



Canadian Nuclear  
Safety Commission

Commission canadienne  
de sûreté nucléaire

## Record of Decision

In the Matter of

Applicant Canadian Nuclear Laboratories Limited

Subject Application to Renew and to Amend the Nuclear  
Research and Test Establishment Operating  
Licence for Chalk River Laboratories

Public Hearing  
Date April 6, 2016

## RECORD OF DECISION

Applicant: Canadian Nuclear Laboratories Limited

Address/Location: Chalk River Laboratories, 286 Plant Road, Chalk River, Ontario, K0J 1J0

Purpose: Application to Renew and to Amend the Nuclear Research and Test Establishment Operating Licence for Chalk River Laboratories

Application submissions received: October 2, 2015  
November 9, 2015

Date of public hearing: April 6, 2016

Location: Canadian Nuclear Safety Commission (CNSC) Public Hearing Room, 280 Slater St., 14th. Floor, Ottawa, Ontario

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

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

<b>Applicant Represented By</b>	<b>Document Number</b>
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See Appendix A		
<b>Others</b>		
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**Licence:** Renewed and Amended

## Table of Contents

<b>1.0</b>	<b>INTRODUCTION</b> .....	<b>1</b>
<b>2.0</b>	<b>DECISION</b> .....	<b>3</b>
<b>3.0</b>	<b>ISSUES AND COMMISSION FINDINGS</b> .....	<b>4</b>
<b>3.1</b>	<b>Management System</b> .....	<b>5</b>
3.1.1	<i>Organization</i> .....	5
3.1.2	<i>The Future of the NRU Reactor Beyond October 31, 2016</i> .....	6
3.1.3	<i>Safety Culture</i> .....	9
3.1.4	<i>Conclusion on Management System</i> .....	9
<b>3.2</b>	<b>Human Performance Management</b> .....	<b>10</b>
3.2.1	<i>Training</i> .....	10
3.2.2	<i>Examination and Certification</i> .....	11
3.2.3	<i>Human Factors</i> .....	11
3.2.4	<i>Conclusion on Human Performance Management</i> .....	12
<b>3.3</b>	<b>Operating Performance</b> .....	<b>12</b>
3.3.1	<i>Conduct of Licensed Activity</i> .....	12
3.3.2	<i>Reporting and Trending</i> .....	13
3.3.3	<i>NRU Reactor Extended Outages and Removal of Licence Condition 16.1</i> .....	14
3.3.4	<i>Conclusion on Operating Performance</i> .....	15
<b>3.4</b>	<b>Safety Analysis</b> .....	<b>16</b>
3.4.1	<i>Integrated Implementation Plan</i> .....	16
3.4.2	<i>Conclusion on Safety Analysis</i> .....	18
<b>3.5</b>	<b>Physical Design</b> .....	<b>19</b>
<b>3.6</b>	<b>Fitness for Service</b> .....	<b>19</b>
3.6.1	<i>Maintenance</i> .....	21
3.6.2	<i>System Health Program</i> .....	21
3.6.3	<i>Aging Management</i> .....	22
3.6.4	<i>Structural Integrity</i> .....	22
3.6.5	<i>Conclusion on Fitness for Service</i> .....	23
<b>3.7</b>	<b>Radiation Protection</b> .....	<b>24</b>
<b>3.8</b>	<b>Conventional Health and Safety</b> .....	<b>25</b>
<b>3.9</b>	<b>Environmental Protection</b> .....	<b>25</b>
3.9.1	<i>Effluent and Emissions Control</i> .....	26
3.9.2	<i>Conclusion on Environmental Protection</i> .....	28
<b>3.10</b>	<b>Emergency Management and Fire Protection</b> .....	<b>28</b>
3.10.1	<i>Potassium Iodide (KI) Distribution</i> .....	30
3.10.2	<i>Fukushima Action Plan</i> .....	31
3.10.3	<i>Conclusion on Emergency Management and Fire Protection</i> .....	31
<b>3.11</b>	<b>Waste Management</b> .....	<b>32</b>
<b>3.12</b>	<b>Security</b> .....	<b>33</b>
<b>3.13</b>	<b>Safeguards</b> .....	<b>34</b>
<b>3.14</b>	<b>Packaging and Transport</b> .....	<b>34</b>
3.14.1	<i>Update to the Commission on the November 2015 Caddy Failure Event</i> .....	35
3.14.2	<i>Conclusion on Packaging and Transport</i> .....	36

<b>3.15</b>	<b>Aboriginal Engagement and Public Information .....</b>	<b>36</b>
3.15.1	<i>Participant Funding Program .....</i>	36
3.15.2	<i>Aboriginal Engagement .....</i>	37
3.15.3	<i>Public Information.....</i>	38
<b>3.16</b>	<b>Decommissioning Plans and Financial Guarantee .....</b>	<b>39</b>
<b>3.17</b>	<b>Cost Recovery .....</b>	<b>40</b>
<b>3.18</b>	<b>Nuclear Liability Insurance.....</b>	<b>41</b>
<b>3.19</b>	<b>Licence Period and Conditions.....</b>	<b>41</b>
<b>4.0</b>	<b>CONCLUSION.....</b>	<b>43</b>
<b>Appendix A – Intervenors.....</b>		<b>A</b>
<b>Appendix B – Acronym List .....</b>		<b>Error! Bookmark not defined.</b>

## 1.0 INTRODUCTION

1. Canadian Nuclear Laboratories Limited (CNL) has applied to the Canadian Nuclear Safety Commission<sup>1</sup> for a renewal and amendment of its Nuclear Research and Test Establishment Operating Licence (NRTEOL) for Chalk River Laboratories (CRL) located near Chalk River, ON. The current operating licence, NRTEOL-01.02/2016, expires on October 31, 2016. CNL has requested a renewal of the NRTEOL for CRL for an additional 17 months to March 31, 2018.
2. This application is linked to CNL's plan for the future of the National Research Universal (NRU) reactor beyond October 31, 2016, subject to Commission approval. CNL's application outlines its intention to continue operation of the NRU reactor with standby production of molybdenum-99 (Mo-99) until March 31, 2018, followed by a state of safe shutdown and storage-with-surveillance prior to decommissioning.
3. CNL also requested licence amendments to two NRU-specific licence conditions:
  - the removal of licence condition 16.1, which required the implementation of annual extended outages of the NRU reactor; and
  - Commission approval of CNL's plan for end of operation or continued operation of the NRU reactor beyond October 31, 2016, and the associated removal of licence condition 16.3.
4. CRL houses many nuclear facilities including the NRU reactor, the Molybdenum Production Facility, waste management areas and laboratories. Historically, CRL was owned and operated by Atomic Energy of Canada Limited (AECL), a federal Crown corporation.
5. In 2013, the Government of Canada announced its decision to manage operations at CRL under a "government-owned, contractor-operated" (GoCo) business model. In May 2014, CNL was created as a wholly-owned subsidiary of AECL and, in October 2014, the Commission approved the transfer of the CRL operating licence from AECL to CNL.<sup>2</sup> The final phase of the GoCo implementation occurred when the management of CNL was transferred by contract to the Canadian National Energy Alliance (CNEA). Under this arrangement, CNL continues to be the licensee for CRL and remains responsible for the safe operations at the site.

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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 Record of Proceedings, Including Reasons for Decision* – Atomic Energy of Canada Limited, "Request for Five Licence Transfers to, and Request for Two Specific Licence Exemptions for, Canadian Nuclear Laboratories Limited, October 22, 2014, e-Doc 4543516.

6. The types of activities conducted at CRL, as well as the activities permitted under CNL's licence, have not changed under the GoCo model. The safety case and licensing basis for CRL, as approved by the Commission in 2011,<sup>3</sup> remain valid under the GoCo model, with CNSC licensing and compliance requirements remaining unchanged, and no change to the licensee's primary responsibility for safety.
7. In November 2015, up to \$25,000 in funding to participate in this licensing process was made available to Aboriginal 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 \$14,710 in participant funding be provided to three applicants. These applicants were required, by virtue of being in receipt of the funding, to submit a written intervention commenting on CNL's application.

#### Issue

8. In considering the application, the Commission was required to decide, pursuant to subsection 24(4) of the *Nuclear Safety and Control Act*<sup>4</sup> (NSCA):
  - a) if CNL is qualified to carry on the activity that a changed licence would authorize for an additional 17 months; and
  - b) if, in carrying on that activity, CNL 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.
9. The Commission was required to address specific questions relating to the requested amendments:
  - a) whether it accepts CNL's proposed modified outage schedule and the removal of licence condition 16.1; and
  - b) whether it approves CNL's plan for continued operation of the NRU reactor beyond October 31, 2016 and the removal of licence condition 16.3.

