regulatory requirements. The Commission expects NB Power to continue the implementation of fire protection focussed improvement plans at the PLNGS, with continued regulatory

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<sup>89</sup> N293-12, *Fire Protection in CANDU nuclear power plants*, CSA Group, 2012.



oversight by CNSC staff throughout the proposed licence period.

#### *3.11.4 Conclusion on Emergency Management and Fire Protection*

346. Based on the above information provided on the record for this hearing, the Commission concludes that the PLNGS nuclear and conventional emergency management preparedness programs and the fire protection measures in place, and that will be in place during the proposed licence period, are adequate to protect the health and safety of persons and the environment.
347. Based on the information submitted for this hearing, the Commission is satisfied that the NB Power Point Lepreau Emergency Response Plan and the NBEMO's PLNGS Off-Site Emergency Plans consider design-basis, beyond-design-basis and severe nuclear accidents. Further, the Commission is satisfied that NB Power's current technical planning basis is adequate for emergency planning purposes. The Commission acknowledges NB Power's commitment to update its nuclear emergency technical planning basis and expects annual updates on the progress of this project to be provided during CNSC staff's presentation of the annual NPP ROR, starting in August 2017.
348. The Commission appreciates the efforts made by the NBEMO in regard to the PLNGS off-site emergency plan and the annual updates that are made to these plans. The Commission encourages NBEMO to improve the public availability of its PLNGS off-site emergency plans and looks forward to an update on NBEMO's initiative to publish a public-friendly emergency planning document later in 2017.
349. Based on the information considered for this hearing, the Commission is satisfied that the 20-km EPZ is protective of the public and the environment and that there would be minimal impact outside of the EPZ in the event of an emergency at the PLNGS.
350. The Commission is satisfied with the improvements that were made to NB Power fire protection program during the current licence period and the increased regulatory oversight by CNSC staff. The Commission encourages NB Power to continue improvements in this regard throughout the proposed licence period.
351. The Commission notes that, although several interventions expressed concerns about the adequacy of the PLNGS emergency response plan and the NBEMO's PLNGS off-site emergency plan, the first response organizations in the communities near the PLNGS, as well as other community organizations, expressed support for and confidence in the emergency plans currently in place for the PLNGS. The Commission agrees with CNSC staff's analysis that on-site and off-site emergency planning for the PLNGS meets regulatory requirements and is satisfactory in protecting the health and safety of persons and the environment.

352. The Commission acknowledges the recommendations made by intervenors in regard to NB Power's PLNGS emergency planning. The Commission is satisfied with the information provided on the record for this hearing on these how these suggestions could be addressed, noting that several of the recommendations have already been implemented by NB Power and the NBEMO.
353. The Commission expresses satisfaction with NB Power's collaboration with provincial and federal partners, community organizations including local hospitals and schools, local municipalities and first responder organizations during emergency planning activities. The Commission encourages NB Power to increase the participation of communities outside of the EPZ in the 2018 *Exercise Intrepid*, where practicable. In this regard, the Commission looks forward to an update regarding the results of and lessons learned from the upcoming 2018 *Exercise Intrepid*.

### **3.12 Waste Management**

354. The Commission assessed NB Power's PLNGS site-wide waste management program. This included the operation of the Solid Radioactive Waste Management Facility (SRWMF) which is located on the PLNGS site. Throughout the current licence period, CNSC staff assessed NB Power's performance in this SCA, including waste minimization, segregation, characterization, and storage programs, as "satisfactory."
355. NB Power asserted its commitment to the safe management of waste and waste minimization at PLNGS. NB Power provided the Commission with information about the waste minimization practices implemented at PLNGS, including the "Likely Clean Program," which significantly reduced the volume of radioactive waste generated, and the incineration of solid radioactive waste at an appropriately-licensed external facility. CNSC staff confirmed this information, noting that NB Power had appropriate programs in place for the minimization, characterization and segregation of waste resulting from the operation of the PLNGS.
356. Asked to clarify the meaning of "likely clean", the NB Power representative explained that the waste generated in Zone 3 of the PLNGS was screened for radiation and that only waste with counts above background radiation was considered radioactive and treated as such.
357. CNSC staff noted that a 2015 inspection focusing on conventional hazardous waste management program at PLNGS identified areas for improvement related to procedures and procedural adherence. CNSC staff reported that these action items were being tracked through the CAPs related to procedural non-compliance as previously reported in subsections 3.2.1 and 3.4.1 .
358. The Commission examined NB Power's compliance with codes and standards related to waste management. CNSC staff submitted that NB Power was in compliance with

N292.3-08, *Management of low and intermediate-level radioactive waste*<sup>90</sup> and would submit an implementation plan for N292.3-14 to CNSC staff by September 30, 2017. In regard to N292.0-14, *General principles for the management of radioactive waste and irradiated fuel*,<sup>91</sup> CNSC staff reported that NB Power had committed to submitting an implementation plan to CNSC staff by September 30, 2017.

### 3.12.1 Solid Radioactive Waste Management Facility

359. The Commission considered the adequacy of NB Power's structure of and programs for the operation of the SRWMF. NB Power provided detailed information about the SRWMF, explaining that the facility was designed to provide at least 50 years of interim storage for radioactive waste originating from PLNGS operations. NB Power also reported that quarterly information on the SRWMF inventory was submitted to the CNSC and that, as of September 30, 2016, 1,768.99 m<sup>3</sup> and 1,011.22 m<sup>3</sup> of waste was in storage in Phases I and III of the facility, respectively.
360. The Commission noted that the PLNGS PROL provided for the transfer of spent fuel between the Spent Fuel Bay and the SRWMF. In this regard, NB Power submitted information to the Commission regarding its management of used PLNGS fuel bundles, explaining that after a minimum of seven years in the Spent Fuel Bay, the used fuel was transferred to Phase II of the SRWMF and stored in above-ground concrete canisters designed to provide maintenance-free storage for at least 50 years. NB Power reported that the SRWMF contained 187 sealed used fuel canisters.
361. CNSC staff submitted to the Commission that it was of the opinion that NB Power had appropriate programs in place to operate the SRWMF safely and in accordance with regulatory requirements. CNSC staff provided the Commission with information about minor SRWMF inspection findings during the current licence period. CNSC staff reported that, to address these findings, NB Power developed a preventive maintenance plan acceptable to CNSC staff.
362. In its consideration of the intervention from Greenpeace Canada, the Commission asked additional information about the maintenance of the SRWMF. The NB Power representative explained that the SRWMF maintenance schedule, noting frequent inspections by NB Power and CNSC staff. The NB Power representative confirmed to the Commission's satisfaction that, as radioactive waste management technologies and methods evolved, NB Power's waste management plans evolved accordingly. CNSC staff confirmed the information provided by NB Power, explaining that the SRWMF could be maintained for the entire lifespan of the PLNGS, through to the end of decommissioning.
363. The Commission acknowledges interventions from MTI, the Passamaquoddy Nation, Greenpeace Canada and individuals that expressed concerns about the storage of spent

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<sup>90</sup> N292.3, *Management of low and intermediate-level radioactive waste*, CSA Group, 2008 and 2014.