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<sup>3</sup> *CNSC Record of Proceedings, Including Reasons for Decision* – Atomic Energy of Canada Limited, Application to Renew its Nuclear Research and Test Establishment Operating Licence for the Chalk River Laboratories, October 2011.

<sup>4</sup> Statutes of Canada (S.C.) 1997, chapter (c.) 9.

## Public Hearing

10. The Commission, in making its decision, considered information presented for a public hearing held on April 6, 2016 in Ottawa, Ontario. The public hearing was conducted in accordance with the *Canadian Nuclear Safety Commission Rules of Procedure*.<sup>5</sup> During the public hearing, the Commission considered written submissions and heard oral presentations from CNL (CMD 16-H2.1, 16-H2.1A and 16-H2.1B) and CNSC staff (CMD 16-H2, 16-H2.A and 16-H2.B). The Commission also considered written submissions from 16 intervenors (see Appendix A for a detailed list of interventions). The hearing was webcast live via the CNSC website, and video archives remain available for a three-month period following the hearing.

## **2.0 DECISION**

11. Based on its consideration of the matter, as described in more detail in the following sections of this *Record of Decision*, the Commission concludes that CNL is qualified to carry on the activity that the changed licence will authorize. The Commission is of the opinion that CNL, in carrying on that activity for an added 17-month period, 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,

the Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, renews and amends the Nuclear Research and Test Establishment Operating Licence issued to Canadian Nuclear Laboratories Limited for Chalk River Laboratories located in Chalk River, Ontario. The renewed and amended licence, NRTEOL-01.00/2018, is valid until March 31, 2018. The licence amendments take effect as of the date of this decision.

12. The Commission includes in the licence the conditions as recommended by CNSC staff in CMD 16-H2 and as detailed below.
13. The Commission approves CNL's request and CNSC staff's recommendation to remove licence condition 16.1, regarding NRU reactor outages. The Commission amends the licence by removing licence condition 16.1 and approves CNL's proposed NRU reactor outage schedule.
14. The Commission approves CNL's plans for the future of the NRU reactor beyond October 31, 2016, presented in accordance with licence condition 16.3, on the basis that the safety case for the NRU reactor remains unchanged. Therefore, the Commission considers this licence condition fulfilled and amends the licence by removing licence condition 16.3.

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<sup>5</sup> Statutory Orders and Regulations (SOR)/2000-211.



15. To ensure continuous reporting on progress of improvement identified during the NRU reactor Integrated Safety Review, the Commission amends licence condition 16.2 by renaming it licence condition 16.1 and modifies it from

*The licensee shall progress to completion the improvements identified during the NRU Reactor Integrated Safety Review, and shall report the status to the Commission annually starting October 31, 2012 through October 31, 2015.*

to

*The licensee shall progress to completion the improvements identified during the NRU Reactor Integrated Safety Review, and shall report the status to the Commission every three months.*

16. The Commission accepts CNSC staff's recommendation regarding the delegation of authority in the Licence Conditions Handbook (LCH) and extends the delegation of authority as presented in the previous CRL operating licence. The Commission notes that CNSC staff can bring any matter to the Commission as required. The Commission directs CNSC staff to inform the Commission on an annual basis of any changes made to the LCH.
17. The Commission directs CNSC staff to provide updates on CNL's performance in the "fitness for service" SCA at every public meeting of the Commission until CNL achieves a satisfactory rating in this SCA, which the licensee indicated was the intention. During the hearing, CNSC staff committed to providing the Commission with information on any slippage in CNL's progress regarding fitness for service at CRL and corrective actions that CNL must implement. The Commission is satisfied with this approach; however, the Commission expects there to be increased scrutiny of CNL's performance in the fitness for service SCA.
18. With this decision, the Commission directs CNSC staff to provide annual reports on the performance of CNL at CRL, as part of an annual *Regulatory Oversight Report*. CNSC staff shall present this report at public proceedings of the Commission, where requests to participate from members of the public can be filed.

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

19. In making its licensing decision, the Commission considered a number of issues relating to CNL's qualification to carry out the activities and the adequacy of the proposed measures for protecting the environment, the health and safety of persons, national security and international obligations to which Canada has agreed.
20. CNSC staff assessed CNL's performance in 14 SCAs over the current licence period. CNSC staff also assessed CNL's performance in relation to several other matters of

regulatory interest relevant to this licensing hearing. Details of and the Commission's consideration of information submitted by CNL in support of its application and of CNSC staff assessments are provided in the following sections of this *Record of Decision*.

### **3.1 Management System**

21. The Commission examined CNL's Management System which covers the framework that establishes the processes and programs required to ensure that CRL achieves its safety objectives and continuously monitors its performance against these objectives, and fosters a healthy safety culture. Whereas CNSC staff rated CNL's performance in this SCA as "below expectations" in 2011 and 2012, CNL's performance improved and was rated as "satisfactory" since 2013.
22. The Commission assessed the information submitted by CNL and CNSC staff regarding CNL's transition to CSA N286-05, *Management System Requirements for Nuclear Power Plants*<sup>6</sup> during the current licence period, which consisted of three phases to close the gaps identified between N286-05 and CNL's previous management system that was based on earlier CSA standards.
23. The Commission noted that target dates for several projects were often missed and enquired about whether CNL would meet the target completion date of June 2016 for Phase 3 of the transition to N286-05. CNSC staff provided the Commission with information on the completion of Phases 1 and 2, stating that CNL expressed its commitment to CNSC staff regarding the completion of Phase 3 by June 2016.<sup>7</sup>
24. On the basis of the information provided, the Commission is satisfied that CNL is completing the transition to meet the new N286-05, and that CNL has submitted the required documentation supporting this transition to CNSC staff.

#### *3.1.1 Organization*

25. The Commission examined the information submitted by CNL and CNSC staff regarding organizational changes due to CNL's transition to the GoCo model, which was completed in September 2015. CNL provided the Commission with details about the organizational relationships and responsibilities of AECL, CNL and CNEA under the GoCo model. CNL also submitted that CNSC staff had been notified of management appointments and that, in the proposed licence period, CNL would continue to provide CNSC staff with updates in this regard. CNSC staff reported that

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<sup>6</sup> N286-05: Management system requirements for nuclear power plants, CSA Group, 2005.

<sup>7</sup> On June 30, 2016, CNSC staff confirmed that CNL had submitted the required documentation to the CNSC confirming the completion of Phase 3 of the transition to N286-05.

there were no changes to regulatory or licensing requirements throughout the GoCo transition. CNSC staff also confirmed to the Commission that, during the proposed licence period, regulatory oversight of organizational changes at CNL would continue.

26. The Commission assessed the organizational impacts on CRL from the GoCo transition and from the upcoming end of operation of the NRU reactor that were identified by CNL and CNSC staff. CNL submitted that it had employed several strategies to mitigate these impacts, including drawing operational experience from other licensees, addressing staff attrition through career planning initiatives and implementing tools to aid with the GoCo transition. CNSC staff submitted that the GoCo transition and the end of operation of the NRU reactor in 2018 had the potential for impacts on morale and worker performance; therefore, CNSC staff was engaged in ongoing communications with CNL regarding these matters.
27. The Commission requested additional details about the length of CNL's contract with AECL. The CNL representative responded that CNL has a six-year contract with AECL, with an option for two extensions, for a total of 10 years.
28. In his intervention, Mr. F. Boyd submitted that CNL's progress at CRL in the last year had shown that the GoCo model could be implemented successfully. The Commission enquired about the intervenor's assertion that the United Kingdom had reversed its position on the effectiveness of the GoCo model. The CNL representative responded that the United Kingdom had reversed its position on the GoCo model for only one site, due to complexities specific to that site. The Commission also requested additional information about how the GoCo model had impacted CRL operations and how Canada's experience compared to other countries' experience with the model. The CNL representative responded that the transition to the GoCo model brought CRL an immediate improvement through change in leadership that had varied industry experience. The CNL representative also noted that the GoCo model had proven to be successful in both the United States and the United Kingdom. The Commission was satisfied with the information that was provided on this matter.

### 3.1.2 *The Future of the NRU Reactor Beyond October 31, 2016*

29. The Commission assessed the information provided by CNL and CNSC staff regarding the future of the NRU reactor beyond October 31, 2016. Licence condition 16.3 of the current licence reads:

*The licensee shall, by June 30, 2015 develop and submit for approval by the Commission a plan for end of operation or continued operation of the NRU Reactor beyond October 31, 2016.*

CNSC staff reported that CNL had submitted a plan for the future of the NRU reactor on June 23, 2015 and that CNL's plan was aligned with the Government of Canada's intent regarding continued operation of the NRU reactor until March 31, 2018.