<sup>91</sup> N292.0-14, *General principles for the management of radioactive waste and irradiated fuel*, CSA Group, 2014.

fuel waste from PLNGS operations. The Commission notes that the Nuclear Waste Management Organization has been mandated by the Government of Canada for the long-term management of spent fuel. However, based on the information submitted for this hearing, the Commission is satisfied that NB Power has appropriate programs in place for the management of spent fuel at the PLNGS throughout the proposed licence period. The Commission notes that additional consideration of these interventions as they relate to financial guarantees and decommissioning is found in section 3.17, *Decommissioning Plans and Financial Guarantee* of this decision.

### 3.12.2 Conclusion on Waste Management

364. Based on the above information and considerations of the hearing materials, the Commission is satisfied that NB Power has appropriate programs in place to safely manage waste at the PLNGS.
365. The Commission also concludes that NB Power is operating and will continue to operate the SRWMF safely throughout the proposed licence period. Furthermore, the Commission is satisfied that the SRWMF is being appropriately maintained and inspected to ensure its safe operation throughout its proposed lifespan.
366. The Commission expects NB Power to submit implementation plans and implement the latest versions of applicable standards in accordance with the schedule in the proposed LCH and submitted during this hearing.

### 3.13 Security

367. The Commission examined NB Power's security program at the PLNGS, which is required to implement and support the security requirements stipulated in the relevant regulations and the licence. This includes compliance with the applicable provisions of the *General Nuclear Safety and Control Regulations*<sup>92</sup> and the *Nuclear Security Regulations*.<sup>93</sup> During the current licence period, CNSC staff rated NB Power's performance in this SCA as "satisfactory."
368. NB Power provided the Commission with information on the comprehensive PLNGS nuclear security program, including its compliance with regulations and CNSC regulatory documents. NB Power also provided detailed information about the CNSC and IAEA guidance documents that were used as a general framework for security program procedures. CNSC staff confirmed that NB Power's PLNGS nuclear security program complied with regulations, standards and guidance documents.

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<sup>92</sup> SOR/2000-202.

<sup>93</sup> SOR/2000-209.

369. NB Power submitted information about improvements made to security-related facilities and equipment at the PLNGS during the current licence period, noting that these upgrades not only met, but in some cases exceeded requirements and guidelines. CNSC staff confirmed this information to the Commission.
370. NB Power submitted information regarding the PLNGS personnel screening processes and explained that these processes met the specifications of REGDOC-2.12.2, *Site Access Security Clearance*<sup>94</sup> and the *Standard on Security Screening*.<sup>95</sup>
371. In response to several interventions that indicated that members of the public had access to the PLNGS for various collaborative and outreach programs, the Commission enquired about visitor security protocols. The NB Power representative provided the Commission with information on PLNGS visitor security protocols, explaining that visitors did not enter the protected area. The Commission was satisfied with the information provided in this regard.
372. NB Power informed the Commission that the training that was provided to Nuclear Response Force Members at PLNGS met the specifications of REGDOC-2.12-1, *High Security Sites: Nuclear Response Force*.<sup>96</sup> CNSC staff submitted that, during the current licence period, a need for NB Power to improve the nuclear security training and drill program was identified, with NB Power addressing CNSC staff's findings satisfactorily.
373. Noting PEACE-NB's concerns about potential PLNGS site access from air or water, the Commission asked for additional information on this matter. The NB Power representative explained that the design basis threat was considered in the protocols for these scenarios and provided additional information regarding PLNGS security protocols. The Commission is satisfied with the information provided on this point.

#### Cybersecurity

374. NB Power provided details about the PLNGS cybersecurity program, noting that an implementation plan for N290.7-14, *Cyber security for nuclear power plants and small reactor facilities*<sup>97</sup> was submitted to CNSC staff in August 2016. CNSC staff confirmed that the PLNGS cybersecurity program at PLNGS satisfied CNSC requirements and that NB Power had confirmed its plans to fully implement N290.7-14 by December 2019.
375. The Commission enquired about the appropriateness of the implementation time frame for N290.7-14 considering the current rapid pace of technological changes. The NB Power representative provided comprehensive information regarding the current

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<sup>94</sup> CNSC Regulatory Document REGDOC-2.12.2, *Site Access Security Clearance*, 2013.

<sup>95</sup> *Standard on Security Screening*, Government of Canada, 2014.

<sup>96</sup> CNSC Regulatory Document REGDOC 2.12.1, *High Security Sites: Nuclear Response Force*, 2013.

<sup>97</sup> N290.7-14, *Cyber security for nuclear power plants and small reactor facilities*, CSA Group, 2014.

cybersecurity program at the PLNGS, explaining that all of the systems controlling nuclear-related operations were separate from all external networks and that the internal oversight committee had validated NB Power's approach for cyberattack prevention. CNSC staff added that N290.7-14 was a new standard with a very modern approach and that, since NB Power already had a cybersecurity program that met CNSC expectations, the implementation of the standard would serve to further improve the program at the PLNGS. CNSC staff confirmed to the Commission that CNSC inspections had shown that the PLNGS cybersecurity program was satisfactory.

376. In its consideration of the intervention from G. Dalzell, the Commission further enquired about compensatory measures that were being taken at the PLNGS until N290.7-14 was fully implemented. CNSC staff provided the Commission with additional details on how program improvements were triaged by NB Power, explaining that CNSC staff closely monitored the implementation of N290.7-14, was satisfied with NB Power's progress in this regard and that risks in the area of cybersecurity at the PLNGS were adequately mitigated. The Commission was satisfied with the information provided by NB Power and CNSC staff on this matter.
377. On the basis of the information provided on the record for this hearing, the Commission is satisfied that NB Power's performance with respect to maintaining security at the PLNGS has been acceptable. The Commission concludes that NB Power has made adequate provision for the physical security of the PLNGS, and is of the opinion that NB Power will continue to make adequate provision for security during the proposed licence period.
378. The Commission is satisfied that NB Power's cybersecurity program is adequate to protect the PLNGS from cyberattacks and other cybersecurity-related concerns. The Commission expects NB Power to implement N290.7-14 during the proposed licence period in accordance with the schedule presented during this hearing.