30. The Commission assessed CNL's high-level plans for the future of the NRU reactor beyond October 31, 2016. CNL provided the Commission with the expected timelines regarding the proposed NRU reactor activities to be conducted during:

- Phase 1: Operating period, the present through March 2018
- Phase 2: Transition to safe shutdown state
- Phase 3: Transition to storage with surveillance

CNSC staff submitted that, based on its assessment of these plans, it was of the opinion that CNL would be able to safely operate and maintain the NRU reactor during the proposed licence period, and that CNL adequately addressed the criteria for the transition to the end of operation of a nuclear facility. CNL submitted that a revised facility licensing and safe shutdown state plan would be prepared during the proposed licence period, with CNSC staff confirming that detailed plans for NRU reactor activities beyond March 2018 would be considered in future licensing proceedings.

31. CNL submitted that operational practices for the NRU reactor during the proposed licence period would remain within CNL's existing policies, procedures and operational limits. CNL further submitted that the most significant change in facility operations would be the return to service of the U-2 experimental loop; this activity was within the current licensing basis. CNSC staff reported that it had examined CNL's proposed operational plans for the NRU reactor until March 31, 2018 and that it was of the opinion that CNL would continue to implement programs and procedures within the current licensing basis. CNSC staff noted that it would ensure that the NRU reactor Integrated Implementation Plan (IIP) would continue to be implemented as scheduled.

32. CNSC staff provided the Commission with additional details regarding the continued operation of the NRU reactor including CNL's strategies for shutdown, transition to safe storage and eventual decommissioning. CNSC staff reported that CNL's current practices, programs, processes and procedures for safe operation of the NRU reactor would remain in effect until March 2018.

33. The Commission examined the information submitted by CNL and CNSC staff regarding the production of radioisotopes in the NRU reactor during the proposed licence period. CNL submitted that isotopes other than Mo-99 would continue to be produced in day-to-day NRU reactor operations. Mo-99 would be produced on an as-needed basis, should a Mo-99 shortage occur, by direction of the Government of Canada.

34. The Commission requested additional information about the increased production of several isotopes in the NRU reactor during the proposed licence period. The CNL representative responded that, while some isotope production, such as Mo-99 and Xe-133, would be discontinued as of October 31, 2016, the production of several other isotopes for which there was market demand, such as high specific activity cobalt-60

(Co-60), would increase. Based on the information provided, the Commission is satisfied with CNL's plans for isotope production in the NRU reactor during the proposed licence period.

#### Standby Molybdenum-99 Production

35. The Commission assessed CNL's plans for standby Mo-99 production capability during the proposed 17-month additional licence period. CNL provided the Commission with details for the management of the NRU reactor in a standby Mo-99 production state, noting that this activity was related to a contractual agreement between CNL and the Government of Canada. CNSC staff confirmed the information provided by CNL and was of the opinion that Mo-99 production could be restarted safely, if required, during this period.
36. The Commission requested clarification on how the decision to restart Mo-99 production would be made. An AECL representative provided details on this matter, specifying that the restart of Mo-99 production would be a Government of Canada decision, based on market demand. The NRCan representative stated that, although shortages of Mo-99 were not expected during the proposed licence period, the standby capability for Mo-99 production at CRL would provide Canada with flexibility in this regard. The NRCan representative also stated that a protocol between all parties to this agreement would be established to ensure clarity on steps and expectations for standby Mo-99 production. The Commission is satisfied with the information presented on this matter.
37. The Commission enquired about how the Mo-99 production facility would be maintained in a state of readiness throughout the 17-month period after the end of regular production. The CNL representative provided detailed information about the regular training of facility staff and other strategies that CNL would implement to ensure that both the facility and its staff would be ready and available to restart Mo-99 production if required.
38. The Commission further enquired about how CNL would manage the risk of attrition of staff from the Mo-99 facility during this period. The CNL representative provided information on projects that Mo-99 production facility employees could be reassigned to at CRL. The CNL representative also noted that employee training for, and the maintenance of, the Mo-99 facility would still be required during this time, providing work for facility staff during this period. The Commission is satisfied that CNL has adequate plans in place to maintain the Mo-99 production facility and retain the required Mo-99 production facility staff.
39. The Commission enquired about how long it would take to produce Mo-99 after the Government of Canada issued a production restart directive. The AECL representative provided information on how this directive would be communicated to CNL, noting that AECL's expectation was that Mo-99 would be produced within three weeks of

notification. The CNL representative confirmed that the three-week timeline was achievable. The CNL representative explained that, should the directive be issued during regular operations, it would take approximately one week to produce Mo-99; production of Mo-99 would take three weeks only if the directive was issued at the beginning of a two-week outage.

### *3.1.3 Safety Culture*

40. The Commission assessed the information provided by CNL and CNSC staff regarding the safety culture improvements made at CRL, including initiatives such as site stand-downs and the focus on the use of event free tools.
41. The Commission enquired about how CNL would ensure that a strong safety culture would continue at CRL throughout the proposed licence period. The CNL representative provided the Commission with information on its safety culture improvement strategy, including the daily “rapid learning” program that had been successfully implemented, and the focus on the determination of the root causes of any safety issues that arise to ensure that they could be corrected as fast as possible. The CNL representative also noted that safety culture at CRL and the safety of its employees was CNL’s number one priority.
42. The Commission enquired about whether the employees at CRL had the right to refuse unsafe work. The CNL representative responded that all CRL site employees had the right to refuse unsafe work and to stop unsafe work activities.
43. In reference to the Women in Nuclear Canada intervention, the Commission enquired about the assertion that safety culture related issues at CRL could disproportionately affect female workers. The CNL representative responded that there were no safety impacts unique to female workers at CRL and that CNL was concerned about the safety of all employees at CRL equally. The Commission was satisfied with the information provided on this matter.

### *3.1.4 Conclusion on Management System*

44. Based on its consideration of the information presented, the Commission concludes that CNL has appropriate organizational and management structures in place and that the operating performance at CRL in the current licence period to date provides a positive indication of CNL’s ability to adequately carry out the activities under the proposed licence period.
45. On the basis of the information provided on the record for this hearing, the Commission is satisfied that CNL will continue to mitigate identified impacts from organizational changes. Furthermore, the Commission is satisfied that CNL’s transition to the GoCo model has not impacted the 2011 Commission-approved licensing basis for CRL.

46. The Commission is satisfied that CNL's high-level plans for the future of the NRU reactor beyond October 31, 2016 are adequate. Therefore, the Commission approves these plans, on the basis that the safety case for the NRU reactor remains unchanged, and amends the licence to remove licence condition 16.3. The Commission is also satisfied that CNL has appropriate plans in place to maintain safe standby Mo-99 production capability during the period between November 1, 2016 and March 31, 2018.

### **3.2 Human Performance Management**

47. Human performance management encompasses activities that enable effective human performance through the development and implementation of processes that ensure licensee staff is 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 CNL's performance in this SCA as "satisfactory".
48. The Commission assessed the information provided by CNL and CNSC staff regarding the improvements made to human performance in operations and the maintenance of the required number of certified staff at CRL. CNL submitted that, during the current licence period to date, it had ensured that adequate numbers of trained and qualified staff were available to manage, operate and maintain all parts of CRL including the NRU reactor. CNSC staff submitted that CNL implemented a formally documented human performance program during the current licence period. Based on the information provided, the Commission is satisfied that human performance management by CNL was adequate, with continuous improvements regularly implemented.

#### *3.2.1 Training*

49. The Commission considered the information submitted by CNL and CNSC staff regarding radiation protection training at CRL. CNL submitted that it had made significant improvements to its radiation protection training program following a 2013 CNSC inspection that identified that the program was not compliant with the processes and procedures under CNL's systematic approach to training (SAT) model. CNSC staff confirmed that CNL had developed a corrective action plan that was approved by CNSC staff and that CNL had improved its program since the 2013 inspection.
50. The Commission enquired about the length of time it took to implement the SAT-based radiation protection training program at CRL. The CNL representative responded that SAT-based training programs required a large amount of documentation and provided the Commission with details on the development of this documentation. The CNL

representative also noted that the SAT-based radiation protection program would be completed by the end of April 2016. CNSC staff confirmed this information to the Commission's satisfaction.

### *3.2.2 Examination and Certification*

51. CNSC staff submitted that CNL continued to maintain appropriate levels of certified staff to support safe NRU reactor operations. The Commission enquired about minimum requirements for qualified and certified staff at CRL. CNSC staff provided the Commission with additional information on this matter and explained that requirements for both the minimum number of certified and qualified staff at CRL was met throughout the licence period to date.
52. The Commission enquired about the process used for qualification of CNL staff. CNSC staff responded that the licensee was required to have training programs for site staff and that the licensee qualified its staff through an internal qualification process. The Commission was satisfied with the information provided in this regard.

### *3.2.3 Human Factors*

53. The Commission examined information submitted by CNL and CNSC staff in regard to procedural adherence, error identification, other human factors and the possibility of staff attrition due to the pending end of operation of the NRU reactor. CNL provided the Commission with information regarding initiatives that were undertaken to support CRL staff throughout the transition to the GoCo business model and the pending shutdown of the NRU reactor. CNL submitted that staff attrition had been recognized as a risk to the organization and that CNL had put in place several strategies to facilitate open and effective communication between workers and management. CNL also provided information about the "Retain, Retrain and Redeploy" initiative, aimed to position affected employees for ongoing and future employment throughout the operational transition.
54. The Commission enquired about the number of employees that would be affected by the end of operation of the NRU reactor and about the extent to which labour and union representatives were involved in the retraining and redeployment initiatives. The CNL representative responded that approximately 500 employees would be affected by the end of operation of the NRU reactor, with several unions representing these employees. The CNL representative noted that, in general, NRU reactor operations would not change significantly during the proposed licence period; however, some operations such as fuel fabrication and Mo-99 production would see a decrease in operations. The CNL representative further stated that CNL was committed to working with the unions to finalize the retraining and redeployment options, and to ensure the retention of critical NRU facility staff.



55. In reference to the intervention from Women in Nuclear Canada, the Commission enquired about the assertion that staff attrition related to the end of operation of the NRU reactor could have a more significant impact on female workers. The CNL representative responded that all programs for employee retention, retraining and redeployment were offered equally to all CNL employees, regardless of gender. The Commission was satisfied with the information provided on this matter, and encourages CNL to maintain a dialogue with Women in Nuclear Canada on their concerns in this regard.

#### *3.2.4 Conclusion on Human Performance Management*

56. Based on its consideration of the information presented, the Commission concludes that CNL has appropriate programs and improvement plans in place and that current efforts related to human performance management provide a positive indication of CNL's ability to adequately carry out the activities for the extended period of the licence. The Commission expects that CNL proactively continues with its efforts in this SCA and that identified deficiencies are resolved before the next licence renewal hearing.
57. Based on the information presented, the Commission is satisfied that CNL has, and will continue to have, an adequate radiation protection training system in place. The Commission expects CNL to continue implementing adequate SAT-based training programs at CRL throughout the proposed licence period.
58. The Commission considered the information provided by CNL and CNSC staff and is satisfied that the minimum requirements for qualified and certified staff are being met at CRL. The Commission is satisfied that CNL has adequate measures in place to minimize staff attrition due to the pending end of operation of the NRU reactor.

### **3.3 Operating Performance**

59. The Commission assessed operating performance at CRL, 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. Throughout the current licence period, CNSC staff rated CNL's performance in the operating performance SCA as "satisfactory".

#### *3.3.1 Conduct of Licensed Activity*

60. The Commission examined the conduct of licensed activities at CRL and the information submitted by CNL and CNSC staff regarding governing documents for operating facilities, facilities in storage-with surveillance and facilities undergoing

active decommissioning. CNSC staff submitted that its assessments showed that CNL was conducting licensed activities at CRL in compliance with the CRL licensing basis.

61. CNL submitted that, during the proposed licence period, the NRU reactor would continue to produce medical and industrial isotopes, with increased production of Co-60 during the remaining life of the NRU reactor. CNSC staff confirmed that these licenced activities were within CNL's current licensing basis.
62. The Commission examined CNL's progress on updating the NRU reactor operating manuals, one of the activities identified in the NRU reactor Integrated Implementation Plan (IIP). CNSC staff submitted that, although CNL had originally committed to fully updating the NRU reactor operating manuals by March 2014, this project was significantly delayed, and that CNL had revised the completion date to June 2017.
63. The Commission expressed its displeasure that CNL had encountered a 27-month delay in the updating of the NRU reactor operating manuals and enquired about whether this delay might give rise to a safety concern. The Commission noted that updating operating manuals should be a routine activity. With the upcoming end of operation of the NRU reactor in 2018, the Commission questioned the viability of such a delayed update. The CNL representative responded that CNL had identified sufficient benefit in continuing the NRU reactor operating manuals update. CNSC staff confirmed the information provided by CNL and stated that the delay in this project did not represent a safety concern. CNL had appropriate operating procedures in place for the NRU reactor, and this project included ongoing updates to improve them.
64. Mr. F. Boyd, in his intervention, enquired about whether CNSC staff conducted compliance activities across the whole CRL site during the current licence period. The Commission requested clarification on this matter. CNSC staff responded that compliance activities were conducted across the whole CRL site.

### *3.3.2 Reporting and Trending*

65. The Commission reviewed the information submitted for this hearing in regard to reportable events from 2011 to 2014, and preliminary information on reportable events for 2015. CNSC staff submitted that an overall downward trend for reportable events was observed for CRL, from 223 events to 111 events in 2014, and 93 events in 2015, and that no significant safety concerns were identified. CNSC staff further submitted that its review of CNL's annual compliance monitoring and operational performance reports for CRL did not identify any significant regulatory issues.
66. The Commission enquired about how the downward trend in the number of reportable events at CRL was achieved. The CNL representative provided the Commission with additional information about reportable events at CRL, noting that CNL had achieved an improvement in its lost-time incident (LTI) rates. CNSC staff reported that, in addition to CRL site improvements leading to fewer reportable events, the introduction

of the LCH provided greater clarity on what was considered a reportable event, leading to this decrease. The Commission was satisfied with the information provided in this regard, noting that, although a low number of reportable events were desirable, it was important to continue to report events as this process was important in order to maintain a healthy safety culture within the organization.

### 3.3.3 NRU Reactor Extended Outages and Removal of Licence Condition 16.1

67. The Commission considered CNL's request to remove licence condition 16.1 from its current licence. Licence condition 16.1 of the current licence reads:

*The licensee shall implement extended outages of the NRU Reactor for the purpose of performing maintenance, inspection, repair and replacement activities, including in-service inspections of the reactor vessel, which cannot be completed during regular outages.*

This licence condition was imposed on CRL by the Commission during the 2011 licensing decision.

68. The Commission examined the detailed information provided by CNL regarding the work that had been performed during the NRU reactor extended outages throughout the current licence period and CNSC staff's assessment of this work. CNL reported that, during the extended outages, it had performed vessel inspections and many of the major equipment replacements that were required under the IIP. CNL also reported that no projects requiring more than a two-week outage remained to be completed; on this basis, CNL was of the opinion that month-long extended outages were no longer the optimal approach for maintaining the NRU reactor. CNSC staff reported that it had assessed CNL's performance during all of the extended outages since 2011 and that it was of the opinion that CNL had demonstrated continuous improvements in the execution of extended outages throughout the licence period.
69. CNL submitted to the Commission a revised outage strategy in support of its request to remove licence condition 16.1. The Commission assessed this revised outage strategy. CNL submitted that work activities planned for the NRU reactor until March 31, 2018 required, at most, a two-week outage. CNL reported that the revised schedule would increase the frequency of the two-week outages, would provide CNL with four opportunities annually, instead of one, to complete activities requiring longer duration outages, would improve the effectiveness of regular outages, and would provide many safety benefits. CNSC staff provided the Commission with information regarding its review of CNL's modified outage schedule and reported that it was of the opinion that annual extended outages, and therefore licence condition 16.1, were no longer necessary. CNSC staff confirmed that all of the planned NRU reactor work activities could be completed in a two-week outage and that the proposed outage schedule provided more flexibility for maintenance work. CNSC staff also confirmed that, should any safety significant work arise, it would continue to be completed immediately regardless of the outage schedule. On this basis, CNSC staff

recommended that the Commission accept CNL's request to remove licence condition 16.1 from the CRL operating licence.

70. The Commission enquired about the appropriateness of the removal of licence condition 16.1 from the proposed licence in consideration of CNL's "below expectations" rating in the fitness for service SCA (further discussed in section 3.6 of this *Record of Decision*). The CNL representative responded that, under the proposed outage schedule, CNL would be able to perform maintenance work more effectively than under the currently-mandated one-month outage schedule. CNSC staff confirmed the information provided by CNL and noted that, although CNL proposed to remove licence condition 16.1 from its operating licence, the LCH would include clear criteria regarding the CNSC's expectations for NRU reactor outages.
71. The Commission further enquired about whether the proposed outage schedule was too prescriptive. The CNL representative responded that an outage schedule was important for operational planning purposes and would provide clarity on CNSC regulatory expectations. CNSC staff confirmed the information provided by CNL and stated that, if CNL needed to make a change to the outage schedule, CNL would have to inform CNSC staff before the change, with CNSC staff ensuring that regulatory expectations continued to be met. The Commission was satisfied with the information provided in this regard.
72. In response to an intervention from the Concerned Citizens of Renfrew County, the Commission enquired about whether an increased frequency in reactor shutdowns and start-ups presented any risks to the NRU reactor. The CNL representative responded that the frequency of shutdowns and start-ups was considered during the design of the proposed outage schedule; however, this was found to be a minor consideration with very little associated risk. The Commission is satisfied that the increased outage frequency will not present unreasonable additional safety risks to the NRU reactor.