### **3.14 Safeguards**

379. The Commission examined the adequacy of NB Power's safeguards program at the PLNGS. The CNSC's regulatory mandate includes ensuring conformity with measures required to implement Canada's international obligations under the *Treaty on the Non-Proliferation of Nuclear Weapons* (NPT). Pursuant to the NPT, 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 in peaceful, non-explosive uses and that there is no undeclared nuclear material or activities in this country. CNSC staff rated NB Power's performance in this SCA as "satisfactory" throughout the current licence period.
380. NB Power provided the Commission with information on the PLNGS safeguards program, how the IAEA safeguards were implemented at the PLNGS and explained

that the safeguards program also satisfied the requirements of the *General Nuclear Safety and Control Regulations*, the *Class I Nuclear Facilities Regulations*, and the *Nuclear Non-proliferation Import and Export Control Regulations*.<sup>98</sup> NB Power also submitted that RD-336, *Accounting and Reporting of Nuclear Material*<sup>99</sup> was implemented at the PLNGS to ensure that the safeguards program enables Canada to meet its safeguards obligations in relation to NB Power's licensed activities.

381. CNSC staff confirmed the information submitted by NB Power and provided the Commission with information regarding safeguards compliance verification and submitted that NB Power continued to comply with all regulatory requirements through the implementation of effective safeguard measures and maintenance of nuclear non-proliferation commitments at the PLNGS.
382. The Commission asked for comments in regard to an intervention that suggested that Canada contributed to the international proliferation of nuclear weapons. CNSC staff confirmed that this statement was incorrect and provided information on Canada's strong safeguards program which includes strict international requirements for the import and export of nuclear materials. The Commission finds that there is no basis for the assertion that Canada contributes to the proliferation of nuclear weapons.
383. Based on the above information, the Commission is satisfied that NB Power has provided and will continue to provide adequate measures in the areas of safeguards and non-proliferation at the PLNGS that are necessary for maintaining national security and measures necessary for implementing international agreements to which Canada has agreed.

### **3.15 Packaging and Transport**

384. The Commission examined NB Power's packaging and transport program at the PLNGS. Packaging and transport covers the safe packaging and transport of nuclear substances and radiation devices to and from the licensed facility. The licensee must adhere to the *Packaging and Transport of Nuclear Substances Regulations, 2015*<sup>100</sup> (PTNSR, 2015) and Transport Canada's *Transportation of Dangerous Goods Regulations*<sup>101</sup> (TDG Regulations) for all shipments. During the current licence period, CNSC staff rated NB Power's performance in this SCA as "satisfactory."
385. NB Power provided the Commission with information on the PLNGS packaging and transport activities, noting that they were carried out in accordance with the PTNSR, 2015, that documentation for shipments was prepared in accordance with the TDG Regulations and that an emergency response plan had been registered and approved by Transport Canada.

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<sup>98</sup> SOR/2000-210.

<sup>99</sup> CNSC Regulatory Document RD-336, *Accounting and Reporting of Nuclear Material*, 2010.

<sup>100</sup> SOR/2015-145.

<sup>101</sup> SOR/2001-286.

386. CNSC staff confirmed the information provided by NB Power, explaining that packaging and transport compliance verification activities during the current licence period showed only positive findings and that the packaging and transport of nuclear substances at the PLNGS satisfied regulatory requirements and met CNSC expectations.
387. Based on the information presented on the record for this hearing, the Commission is satisfied that NB Power is meeting, and will continue to meet, regulatory requirements regarding packaging and transport.

### **3.16 Aboriginal Engagement and Public Information**

#### *3.16.1 Participant Funding Program*

388. The Commission assessed the information provided by CNSC staff regarding public engagement in the licensing process as enhanced by the CNSC's Participant Funding Program (PFP). CNSC staff submitted that, in September 2016, up to \$75,000 in funding to participate in this licensing process was made available to Indigenous groups, not-for-profit organizations and members of the public to review NB Power's licence renewal application and associated documents, and to provide the Commission with value-added information through topic-specific interventions.
389. A Funding Review Committee (FRC), independent of the CNSC, recommended that six applicants be provided with up to \$108,462 in participant funding. These applicants were required, by virtue of being in receipt of participant funding, to submit a written intervention and make an oral presentation at Part 2 of the public hearing commenting on NB Power's licence renewal application. One PFP applicant withdrew its request prior to Part 2 of the hearing. As such, \$76,512 in participant funding was awarded to the following recipients:
- Canadian Environmental Law Association (CELA) – Conservation Council of New Brunswick (CCNB)
  - Sipekne'katik First Nation
  - Mi'gmawe'l Tplu'taqnn Incorporated (MTI)
  - Maliseet First Nations (Madawaska Maliseet, Tobique, Kingsclear, St. Mary's and Oromocto First Nations)
  - Passamaquoddy Nation Recognition Group Inc.
390. The Commission noted concerns from several intervenors regarding PFP and intervention timelines, and asked for comments on this matter. CNSC staff provided the Commission with information regarding the timelines, noting that CNSC staff tried to ensure the timely provision of all publicly available documents to ensure that



intervenor had sufficient time for the preparation of their interventions.

391. The Commission wishes to acknowledge that, due to the delays experienced by CELA in obtaining the PLNGS off-site emergency plans, CELA asked for an extension of time to submit its intervention to the Commission. In making its decision to grant CELA's request, the Commission was satisfied that CELA's intervention submission date of April 3, 2017, more than 30 days before Part 2 of the hearing, would cause no prejudice to the other participants.
392. In response to interventions from CELA, Greenpeace Canada, New Clear Free Solutions, PEACE-NB and individuals, the Commission asked for comments regarding the public availability of documents referenced during this hearing. CNSC staff responded that the CNSC made all documents referenced in CNSC CMDs available to the public, unless otherwise noted in the CMD. The NB Power representative provided the Commission with information regarding its document disclosure policies and submitted detailed information why some documents could not be provided to intervenors for confidentiality and sensitivity reasons. The Commission recognizes the sensitive nature of some NGS-related documentation. However, the Commission strongly encourages licensees and CNSC staff to simplify the provision of public documents referenced in CMDs and to clearly identify documents that are not publicly available.
393. The Commission also noted concerns from several intervenors that inadequate participant funding was awarded through the PFP and that these amounts were not sufficient for the development of in-depth interventions. CNSC staff acknowledged the intervenors' concerns and submitted that the CNSC's two PFP streams, project-specific funding and funding for general matters of regulatory interest, provided intervenors with multiple funding options and opportunities for participation in CNSC proceedings.
394. Based on the information submitted for this hearing, the Commission concludes that Indigenous groups, members of the public and other stakeholders were encouraged to participate in this licence renewal process.
395. The Commission appreciates the intervenors' comments regarding public participation in these licence renewal proceedings. The Commission expects CNSC staff to review its practices and service standards for PFP timelines. With respect to Commission proceeding timelines, the Commission intends to provide publicly-available hearing documents in a timely manner to ensure that intervenors are able to fully participate in Commission proceedings. The Commission also notes the availability of the two PFP streams and encourages intervenors to make use of the PFP for future participation in Commission proceedings.

### 3.16.2 *Aboriginal Engagement*

396. The common law duty to consult with Aboriginal peoples applies when the Crown contemplates action that may adversely affect established or potential Aboriginal and/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 and engaging 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*.<sup>102</sup>
397. The Commission examined the information submitted by NB Power regarding its ongoing engagement with First Nations near the PLNGS site. NB Power asserted its commitment to its engagement with First Nations about NB Power business undertakings, PLNGS operations and other major NB Power projects, and provided the Commission with details on the communication media it used in this regard.
398. NB Power submitted that, during the proposed licence period, REGDOC-3.2.2, *Aboriginal Engagement*<sup>103</sup> will be integrated into PLNGS Aboriginal engagement activities. CNSC staff submitted that NB Power did not have any upcoming projects that would raise the duty to consult and that, as such, CNSC staff was satisfied with NB Power's approach in this regard.
399. NB Power reported that it was finalizing its First Nations Strategic Approach to enhance and complement NB Power's current policies and guides for its relationships with local First Nations. NB Power provided details about this initiative, explaining that it was based on education, employment, cultural awareness and sensitivity programs.
400. The Commission asked whether NB Power had invited First Nations to visit the PLNGS. The Maliseet Nation, Passamaquoddy Nation, and MTI representatives confirmed that NB Power had extended invitations to them for PLNGS site tours and that these were accepted. The NB Power representative stated that interested First Nations were welcome to visit the PLNGS at any time.
401. The Commission requested additional information on NB Power's First Nations outreach programs. The NB Power representative submitted information about the First Nations in New Brunswick with which NB Power had engaged over the current licence period and stated that NB Power actively employed First Nations community members. The NB Power representative also provided information about the partnership that NB Power had with the New Brunswick Community College to host information sessions for First Nations communities and about NB Power's engagement with the Joint Economic Development Initiative, which promotes First Nations inclusion in industry.

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<sup>102</sup> *Constitution Act, 1982*, Schedule B to the *Canada Act 1982*, 1982, c. 11 (U.K.).

<sup>103</sup> CNSC Regulatory Document REGDOC-3.2.2, *Aboriginal Engagement*, 2016.

402. CNSC staff provided the Commission with information about 18 First Nations groups that were identified as having a potential interest in the PLNGS licence renewal and about the consultation activities that were carried out with the identified groups. CNSC staff explained that the primary concerns raised by First Nations groups included potential impacts on community commercial fisheries in the Bay of Fundy, environmental and health impacts associated with the operation of the PLNGS and meaningful consultation. CNSC staff submitted that offers to meet with the First Nations groups to discuss their concerns and answer their questions were made and that CNSC staff encouraged their participation in this licence renewal process.
403. CNSC staff submitted that, since the proposed licence renewal did not include any significant modifications to the PLNGS, this renewal would not cause adverse impacts to any potential or established Aboriginal and/or treaty rights. Therefore, CNSC staff was of the opinion that the proposed licence renewal did not raise the duty to consult. CNSC staff explained, however, that continued communication with interested Aboriginal groups was, and would continue to be, maintained throughout the proposed licence period to ensure that the groups received all information requested and to establish and maintain relationships with the groups.
404. In its intervention, the Maliseet Nation of New Brunswick expressed disappointment about a lack of engagement prior to this licence renewal and the Commission requested additional information on this matter. The NB Power representative acknowledged that, prior to 2000, NB Power carried out limited engagement with First Nations and provided detailed information about how NB Power's First Nations engagement program had evolved since that time. NB Power also provided the Commission with information regarding a recently-signed engagement memorandum of understanding (MOU) with the Maliseet Nation of New Brunswick and upcoming engagement activities, and expressed NB Power's commitment to addressing the Maliseet Nation of New Brunswick's concerns regarding PLNGS operations. CNSC staff provided the Commission with information about the CNSC's current and future consultation activities, including regularly scheduled meetings, with the Maliseet Nation of New Brunswick. The Maliseet Nation of New Brunswick representative indicated that the MOU with NB Power and planned consultation activities with CNSC staff were satisfactory.
405. In reference to the intervention from the Maliseet Nation of New Brunswick, the Commission enquired about whether archaeological and historical and current First Nations land use studies in the area surrounding the PLNGS were planned. The Maliseet Nation of New Brunswick representative responded that such a study should be carried out to ensure accurate First Nations history records for the area, noting that the funding for such a study had not yet been secured. The Commission is of the opinion that the study of First Nations historical context for the PLNGS should be encouraged.

406. The Commission asked NB Power for additional details on its engagement activities with the Passamaquoddy Nation. The NB Power representative explained that NB Power had been engaging with the Passamaquoddy Nation for several years and that NB Power was committed to share, educate and provide awareness on all aspects of the PLNGS with the Passamaquoddy Nation. The NB Power representative also confirmed that NB Power had signed a waiver stating that these engagement activities were not part of the formal consultation process. The Passamaquoddy Nation representative confirmed this information and provided additional details in regard to consultation activities.
407. Asked about CNSC consultation activities with the Passamaquoddy Nation, CNSC staff reported that the CNSC remained committed to engagement with the Passamaquoddy Nation and was in contact with them throughout this licence renewal process. The Passamaquoddy Nation representative indicated appreciation for these activities carried out by CNSC staff.
408. In regard to NB Power's engagement with MTI, the NB Power representative stated that NB Power had established an ongoing respectful relationship with MTI and provided information on NB Power's monthly meetings and outreach activities with MTI, and its attendance at MTI community meetings. The MTI representative acknowledged NB Power's engagement efforts but explained that a greater level of engagement, such as environmental monitoring by Indigenous peoples and the inclusion of Indigenous knowledge in research studies, including the monitoring of traditional foods and medicines of Indigenous peoples, was required to increase First Nations' confidence in the safety of the PLNGS' operations. The MTI representative added that MTI had an extensive team of highly-skilled personnel who could contribute to a monitoring program at and around the PLNGS but a mechanism for this was still required. The NB Power representative responded to the Commission's satisfaction that NB Power was committed to its engagement activities with MTI and was looking forward to collaborating with First Nations groups in order to establish environmental monitoring programs and finding ways to include Indigenous knowledge in NB Power's research activities.
409. On the same topic, CNSC staff confirmed the information provided by NB Power in regard to engagement activities with MTI and provided the Commission with details on CNSC staff's engagement with MTI throughout the current licence period and leading up to this licence renewal hearing. CNSC staff also provided the Commission with information on how the CNSC could facilitate the inclusion of members of First Nations in the IEMP and the inclusion of Indigenous knowledge in research studies, noting that the PFP was a mechanism that could potentially be employed in this regard. The Commission wishes to express its satisfaction with the information contained in MTI's *New Brunswick Mi'gmaq Indigenous Knowledge Study Process Guide*, which was submitted into the record for this hearing, and encourages the continued establishment of internal capacity for the inclusion of Indigenous knowledge as described by the MTI representative.