#### *3.3.4 Conclusion on Operating Performance*

73. Based on the above information, the Commission concludes that the operating performance at the facility during the current licence period provides a positive indication of CNL's ability to carry out the activities under the proposed licence.
74. On the basis of its review of the above information, the Commission is satisfied that CNL will continue to ensure appropriate reporting and trending of the licensed activities at CRL.
75. The Commission amends the CRL operating licence by removing condition 16.1 as it is satisfied that the modified outage schedule proposed by CNL is adequate to ensure that maintenance activities and the work required to be executed under the IIP are

conducted as necessary. The Commission recommends that an outage schedule be satisfactorily described in the LCH to ensure clear communication of CNSC regulatory expectations to CNL in this regard.

### 3.4 Safety Analysis

76. The Commission examined the information submitted by CNSC staff and CNL in regard to safety analysis at CRL. Safety analysis is a systematic evaluation of the potential hazards associated with the conduct of a proposed activity or the operation of a facility, and considers the effectiveness of preventive measures and strategies in reducing the effects of such hazards. It supports the overall safety case for the facility. During the current licence period, CNSC staff rated CNL's performance in this SCA as "satisfactory". CNSC staff submitted to the Commission that the overall safety case for the CRL facility remained unchanged from that approved by the Commission in 2011.
77. The Commission considered the Safety Analysis Report (SAR) for the safety analyses that were performed for the CRL Class II nuclear facilities, radioisotope laboratories and other locations where nuclear materials were used. CNSC staff reported that, through the IIP and as required by the *Class I Nuclear Facilities Regulations*,<sup>8</sup> CNL completed the revision of the NRU reactor SAR on March 30, 2016; this revision incorporated the results of previously submitted analyses, including the NRU reactor probabilistic safety assessment (PSA). CNSC staff submitted that it was of the opinion that the safety analyses demonstrated that the CRL facilities had adequate preventive measures and strategies in place to ensure the protection of workers, members of the public and the environment.
78. The Commission requested additional information about the NRU SAR and how the information presented in the SAR would be disseminated to the public. The CNL representative responded that the NRU SAR was a technical document that CNL did not post on its website. CNSC staff stated that the public was provided with facility safety analysis information through its annual *Regulatory Oversight Reports*. The Commission was satisfied with the information provided on this matter, but encourages CNL to provide SAR-related information should such data be requested by members of the public.

#### 3.4.1 Integrated Implementation Plan

79. The IIP was developed after an integrated safety review (ISR) was conducted for the NRU reactor in support of its licence renewal application in 2011 and based on the guidelines contained in RD-360, *Life Extension of Nuclear Power Plants*.<sup>9</sup> An ISR is analogous to a periodic safety review (PSR) and is an all-encompassing assessment of the NRU reactor design, condition and operation. In 2011, the ISR had provided the

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<sup>8</sup> SOR/2000-204.

<sup>9</sup> CNSC Regulatory Document RD-360, *Life Extension of Nuclear Power Plants*, February 2008.

Commission with the necessary information to assess the continued safe and reliable operation of the NRU reactor. The IIP was approved by the Commission as part of its 2011 licensing decision for CRL.

80. The Commission examined the validity of the NRU reactor ISR in relation to the current NRU reactor operation and the progress on IIP activities. CNSC staff provided the Commission with information about this matter, noting that the NRU reactor ISR was conducted with a 10-year scope, providing regulatory confidence that the NRU reactor safety case remained valid until 2021, as long as the IIP activities were carried out.
81. The Commission assessed the information provided by CNL and CNSC staff in regard to CNL's progress in implementing the NRU reactor IIP, which remained central to the safety case for continuous NRU reactor operation, and was used to determine corrective actions and improvements. CNL submitted information regarding the scheduling and completion of improvement activities identified in the IIP, noting that the IIP was progressing as scheduled, with 42 of 45 high-priority actions completed. CNL also submitted that changes to the scope of IIP Phase 2 work, originally scheduled from 2016 to 2021, were consistent with the Government of Canada's decision to end NRU reactor operation on March 31, 2018. CNL provided the Commission with information regarding the organizational structure that it had established to effectively execute the requirements of the IIP and reported that, to date, CNL had produced 12 quarterly IIP progress reports, four annual IIP reports and six IIP revisions. CNL also provided the Commission with detailed information on significant IIP achievements resulting from IIP Phase 1 and its plans and commitment for the implementation of IIP Phase 2, noting that further IIP reporting would consider only Phase 2 activities and any unfinished Phase 1 activities. CNSC staff confirmed the information provided by CNL. CNSC staff reported that it had assessed CNL's execution of the IIP through desktop reviews and on-site inspections, and that no safety significant concerns had been identified.
82. The Commission assessed the information provided by CNL and CNSC staff in regard to IIP Phase 2 activities remaining to be completed before March 2018. CNL submitted that it had provided CNSC staff with CNL's assessment of Phase 2 activity reprioritization in light of the March 2018 end of operation of the NRU reactor. CNSC staff confirmed that CNL had provided it with this information, which included the identification of the 152 Phase 2 activities that were necessary to be completed for continued safe operation until March 2018. CNSC staff determined that CNL's analysis, which focused on the safety and operational significance of Phase 2 activities, was adequate to ensure that all safety significant activities were appropriately addressed; therefore, CNSC staff accepted CNL's resubmission of the IIP Phase 2 plans.
83. CNSC staff brought the Commission's attention that licence condition 16.2 should be modified in order to ensure continuous reporting on the progress of the improvements

identified the NRU reactor ISR and the IIP status throughout the proposed licence period. Currently, licence condition 16.2 reads

*The licensee shall progress to completion the improvements identified during the NRU Reactor Integrated Safety Review, and shall report the status to the Commission annually starting October 31, 2012 through October 31, 2015.*

Taking into account the proposed licence renewal to March 31, 2018, CNSC staff recommended that licence condition 16.2 be amended to

*The licensee shall progress to completion the improvements identified during the NRU Reactor Integrated Safety Review, and shall report the status to the Commission annually starting October 31, 2012 through **October 31, 2017.***

#### 3.4.2 Conclusion on Safety Analysis

84. On the basis of the information presented on the record for this hearing, 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 CRL facility and the activities under the proposed licence. The Commission finds that CNL has adequate preventive measures and strategies in place at CRL to ensure the protection of workers, members of the public and the environment and that the facilities at CRL meet safety requirements.
85. The Commission is satisfied that the ISR for the NRU reactor conducted before the licensing hearing in 2011 remains valid and finds that the progress on IIP activities throughout the licence period was satisfactory. The Commission is satisfied that the identified IIP Phase 2 activities remaining to be completed during the proposed licence period are adequate. The Commission is also satisfied that the revised IIP Phase 2 is appropriate, on the basis that the NRU reactor will cease operation on March 31, 2018.
86. The Commission considered the proposed amendments of licence condition 16.2. The Commission modifies CNSC staff's recommendation and amends licence condition 16.2 from

*The licensee shall progress to completion the improvements identified during the NRU Reactor Integrated Safety Review, and shall report the status to the Commission annually starting October 31, 2012 through October 31, 2015.*

to

*The licensee shall progress to completion the improvements identified during the NRU Reactor Integrated Safety Review, and shall report the status to the Commission **every three months.***

This licence condition shall be renamed licence condition 16.1.

87. The Commission expects CNSC staff to maintain adequate regulatory oversight during the implementation of the IIP and to also provide updates to the Commission on the progress of IIP activities, as required.

### **3.5 Physical Design**

88. The Commission considered the physical design of facilities at CRL, 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 CNL's performance in this SCA as "satisfactory" throughout the current licence period.
89. The Commission assessed the information submitted by CNL and CNSC staff in regard to changes to design documentation, which included lessons learned from the Fukushima Daiichi accident. CNSC staff reported that it had verified CNL's physical design programs through desktop reviews and inspections, and was of the opinion that CNL continued to meet regulatory expectations in this SCA.
90. In its intervention, the Concerned Citizens of Renfrew County expressed concerns about back-up power reliability for the NRU reactor U-2 experimental loop. The Commission requested additional information about this matter and whether this could be a safety concern. The CNL representative provided the Commission information about the U-2 experimental loop and explained that a back-up power supply in the event of a loss of site power was available at all times. CNSC staff confirmed the information provided by CNL, noting that CNSC staff had confirmed that the U-2 experimental loop had back-up power available via diesel generators and that there were no safety concerns with this system. The Commission is satisfied that appropriate back-up power supply is available to the U-2 experimental loop.
91. The Commission concludes that, on the basis of the information presented for this hearing, the physical design of facilities at CRL 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 facilities at CRL.