410. In regard to NB Power's engagement activities with the Sipekne'katik First Nation, the NB Power representative stated that NB Power was committed to continuing the relationship that it had established with the Sipekne'katik First Nation and provided further information on future engagement activities. The Sipekne'katik representative confirmed that the Sipekne'katik First Nation looked forward to establishing a relationship and ongoing communication with NB Power.
411. Based on the information provided for this hearing, the Commission is satisfied that Aboriginal engagement activities carried out for this licence renewal were adequate. The Commission anticipates that NB Power will continue its expansion of Aboriginal engagement activities, including the finalization of the NB Power First Nations Strategic Approach.
412. The Commission expressed satisfaction with NB Power's First Nations Strategic Approach and encourages NB Power to implement this approach as soon as practicable.
413. The Commission expects NB Power to implement REGDOC-3.2.2 during the proposed licence period.
414. The Commission directs CNSC staff to provide First Nations with additional information on how the PFP could be employed to establish Indigenous environmental monitoring programs and to carry out Indigenous knowledge studies.

### 3.16.3 Public Information

415. The Commission assessed NB Power's public information and disclosure program (PIDP) for the PLNGS. A public information program 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*<sup>104</sup> 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.”
416. The Commission also assessed how NB Power's PIDP met the specifications of RD/GD-99.3, *Public Information and Disclosure*.<sup>105</sup> NB Power provided the Commission with information regarding its public and stakeholder consultations and communication activities including meetings, PLNGS media days, workshops and the Community Relations Liaison Committee (CRLC). NB Power also submitted information regarding PIDP evaluation, internal communications and its Annual and

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<sup>104</sup> SOR/2000-204.

<sup>105</sup> CNSC Regulatory/Guidance Document RD/GD-99.3, *Public Information and Disclosure*, 2012.

Quarterly Reports. CNSC staff confirmed to the Commission that NB Power had a well-established PIDP that satisfied regulatory requirements and provided details about several best practices that had been implemented by NB Power.

417. Asked about whether NB Power's PIDP included all communities that had expressed interest in PLNGS operations, the NB Power representative confirmed to the Commission's satisfaction that the NB Power public disclosure protocol required that information be communicated to all interested members of the public and communities, including Indigenous communities. The NB Power representative also submitted that NB Power made every reasonable effort to meet community-specific information needs and requests as well.
418. The Commission enquired about public opinion surveys conducted for the PLNGS. The NB Power representative provided information about annual surveys, noting that NB Power revised the PLNGS PIDP based on the survey responses and provided information on how NB Power ensured that Indigenous communities were well-represented in the survey results. Asked if the results were publicly posted on NB Power's website, the NB Power representative responded that they were not; however, the results were available to the public upon request. The Commission suggested that future survey results be posted on NB Power's website.
419. The Commission enquired about the outreach that NB Power conducted outside the EPZ. The NB Power representative provided details about outreach activities, such as open houses, that NB Power carried out in the City of Saint John and surrounding communities, including activities carried out upon request from an intervenor. The NB Power representative also stated that the *Nuclear – Preparedness Guide* was distributed throughout the EPZ and was available to all members of the public on the NB Power website. The NB Power representative also stated to the Commission's satisfaction that this expanded outreach would be continued throughout the proposed licence period.
420. Upon request from the Commission, several intervenors who were also members of the PLNGS CRLC, provided the Commission with information about how the CRLC shared information with communities near the PLNGS site. The intervenors also provided the Commission with information regarding CRLC membership, including local government and committee representation, stating the expectation that CRLC members shared information with their communities.
421. In considering the intervention from the New Brunswick Community College and the Faculty of Engineering, Université de Moncton, the Commission requested additional information on collaborative initiatives between NB Power and local educational institutions. The NB Power representative responded that NB Power engaged with these educational institutions through curriculum support, co-op and summer employment opportunities. Asked about whether NB Power collaborated with the NB Department of Education to include nuclear energy production in its curriculum, the NB Power representative explained that NB Power had collaborated with the Department of Education and provided information about an initiative starting in the

2017-18 school year that would introduce nuclear-related subject matter in NB Grade 4 classrooms.

422. Based on the information presented for this hearing, the Commission is satisfied that NB Power's PLNGS PIDP has and will continue to communicate to the public information about the health, safety and security of persons and the environment and other issues related to the PLNGS. The Commission expressed satisfaction with the best practices identified in NB Power's PIDP and encourages NB Power to continue its efforts in this regard.
423. The Commission encourages NB Power to assess the feasibility of publicly posting the minutes of the PLNGS CRLC on its website. The Commission also suggests that future PLNGS survey results be posted on NB Power's website.

#### *3.16.4 Conclusion on Aboriginal Engagement and Public Information*

424. Based on the information presented, the Commission is satisfied that, overall, NB Power's PIDP meets regulatory requirements and is effective in keeping First Nations and the public informed of PLNGS operations. The Commission acknowledges the many best practices already implemented by NB Power and encourages its efforts in creating, maintaining and improving its dialogue with the neighbouring communities.
425. Several First Nations informed the Commission that the PLNGS was built on traditional and ancestral territories and that the facility adversely impacted their Aboriginal and/or treaty rights. The Commission recognizes that First Nations were not consulted at the time of the construction of the PLNGS. The Commission, however, acknowledges the current efforts and commitments made by NB Power in relation to Aboriginal engagement and CNSC staff's efforts in this regard on behalf of the Commission. Based on the information presented on the record for this hearing, the Commission is satisfied that this licence renewal will not result in any changes to PLNGS operations, that the renewal will not cause adverse impacts to any potential or established Aboriginal and/or treaty rights and that the duty to consult was not triggered in this matter. The Commission is also of the opinion that the engagement activities taken for the review of the PLNGS licence renewal application have been adequate.<sup>106</sup>
426. The Commission expects NB Power to establish an environmental program with First Nations' input and to establish mechanisms in order to include Indigenous knowledge in NB Power's environmental protection and monitoring activities. The Commission also notes that CNSC's PFP is a mechanism that Indigenous groups can access in regard to environmental monitoring activities and the inclusion of Indigenous knowledge in these activities.

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<sup>106</sup> *Rio Tinto Alcan v. Carrier Sekani Tribal Council*, 2010 SCC 43[2010] 2 S.C.R. 650 at paras 45 and 49.

427. The Commission recognizes the difficulty that many intervenors had in the receipt of publicly-available documents. The Commission is of the opinion that, in the absence of previously-established security or sensitivity issues, all documents should be made available to the public upon request. The Commission intends on providing publicly available hearing documents to members of the public quickly to ensure that intervenors are able to fully participate in Commission proceedings.