### **3.6 Fitness for Service**

92. Fitness for service covers activities that are performed to ensure that the systems, structures and components at CRL continue to effectively fulfill their intended purpose. CNSC staff rated CNL's performance in this SCA as "below expectations" throughout the current licence period. CNSC staff noted, however, that CNL had demonstrated significant improvement in fitness for service since 2011 and that CNL was progressing towards a "satisfactory" rating in this SCA.



93. The Commission reviewed the information submitted by CNL and CNSC staff regarding the reasons for the below expectations rating in this SCA and the improvements that CNL had made to fitness for service at CRL during the current licence period. CNL submitted that, during the proposed licence period, there would be continued implementation of programs to ensure adequate aging management, equipment reliability, system health and inspections. CNSC staff submitted that improvements at CRL included a reduction in maintenance backlog and improvements to site-wide infrastructure. Although the Commission acknowledged that improvements in fitness for service at CRL had been made during the current licence period, the Commission expressed its dissatisfaction with CNL's performance meriting the below expectations rating for this SCA, especially since CNL had started the current licence period with this rating.
94. CNSC staff provided the Commission with additional information regarding the challenges with fitness for service at CRL, noting that the whole CRL site was considered in this SCA, not just the NRU reactor, and that the age of the site-wide infrastructure at CRL contributed to these challenges. CNSC staff reported that CNL was aware of CNSC expectations for this SCA and stated that the challenges related to fitness for service included programmatic and infrastructure improvements that required time to be fully implemented. CNSC staff reported that, although safety and control measures implemented by the licensee that are not yet as effective as CNSC staff would expect, CNL was taking appropriate corrective actions. CNSC staff stated that it is satisfied that CNL is on the path towards a satisfactory rating, emphasizing that it had ensured that at no time during the current licence period had safety been compromised at CRL.
95. The Commission enquired about the fitness for service of only the NRU reactor and whether it could be rated as "satisfactory". CNSC staff responded that CNSC ratings included a combination of factors for the whole CRL site, not just the NRU reactor, and also considered the maturity of the site's programs. CNSC staff noted that, since many of the early IIP activities included significant improvements to the NRU reactor, its fitness for service and related programs had greatly improved during the current licence period. CNSC staff also provided details regarding challenges that were presented by the NRU reactor's historical designs and related engineering changes.
96. In reference to the Canadian Environmental Law Association's intervention and recommendation that CNL should be required to attain a "satisfactory" rating in the fitness for service SCA, the Commission requested additional information on how this concern was being addressed. The CNL representative provided information about the many initiatives that CNL had in place to improve its performance in this SCA. The CNL representative also discussed the challenges that it faced with the maintenance of older equipment and noted that the inspection programs had been greatly improved during the current licence period. The CNL representative explained that, although its programs were approaching best industry practices, it would typically take several years to achieve a fully implemented and mature program. CNSC staff provided the

Commission with information regarding the historical and current tracking of equipment health; maintenance improvements through increased outages; challenges related to aging effects; and the implementation of program improvements. CNSC staff noted that there was a clear upward trend in fitness for service at CRL. The Commission is satisfied with the information provided by CNL and CNSC staff in regard to the intervenor's recommendations.

97. The Commission expresses its dissatisfaction with CNL's below expectations rating for the fitness for service SCA. The Commission considered the information presented by CNL and CNSC staff, and is of the opinion that, although fitness for service at CRL is rated as "below expectations", CNL is applying the appropriate corrective actions and is headed towards a satisfactory rating. Furthermore, based on the information presented by CNL and CNSC staff, the Commission is satisfied with CNSC staff's assessment in regard to this SCA, and is of the opinion that safety has not been and will not be compromised at CRL during the extended period of the licence.

### *3.6.1 Maintenance*

98. The Commission examined the information provided by CNSC staff regarding the maintenance program at CRL and the improvements made to the program. CNL submitted that, during the current licence period, a reduction of corrective maintenance was achieved and that IIP activities improved NRU fitness for service. CNSC staff submitted that CNL's maintenance program met regulatory requirements, that there was a reduction in maintenance backlog for the NRU reactor and that safety significant maintenance activities were completed as scheduled. The Commission expects CNL to continue these maintenance program improvements at CRL.
99. The Commission enquired about the maintenance of fitness for service of the Mo-99 production facility after October 31, 2016. The CNL representative provided the Commission with details on how the Mo-99 facility would be maintained during the proposed standby production period. CNSC staff confirmed the information provided by CNL, noting CNSC expectations that CNL maintain the Mo-99 production facility fit for service throughout the proposed licence period. The Commission is satisfied with the information provided by CNL and CNSC staff in this regard.

### *3.6.2 System Health Program*

100. The Commission assessed the information provided by CNL and CNSC staff about the system health program that was introduced during the current licence period. CNL submitted that it had started the implementation of the system health program at CRL and that this program greatly improved its integrated plant life management processes. CNL also submitted that it intended to continue the implementation of the system health program throughout the proposed licence period. CNSC staff submitted that it had reviewed the governing documents for the system health program and had

conducted an inspection of program implementation, which determined that the program had not yet been fully implemented. CNSC staff was of the opinion that, although some key issues affecting system reliability and equipment safety were not yet fully addressed, CNL's partial implementation of the program was a sign of improvement. CNSC staff also reported that CNL had developed an action plan to address inspection findings and that this plan was accepted by CNSC staff.

### *3.6.3 Aging Management*

101. The Commission examined the information submitted by CNSC staff regarding CNL's aging management program, tracked under the IIP for the NRU reactor. CNL submitted that, during the current licence period, CNL had developed and began to implement an industry best practice Equipment Reliability Program for the NRU reactor and its support facilities, which would help monitor and mitigate aging related degradation. CNSC staff reported that, through a desktop review, it had determined that CNL's aging and obsolescence management program and plans met regulatory requirements. The Commission is satisfied with the information provided on this matter.

### *3.6.4 Structural Integrity*

102. The Commission assessed the information submitted by CNL and CNSC staff in regard to licence condition 7.1, which requires CNL to establish inspection programs to monitor the structural integrity of safety significant systems, components and civil structures. CNSC staff submitted that CNL had developed its programs using guidance from applicable CSA standards for CANDU nuclear power plants and that it was of the opinion that CNL's inspection activities were adequate to monitor component integrity. The Commission expects CNSC staff to continue monitoring CNL's implementation of the aforementioned programs.
103. The Commission also examined in-service inspection program results for the NRU reactor vessel and the information submitted by CNL and CNSC staff regarding its annual vessel monitoring assessment. CNL informed the Commission that, based on inspection results, it was confirmed that the NRU reactor vessel's corrosion allowance had not been consumed and that it remained fit for service. CNSC staff also reported that CNL's NRU reactor vessel annual inspection program had been reviewed and accepted by CNSC staff. CNSC staff was of the opinion that, throughout the current licence period to date, there had not been a measurable change to the integrity of the NRU reactor vessel and that it was satisfied that the integrity of the vessel would continue to be sound throughout the proposed licence period.

104. The Commission enquired about the integrity of the NRU vessel weld repairs that had been conducted in 2009 and 2010. CNSC staff responded that all of the welds had been inspected at least once since the repairs, which confirmed that there had not been any detectable changes to vessel weld integrity during the current licence period.
105. The Commission notes the concerns raised by the Canadian Environmental Law Association regarding NRU reactor vessel integrity and vessel corrosion due to nitric acid formation in the vessel annulus. In response to this intervention, the CNL representative responded that measurements of vessel thickness were conducted annually over the current licence period and that no measurable vessel corrosion had been detected. CNSC staff confirmed the information provided by CNL and did not have concerns regarding NRU vessel integrity during the proposed licence period. The Commission is satisfied with the information provided by CNL and CNSC staff in this regard.