### **3.17 Decommissioning Plans and Financial Guarantee**

428. The Commission requires that NB Power has operational plans for the decommissioning and long-term management of waste produced during the lifespan of the PLNGS. In order to ensure that adequate resources are available for safe and secure future decommissioning of the PLNGS site, the Commission requires that an adequate financial guarantee for realization of the planned activities is put in place and maintained in a form acceptable to the Commission throughout the licence period.
429. NB Power reported that the PLNGS decommissioning plans met the specifications of N294-09, *Decommissioning of facilities containing nuclear substances*.<sup>107</sup> NB Power also provided the Commission with information on its Preliminary Decommissioning Plan (PDP).
430. CNSC staff confirmed the information provided by NB Power and informed the Commission that NB Power's PDP also met the specifications G-219, *Decommissioning Planning for Licensed Activities*. CNSC staff further reported that, during the next licence period, NB Power would implement N294-09 (2014 Update 1) at the PLNGS.
431. CNSC staff provided the Commission with detailed information on NB Power's financial guarantee for the PLNGS, explaining that, as per licence requirements, NB Power submitted its revised PDP, estimated decommissioning costs and proposed financial guarantee to the CNSC in June 2015. CNSC staff further reported that NB Power fulfilled licence requirements in providing annual written reports confirming that the financial guarantee remained adequate to meet decommissioning needs and in updating the PDP every five years. CNSC staff also submitted that the total value of the financial guarantee on March 31, 2016 was \$673.1 million, whereas the funding requirement was \$555.6 million, and that CNSC reviews showed that the financial guarantee was adequate to meet the decommissioning needs at the PLNGS.
432. The Commission enquired about whether NB Power had established an approximate start date for PLNGS decommissioning. The NB Power representative added that the financial guarantee estimate represented the most conservative scenario with decommissioning starting in approximately 2037, which was based on the shortest potential operating period after refurbishment of 25 years.

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<sup>107</sup> N294-09, *Decommissioning of facilities containing nuclear substances*, CSA Group, 2009; Update 1, 2014.



433. Noting the concern expressed by Greenpeace Canada about the amount of the financial guarantee set aside for nuclear fuel waste management, the Commission requested additional information on this matter. The NB Power representative responded that 33% of the financial guarantee was kept in a segregated account for this purpose. The NB Power representative also advised the Commission that 5% of the decommissioning fund was set aside for the decommissioning of low- and intermediate-level waste. CNSC staff confirmed this information, indicating that this percentage was established by the Nuclear Waste Management Organization and that NB Power met CNSC staff's expectations in this regard.
434. In its intervention, Greenpeace Canada stated the concern that NB Power's submission for this hearing implied that the PLNGS preliminary decommissioning plans relied on the establishment of a long-term nuclear waste storage facility in Ontario for the disposal of its nuclear waste. Noting that such a long-term nuclear waste disposal facility had not yet been approved, Greenpeace Canada expressed concerns about the length of time it may take to approve and construct a long-term waste management facility and submitted that NB Power's PDP required additional scrutiny from the Commission in this regard. The NB Power representative explained that the PLNGS PDP did not make assumptions about the nature of the disposal facility that would be used for fuel, low- and intermediate-level wastes generated at the PLNGS. The NB Power representative further stated that the PDP considered non-specific waste disposal costing assumptions, including the possibility of waste disposal outside of New Brunswick. The NB Power representative also stated that the PDP was flexible, with room to evolve in case of changes to waste disposal conditions or technology. CNSC staff confirmed this information and indicated that NB Power had met planning objectives for the waste disposal component of the PDP at the current PLNGS lifecycle stage and explained that the PDP was a living planning tool that helped CNSC staff assess whether NB Power's financial guarantee was adequate. The explanation satisfies the Commission on this point.
435. Based on this information considered at this hearing, the Commission concludes that the preliminary decommissioning plan and related financial guarantee for the PLNGS are acceptable for the purpose of the current application for licence renewal.
436. The Commission expects NB Power to implement N294-09 (2014 Update 1) during the current licence period, with an implementation plan submitted to CNSC staff as specified in the proposed LCH.

### **3.18 Cost Recovery**

437. The Commission examined NB Power's standing under the *Cost Recovery Fees Regulations*<sup>108</sup> (CRFR) requirements for the PLNGS. Paragraph 24(2)(c) of the NSCA requires that a licence application is accompanied by the prescribed fee, as set out by the CRFR and based on the activities to be licensed.

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<sup>108</sup> SOR/2003-212.

438. NB Power submitted that it was in good standing for cost recovery fee payments for the PLNGS, paying these fees quarterly. CNSC staff confirmed the information provided by NB Power, noting that, based on previous performance in this area, CNSC staff did not have concerns over NB Power's payment of future cost recovery fees.
439. Based on the information submitted by NB Power and CNSC staff, the Commission is satisfied that NB Power has satisfied the requirements of the CRFR for the purpose of this licence renewal.

### **3.19 Nuclear Liability Insurance**

440. The Commission notes that NB Power is required to maintain nuclear liability insurance for the PLNGS. CNSC staff submitted that NB Power maintained nuclear liability insurance in accordance with the *Nuclear Liability Act*<sup>109</sup> (NLA) during the current licence period until December 31, 2016, with the *Nuclear Liability and Compensation Act*<sup>110</sup> (NLCA) coming into force on January 31, 2017. CNSC staff reported to the Commission that NRCan, the federal department responsible for the administration of the NLCA, had confirmed that NB Power had satisfied and should continue to satisfy its obligation under the NLCA during the balance of the current licence period and throughout the proposed licence period.
441. With the administration of the NLCA being the responsibility of NRCan rather than the CNSC, the Commission asked about how the CNSC would ensure NB Power's compliance in this regard. The NRCan representative provided the Commission with details about the administration of the NLCA and submitted that a mechanism to immediately inform the CNSC of non-compliances was in place. The Commission was satisfied on this point.
442. Based on the information provided on the record for this hearing, the Commission is satisfied that NB Power has satisfied, and will continue to satisfy, the requirements for the maintenance of nuclear liability insurance under the NLCA. The Commission expects annual updates in the NPP ROR in regards to NB Power's compliance with the NLCA.

### **3.20 Licence Length and Conditions**

443. The Commission considered NB Power's application for the renewal of the current PLNGS operating licence for a period of 5 years. CNSC staff recommended the renewal of the licence for a period of 5 years, until June 30, 2022, submitting that NB Power is qualified to carry on the licensed activities authorized by the licence.

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<sup>109</sup> R.S.C., 1985, c. N-28 (repealed).

<sup>110</sup> S.C. 2015, c. 4, s. 120.