#### *3.6.5 Conclusion on Fitness for Service*

106. Based on the information provided on the record for fitness for service at CRL, the Commission is of the opinion that CNL's performance in this SCA is improving and that CNL is working towards achieving a rating of "satisfactory". In this regard, the Commission is satisfied with CNL's programs for the inspection and life-cycle management of key safety systems. Based on the information presented, the Commission is also of the opinion that the "below expectations" rating in this SCA did not present a safety concern in the current licence period to date as it is only one element amongst many safety features; the rating does not represent a safety issue in this case but rather an area requiring improvement. Consequently, the Commission is satisfied that the "below expectations" rating in this SCA will not present a safety concern during the extended period of the licence, as long as improvements to CRL continue to be implemented.
107. The Commission, however, expresses its displeasure at CNL's below expectations rating in this SCA. With the upcoming end of operation of the NRU reactor, the Commission expects that CNL implements improvements to the NRU reactor's fitness for service as soon as practicable. Although the Commission recognizes that CNL expressed its dedication to achieving a "satisfactory" rating in fitness for service at CRL, the Commission fully expects that CNL achieves and maintains a "satisfactory" rating in all SCAs before returning to the Commission for a licence renewal hearing on this matter.
108. The Commission directs CNSC staff to provide updates on CNL's performance in the fitness for service SCA at every public meeting of the Commission until CNL achieves a satisfactory rating in this SCA. During the hearing, CNSC staff committed to providing the Commission with information on any deviations in CNL's progress regarding fitness for service at CRL and corrective actions that CNL would be required

to implement. The Commission is satisfied with this approach in this matter, and expects the LCH to provide detail on increased scrutiny of CNL's performance in the fitness for service SCA.

109. Based on the information that it considered as part of this hearing, the Commission is satisfied that CNL's system health program is adequate. The Commission expects CNL to continue the implementation of its system health program, with CNSC staff closely monitoring CNL's progress in completing the action plan developed to address the inspection findings. The Commission directs CNSC staff to provide updates on CNL's implementation of the system health program during regular fitness for service updates to the Commission.
110. On the basis of the information provided on the record, the Commission is satisfied with CNL's progress in aging management and with CNSC's staff's assessments in this regard. The Commission is also satisfied with CNSC staff's assessment that the NRU reactor vessel continues to be fit for service and expects CNL to continue to improve its implementation of the in-service inspection program.

### **3.7 Radiation Protection**

111. 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 CNL in the area of radiation protection. The Commission also considered the radiation protection program at CRL to ensure that both radiation doses to persons and contamination are monitored, controlled and kept as low as reasonably achievable (ALARA), with social and economic factors taken into consideration.
112. The Commission examined the information regarding CNL's radiation protection program. CNL provided the Commission with details about the improvements that were made to CRL's radiation protection program throughout the current licence period, including physical improvements to further reduce worker dose exposures. CNSC staff submitted that, although inspections of CNL's radiation protection program revealed areas for improvement, CNL's corrective actions in response to the findings were appropriate. CNL's redesign of the CRL radiological areas in 2014 better reflected the necessary control of radiation work at CRL.
113. CNSC staff submitted that, during the current licence period thus far, no worker at CRL received a radiation dose exceeding the regulatory dose limits as specified in the *Radiation Protection Regulations*.<sup>10</sup> CNSC staff also submitted to the Commission that doses to the public continue to be well below the regulatory public dose limit of 1 mSv/year.

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<sup>10</sup> SOR/2000-203.

114. 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 or will be in place to control radiation hazards, CNL provides adequate radiation protection to the health and safety of persons and the environment.

### **3.8 Conventional Health and Safety**

115. The Commission examined CNL's implementation of a conventional health and safety program, which covers the management of workplace safety hazards. This program is mandatory for all employers and employees in order to reduce the risks associated with conventional (non-radiological) hazards in the workplace. CNSC staff rated this SCA as "satisfactory" throughout the current licence period.
116. CNSC staff informed the Commission that, over the current licence period to date, CNL improved its conventional health and safety program with a focus on audits, self-assessments, effectiveness reviews, and health and safety inspections. CNSC staff also noted that the frequency and severity of LTIs showed a downward trend during the current licence period.
117. The Commission asked about whether the LTI statistics included contractors. The CNL representative responded that CNL's LTI statistics only included employees; however, the CNL representative provided the Commission with information on LTI rates for both employees and contractors. The CNL representative noted that if an employee or a contractor was seriously injured, the incident was reported to the CNSC. CNSC staff stated that LTI statistics for both employees and contractors were reported in the annual CNSC ROR. The Commission was satisfied with the information presented in this regard.
118. The Commission is satisfied that CNL recognized the importance of, and continued to implement, a comprehensive conventional health and safety program at CRL and expects CNSC staff to continue its monitoring activities through field verification and desktop reviews of quarterly health and safety reports.
119. Based on the information presented, the Commission is of the opinion that the health and safety of workers and the public were adequately protected during the operation of the facility for the current licence period, and that the health and safety of persons will also be adequately protected during the continued operation of the facility.

### **3.9 Environmental Protection**

120. Environmental protection covers CNL programs that identify, control and monitor all releases of radioactive and hazardous substances, and that minimize the effects on the environment which may result from the licensed activities. It includes effluent and

emissions control, environmental monitoring and estimated doses to the public. During the current licence period, CNSC staff rated CNL's performance in this SCA as "satisfactory".

121. The Commission examined CNL's environmental protection program at CRL which is comprised of effluent monitoring, environmental monitoring and groundwater monitoring. CNSC staff submitted that it had conducted inspections and desktop reviews of the CRL program, including conformance with CSA N288.4, *Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills*,<sup>11</sup> CSA N288.5, *Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills*,<sup>12</sup> and CSA N288.6, *Environmental risk assessment at Class I nuclear facilities and uranium mines and mills*,<sup>13</sup> and that no serious deficiencies had been identified.
122. In its intervention, the Concerned Citizens of Renfrew County expressed several concerns regarding CNL's environmental reporting practices and the availability of this information, and provided several recommendations including
- the production of a publicly accessible and detailed document regarding air emissions at CRL
  - the appropriate reporting and investigation of action level exceedances
  - the production and online posting of a detailed environmental monitoring report by CNL
  - an annual CNSC staff report on the performance of CNL

The intervenor also expressed concerns regarding CNL's environmental monitoring methodology. The Commission considered the recommendations from this intervenor and asked CNL to address this matter. The CNL representative provided the Commission with detailed information regarding its environmental monitoring methodology and its annual environmental monitoring report, noting that CNL also posted a monthly environmental performance report on its website. The CNL representative also reported that, although not all of CNL's environmental reports were available on its website, many were available to the public upon request. CNSC staff confirmed the information provided by CNL and stated that CNL was meeting environmental reporting licensing requirements. CNSC staff also noted that CNSC reporting on the performance of CNL is captured in CNSC's staff annual *Regulatory Oversight Report* on CNL's facilities. The Commission was satisfied with the information provided.

### 3.9.1 Effluent and Emissions Control

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<sup>11</sup> N288.4: Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills, CSA Group, 2010.

<sup>12</sup> N288.5: Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills, CSA Group, 2011.

<sup>13</sup> Environmental risk assessment at Class I nuclear facilities and uranium mines and mills, CSA Group, 2012.

123. The Commission examined effluent and emissions data for CRL indicating that CNL had not exceeded its release limits during the current licence period. CNSC staff also submitted that the tritium concentration in the Ottawa River near Petawawa, Ontario, the closest point of drinking water intake downstream of CRL, remained below 4 Bq/L throughout the current licence period, well below the 7,000 Bq/L Ontario Drinking Water Quality Standard for tritium.
124. The Commission considered the results from the CNSC's Independent Environmental Monitoring Program (IEMP) that were presented by CNSC staff. CNSC staff reported that the IEMP results confirmed that the public and the environment in the vicinity of CRL were safe and there were no health impacts from CRL activities. CNSC staff also submitted that the results of the IEMP were published on the CNL and CNSC websites.
125. The Commission noted the concerns raised by the Concerned Citizens of Renfrew County about the persistence of organically-bound tritium (OBT) and the intervenor's recommendation to update the CNSC's regulation of tritium releases. CNSC staff provided the Commission with information regarding the difference in dose consequence resulting from exposure to tritium versus exposure to OBT, noting that updated standards incorporated the latest research on this matter. CNSC staff informed the Commission that OBT exposure to members of the public and workers from CRL operations was very low; however, CNSC staff stated that changes to how the CNSC regulated OBT would be implemented should research indicate that this was required. CNSC staff also stated that the CNSC published two papers on this topic in 2015, and that research in this field was ongoing. The Commission is satisfied that it is adequately regulating releases of OBT.
126. In its intervention, the Concerned Citizens of Renfrew County also presented concerns and recommendations regarding air emissions from CRL. CNSC staff explained that air emissions from CRL were directly related to the activities conducted at the site; therefore, air emissions were higher during some years. CNSC staff provided information about the results from the CNSC's IEMP, which indicated that air emissions during 2015 corresponded to the activities conducted at CRL during that year and that they were well within regulatory limits. The Commission is satisfied with the explanation provided in regard to air emissions levels from CRL.
127. In its intervention, Northwatch recommended changes to the IEMP website. CNSC staff explained that the IEMP results presented a 'snapshot in time' of the contaminants in publicly accessible areas surrounding the facility. CNSC staff also provided information on the IEMP data collection methodology and how the sampling locations were selected. CNSC staff emphasized that the IEMP was a complementary program to CNL's environmental monitoring program and was not intended to replace it. Based on the information provided and its consideration of the matter, the Commission is satisfied that the CNSC website provides the public with adequate access to IEMP results.