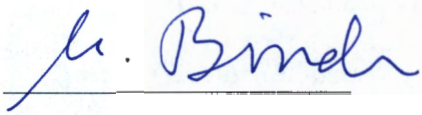
444. In order to provide adequate regulatory oversight of changes that are administrative in nature or less significant and do not require a licence amendment nor Commission approval, CNSC staff recommended that the Commission delegate authority for certain approval or consent, as contemplated in licence conditions that contain the phrase “a person authorized by the Commission,” to the following CNSC staff:
- Director, Gentilly-2/Point Lepreau Regulatory Program Division
  - Director General, Directorate of Power Reactor Regulation
  - Executive Vice-President and Chief Regulatory Operations Officer, Regulatory Operations Branch
445. Noting the implementation schedule for new and updated REGDOCs and standards in the proposed licence and LCH, the Commission enquired about the length of time required for the implementation of the standards and how that reflected on the maturity of NB Power’s programs. CNSC staff provided the Commission with detailed information about the implementation of new and updated REGDOCs and standards, and explained that risk and safety significance of a new or updated standard was the primary consideration in determining an implementation schedule. The NB Power representative confirmed to the Commission’s satisfaction that NB Power was continuously trying to improve in this regard, provided details on the implementation schedule in the proposed LCH and confirmed the risk-based strategy used to implement updated or new REGDOCs and standards. The Commission expressed its appreciation for the detailed information provided by NB Power and CNSC staff regarding the implementation of new and updated standards and encourages NB Power to continue to implement codes, standards and REGDOCs as soon as feasible at the PLNGS. Upon suggestion from the Commission, CNSC staff confirmed that standard and REGDOC implementation information would be included in the next NPP ROR.
446. The Commission is satisfied with CNSC staff’s plans to include NB Power’s SOE documentation in the PLNGS LCH under the proposed licence condition 3.1. The Commission reaffirms that, since the SOE is part of the PLNGS licensing basis, any change to the SOE documentation that may reduce safety margins requires Commission approval.
447. The Commission noted that several interventions raised concerns about NB Power not meeting some regulatory requirements and the number of outstanding corrective actions in several SCAs. The Commission asked CNSC staff about the reasonableness of a licence renewal in light of these apparent regulatory compliance issues. CNSC staff acknowledged that there were several areas in PLNGS operations and programs which required improvement. CNSC staff also provided information about the CNSC’s comprehensive compliance verification program that continuously monitored a licensee’s performance, identifying any compliance issues at the PLNGS and corrective actions that were required to be taken by NB Power. CNSC staff confirmed that corrective actions and compliance issues were considered in a risk-informed manner and that any safety-significant issues were dealt with immediately. The Commission is satisfied with the information provided on this point.

448. The Commission notes the quantity of assessments and analyses that were incomplete or under review during Parts 1 and 2 of this hearing. Although the Commission acknowledges and agrees with CNSC staff's position that not having the final reviews for these analyses is not an impediment to licensing and that the Commission has adequate information to make a well-reasoned and balanced decision, the Commission notes that the availability of this information would allow for the opportunity of increased stakeholder engagement and provide a more complete picture of facility operations. The Commission suggests that more consideration be given to the timing of assessment, analyses and their review by CNSC staff and third parties for future Commission proceedings.
449. The Commission acknowledges the concerns of several intervenors who submitted that the hearing process, while fully complying with the timelines set out in the CNSC *Rules of Procedure*, may not have provided enough time to allow their concerns to be heard and that the PFP resources did not adequately meet the intervenors' needs. The Commission encourages intervenors to take advantage of all of the opportunities provided by the CNSC for public participation including RORs, Commission meetings on specific issues and Commission hearings.
450. The Commission acknowledges that several intervenors recommended that NB Power be issued a licence for a shorter licence period for the PLNGS. The Commission considered the information provided by these licensees and the reasoning for this recommendation including procedural and program maturity, the FA authorization process and other environmental monitoring concerns, and concerns about seismic safety.
451. Based on the information examined by the Commission during the course of this hearing, the Commission is satisfied that a 5-year licence is appropriate for the PLNGS. The Commission accepts the licence conditions as recommended by CNSC staff. The Commission also accepts CNSC staff's recommendation regarding the delegation of authority, and notes that it can bring any matter to the Commission as required.
452. In light of the information provided and the information examined by the Commission for this hearing, the Commission is satisfied that the outstanding corrective actions at the PLNGS are of lower safety significance and are being adequately addressed. The Commission expresses, however, its dissatisfaction at the number of outstanding corrective actions required to be completed by NB Power to meet regulatory requirements and fully expects NB Power to address these issues as soon as practicable. The Commission directs CNSC staff to provide annual updates on the status of the outstanding corrective actions for NB Power during the annual NPP ROR.

#### 4.0 CONCLUSION

453. The Commission has considered the information and submissions of the applicant, CNSC staff and all participants as set out in the material available for reference on the record, as well as the oral and written interventions provided or made by the participants at the hearing.
454. The Commission is satisfied that NB Power meets the test set out in subsection 24(4) of the *Nuclear Safety and Control Act*. That is, the Commission is of the opinion that NB Power is qualified to carry on the activity that the proposed licence will authorize and that 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.
455. Therefore, the Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, renews the Nuclear Power Reactor Operating Licence issued to New Brunswick Power Corporation for the Point Lepreau Nuclear Generating Station located on the Lepreau Peninsula in New Brunswick. The renewed licence, PROL 17.00/2022, is valid from July 1, 2017 until June 30, 2022.
456. The Commission includes in the licence the conditions as recommended by CNSC staff in CMDs 17-H2 and 17-H2.B. The Commission also delegates authority for the purposes of licence conditions 3.2 and 15.2, as recommended by CNSC staff.
457. The Commission considers the environmental review that was conducted by CNSC staff to be acceptable and thorough. The Commission is satisfied that an EA under CEAA 2012 was not required for the PLNGS licence renewal application and notes that the NSCA provides a strong regulatory framework for environmental protection. Further, the Commission is satisfied that NB Power has made, and will continue to make, adequate provision for the protection of the environment and the health of persons throughout the proposed licence period.
458. 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).
459. With this decision, the Commission directs CNSC staff to report annually on the performance of NB Power and PLNGS, as part of the annual *Regulatory Oversight Report for Canadian Nuclear Power Plants* (NPP ROR). CNSC staff shall present this report at a public proceeding of the Commission, where members of the public will be able to participate.
460. The Commission expects CNSC staff to continue increased regulatory oversight in the Management System safety and control area, with annual reports to the Commission through the NPP ROR.

461. The Commission appreciates the detailed data provided by CNSC staff and NB Power in the submissions. The Commission suggests future submissions present performance-related trending data in a graphical, rather than tabular, format to more effectively illustrate trends.
462. The Commission suggests that CNSC staff review which Safety Performance Indicators (SPIs) would be of interest to the Commission and to the public and report on these SPIs in the context of the annual NPP ROR.



SEP 08 2017

Michael Binder  
President,  
Canadian Nuclear Safety Commission

Date

**Appendix A – Intervenors**

|  |                       |
|--|-----------------------|
|  |                       |
| City of Saint John, represented by K. Clifford   | 17-H2.35              |
| Maliseet Nations of New Brunswick, represented by R. Letica, F. Sabattis and Z. Crafton-McDonald           | 17-H2.92              |
| Canadian Nuclear Society, represented by P. Ozemoyah, C. Hunt and P. Easton                                | 17-H2.12              |
| Lorneville Mechanical Contractors, represented by S. Dumouchel   | 17-H2.37              |
| CANDU Owners Group, represented by F. Dermakar   | 17-H2.14              |
| Saint John Naturalists’ Club Inc., represented by J. Wilson  | 17-H2.24<br>17-H2.24A |
| Passamaquoddy Nation, represented by Chief H. Akagi, W. Nolan and Grand Chief R. Tremblay                  | 17-H2.73              |
| Gordon W. Dalzell  | 17-H2.25              |
| North American Young Generation in Nuclear, represented by R. Horgan                                       | 17-H2.21              |
| International Brotherhood of Electrical Workers, Local 37, represented by R. Galbraith and M. Goddard      | 17-H2.58              |
| Canadian Nuclear Workers’ Council, represented by D. Shier and D. Dixon                                    | 17-H2.28<br>17-H2.28A |
| Ron Mawhinney  | 17-H2.31<br>17-H2.31A |
| Andrew Dykeman   | 17-H2.55              |
| Women in Nuclear (Win) New Brunswick, represented by G. Clark and M. Hawkes                                | 17-H2.51              |
| New Brunswick Emergency Measures Organization (NBEMO), represented by G. McCallum and R. Shepard           | 17-H2.52              |
| Canadian Environmental Law Association and Conservation Council of New Brunswick, represented by K. Blaise | 17-H2.93<br>17-H2.93A |
| Musquash Volunteer Fire Rescue Department, represented by W. Pollock                                       | 17-H2.33              |
| Sunny Corner Enterprises Inc., represented by G. Lavoie  | 17-H2.13              |

| Intervenors  |                       |
|--|-----------------------|
| Greenpeace Canada, represented by S.-P. Stensil                                      | 17-H2.74              |
| SNC Lavalin, represented by R. Whalen  | 17-H2.57              |
| Mi'gmawe'l Tplu'taqnn Inc. (MTI), represented by K. Barnaby, D. Gorber and K. Narvie | 17-H2.45<br>17-H2.45A |
| Corporate Research Associates Inc., represented by C. Wight                          | 17-H2.59<br>17-H2.59A |
| New Clear Free Solutions, represented by C. Rouse                                    | 17-H2.94              |
| Saint John Region Chamber of Commerce, represented by D. Duplisea                    | 17-H2.79              |
| Joseph Valardo   | 17-H2.65              |
| Black & McDonald Limited, represented by M. Arseneault                               | 17-H2.63              |
| Jason McKay  | 17-H2.61              |
| Centre for Nuclear Energy Research, represented by W. Cook                           | 17-H2.40              |
| RESD Inc., represented by P. Sedran  | 17-H2.96              |
| Sipekne'katik, represented by J. Copage  | 17-H2.76              |
| Leah Belding   | 17-H2.69              |
| Sunil Nijhawan   | 17-H2.78              |
| Keith Miller   | 17-H2.72              |
| Canadian Nuclear Association, represented by J. Barrett and S. Coupland              | 17-H2.15              |
| PEACE NB, represented by S. Murphy-Flatt   | 17-H2.95              |
| Marlene Dewar  | 17-H2.66              |
| Leanna Hickman-Leroy and H. Mawhinney  | 17-H2.85              |
| Anne Harding   | 17-H2.89              |
| Town of Rothesay   | 17-H2.2               |
| Atlantica Centre For Energy  | 17-H2.3               |
| Wayne Long, Member of Parliament, Saint John-Rothesay                                | 17-H2.4               |
| St. George and Area Food Bank  | 17-H2.5               |
| Stephen Smith  | 17-H2.6               |
| New Brunswick Community College  | 17-H2.8               |
| New Brunswick Mentor Apprentice Program (NB-MAP)                                     | 17-H2.9               |



| Intervenors   |          |
|---|----------|
| Town of St. George  | 17-H2.10 |
| Maritime Electric   | 17-H2.11 |
| David Small   | 17-H2.16 |
| Joey Baird and some members of the Fundy Bay Senior Citizens' Club Inc.     | 17-H2.17 |
| Saint John Energy   | 17-H2.18 |
| Cooke Aquaculture   | 17-H2.19 |
| Town of Shediac   | 17-H2.20 |
| Saint John Regional Hospital Foundation                                     | 17-H2.22 |
| Rick Doucet, Minister, Energy and Resource Development                      | 17-H2.23 |
| Patty Bent and Richard Young, Campobello VillageMart                        | 17-H2.26 |
| Timothy L. Curry  | 17-H2.27 |
| TJ Harvey, Member of Parliament, Tobique-Mactaquac                          | 17-H2.29 |
| Fundy Shores School   | 17-H2.30 |
| John Weir, Point Lepreau Chief Warden                                       | 17-H2.32 |
| Mark Wilson, PTech  | 17-H2.34 |
| Hon. Stephen Horsman, Deputy Premier, Legislative Assembly of New Brunswick | 17-H2.36 |
| Atlantic Cancer Research Institute  | 17-H2.38 |
| Gilles Allain   | 17-H2.39 |
| J. Smith Excavating   | 17-H2.41 |
| Joel Levesque   | 17-H2.43 |
| Saint John Port Authority (Port Saint John)                                 | 17-H2.44 |
| J. Curtis Nason   | 17-H2.46 |
| Town of Quispamsis  | 17-H2.47 |
| Laurie Comeau   | 17-H2.48 |
| Faculty of Engineering, Université de Moncton                               | 17-H2.49 |
| HAWK Marketing Service  | 17-H2.50 |
| New Brunswick's Building Trades Unions                                      | 17-H2.53 |

| Intervenors  |          |
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| Coastal Enterprises Ltd.   | 17-H2.54 |
| Town of Saint Andrews  | 17-H2.56 |
| Boilermaker Contractors' Association of Canada                           | 17-H2.60 |
| Dave Wilson  | 17-H2.62 |
| Jennifer Lennox  | 17-H2.64 |
| Matt DeCoursey, Member of Parliament, Fredericton                        | 17-H2.67 |
| Association of Professional Engineers and Geoscientists of New Brunswick | 17-H2.68 |
| Northern Harvest Sea Farms   | 17-H2.70 |
| Stéphane Boucher   | 17-H2.71 |
| Connors Brothers Clover Leaf Seafood Company                             | 17-H2.75 |
| BWXT Canada Ltd  | 17-H2.77 |
| Lyman Crawford   | 17-H2.80 |
| Holly Breau  | 17-H2.81 |
| Eileen Mawhinney   | 17-H2.82 |
| Local Service District   | 17-H2.83 |
| Town of Grand Bay-Westfield  | 17-H2.84 |
| United Way of Central New Brunswick                                      | 17-H2.86 |
| Darlene Weir   | 17-H2.87 |
| Lester and Helen Hyslop  | 17-H2.88 |
| Construction Association of New Brunswick                                | 17-H2.90 |
| United Way, serving Saint John, Kings and Charlotte                      | 17-H2.91 |