### *3.9.2 Conclusion on Environmental Protection*

128. Based on its assessment of the applications and the information provided at the hearing, the Commission is satisfied that, given the mitigation measures and safety programs that are in place to control hazards, CNL will provide adequate environmental protection to the health and safety of persons and the environment. The Commission is also satisfied that CNL's compliance with its environmental protection program has been acceptable.
129. On the basis of the information presented on the record, the Commission is satisfied that effluents and emissions are adequately controlled at CRL. The Commission is also satisfied that the IEMP confirmed that the public and the environment near CRL are protected by CNL's environmental protection program.

### **3.10 Emergency Management and Fire Protection**

130. The Commission considered CNL's emergency management and fire protection measures that cover preparedness and response capabilities which exist for emergencies and for non-routine conditions at CRL. This includes nuclear emergency management, conventional emergency response, and fire protection and response. Throughout the current licence period, CNSC staff rated CNL's performance in this SCA as "satisfactory".
131. CNSC staff submitted that inspections of CNL's emergency management program showed that CNL continued to enhance its conventional and nuclear emergency preparedness and response capability at CRL. CNSC staff noted that, while some areas for improvement were identified, CNL was implementing appropriate corrective actions in this regard. The Commission expects that CNSC staff will continue to monitor the effectiveness of the identified improvements to CNL's emergency management program during the proposed licence period.
132. The Commission requested an update from provincial and municipal authorities on emergency planning in the municipalities near CRL. The Office of the Fire Marshal and Emergency Management (OFMEM) representative provided the Commission with detailed information regarding the emergency planning basis at CRL, stating that the primary planning zone of 9 kilometres (km) was set conservatively and was based on an independent study. The OFMEM representative further noted that additional work was being carried out to confirm the validity of the planning basis at CRL but that, at this time, it considered the current planning basis adequate. Additionally, the OFMEM representative stated that, since the NRU reactor operates at a much lower power and uses a different fuel type than CANDU reactors, the level of emergency planning for the NRU reactor could not be compared to emergency planning for CANDU power reactor sites.

133. The Commission requested additional information on how the planning basis for sheltering, evacuation and KI administration in the event of a severe accident at the NRU reactor was developed. The OFMEM representative stated that, based on the Health Canada *Canadian Guidelines for Intervention during a Nuclear Emergency*,<sup>14</sup> sheltering in place would be required within 8 km, evacuation would be required within 3 km and KI administration would be required within 1 km of the NRU reactor during an emergency. CNSC staff stated that it was of the opinion that, considering the current planning basis, the emergency preparedness measures implemented by CNL and the municipalities were adequate.
134. The Commission considered the emergency planning recommendations made by the Canadian Environmental Law Association. The CNL representative responded that many of the intervenor's recommendations for KI distribution had already been implemented and that public outreach was ongoing in both Ontario and Quebec. The CNL representative stated that the municipalities surrounding the CRL site had adequate emergency plans in place and that these plans considered the transient populations in the region. Representatives from the municipalities confirmed the information provided by CNL. CNSC staff stated that the recommendations for public education and outreach could be considered in the future in terms of continuous improvements efforts. The Commission was satisfied with the information provided in regard to this intervenor's recommendations.
135. The Commission requested clarification on how the Province of Quebec coordinated its emergency planning efforts with the Province of Ontario. The Sécurité civile representative responded that an emergency planning committee was established with the affected Quebec municipalities, as well as with the OFMEM and CNL, and that all groups were cooperating well in regard to emergency planning and notification.
136. The Commission enquired about the adequacy of public notification systems in the event of an emergency at CRL. The CNL representative submitted that CNL was working with surrounding municipalities to improve public notification systems. The Sécurité civile representative responded that, although the sirens from CRL were not very audible in Quebec and some challenges with emergency notification had been encountered, other notification systems were being considered for Quebec residents, including the possibility of disseminating emergency notifications through the national emergency notification system.

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<sup>14</sup> Health Canada, *Canadian Guidelines for Intervention during a Nuclear Emergency*, November 2003.

### 3.10.1 Potassium Iodide (KI) Distribution

137. The Commission examined CNL's collaboration with municipal and provincial authorities in both Ontario and Quebec in response to the 2014 Commission directive regarding the distribution and pre-stocking of potassium iodide<sup>15</sup> (KI) within the CRL primary and secondary zones.<sup>16</sup>
138. The Commission noted that several intervenors expressed concerns about emergency planning in the communities near CRL and suggested that KI should be pre-distributed in the secondary zone. The OFMEM representative explained that it had worked closely with CNL, the municipalities and CNSC staff during the successful KI distribution initiative. CNSC staff confirmed that the pre-stocking efforts in the secondary zone were comprehensive and that, based on the current planning basis, pre-distribution of KI tablets in the secondary zone was not necessary.
139. The Commission invited the OFMEM to address why the current emergency planning basis required KI administration only within 1 km of the NRU reactor. The OFMEM representative provided information about how the planning basis for KI administration was developed and how it differed from the planning basis development for other protective actions, such as sheltering and evacuation.
140. The Commission requested additional information regarding KI distribution and public outreach in the emergency planning zone in the Province of Quebec. The Sécurité civile representative responded that KI had been successfully pre-distributed to 37 permanent residents within the primary zone, with one resident declining the KI package. The Sécurité civile representative also explained that KI was available to non-permanent residents and that public outreach and education in this regard was ongoing.
141. The Commission asked the Direction de santé publique de l'Outaouais (DSPO) representative to provide additional details on emergency planning and KI distribution for Quebec residents. The DSPO representative explained the KI distribution approach in the CRL primary zone for both permanent and seasonal residents. The DSPO representative also explained that 30,600 KI tablets were pre-stocked in a single location but that planning was continuing to pre-stock the tablets in multiple locations to ensure their rapid distribution, if required. The DSPO representative noted that the rural nature of the secondary zone in Quebec provided challenges in the distribution of pre-stocked KI during an emergency and that the DSPO would finalize a strategy in this regard when updated information for the CRL planning basis was available.
142. The Commission enquired about whether municipal facilities such as schools, hospitals and long-term care centers had supplies of KI tablets. The Town of Deep River

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<sup>15</sup> *Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held on August 20 and 21, 2014*, e-Doc 4528070.

<sup>16</sup> For the purposes of emergency planning, the CRL "primary zone" is a 9-kilometre radius surrounding CRL's stack. The CRL "secondary zone" is a 50-kilometre radius surrounding CRL's stack.

representative confirmed that all municipal facilities had KI tablet supplies. The DSPO representative responded that the need to pre-stock KI in municipal facilities in Quebec would be evaluated when the updated planning basis was developed.

### *3.10.2 Fukushima Action Plan*

143. The Commission examined the information provided by CNL and CNSC staff for the Fukushima Action Plan (FAP) as it related to CRL. It should be noted that information on the FAP as it relates to safety analysis is found in section 3.4.
144. CNL provided the Commission with information regarding the work conducted at CRL for the FAP, noting that it had completed all actions ahead of schedule. CNSC staff confirmed that CNL had successfully closed all 22 Fukushima actions for CRL, including the
  - implementation of Severe Accident Management Guidelines (SAMGs) into CRL's emergency preparedness program
  - procurement of emergency mitigation equipment
  - installation of new instrumentation for in-reactor measurements

CNSC staff also noted that the implementation of the SAMGs exceeded CNSC staff's expectations.

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

145. Based on the information provided on the record for this hearing, the Commission concludes that the fire protection measures and emergency management preparedness programs in place, and that will be in place, at CRL are adequate to protect the health and safety of persons and the environment. The Commission also notes that it is satisfied that the emergency planning basis for CRL is adequate and expects CNSC staff, CNL, the OFMEM and the Sécurité civile to continue the work that is being conducted on this matter.
146. The Commission is satisfied with CNL's KI distribution efforts and expects public outreach and collaboration with the OFMEM, the Sécurité civile and the municipalities to continue throughout the proposed licence period to ensure that adequate emergency plans are maintained or are in place.
147. Based on the information, the Commission is satisfied that CNL has adequately closed the actions identified for CRL in the FAP.

### **3.11 Waste Management**

148. The Commission examined CNL's site-wide waste management program which identifies the requirements for radioactive and hazardous waste produced from CRL operations. CNSC staff evaluated CNL's performance in regard to waste minimization, segregation, characterization, and storage. This SCA also considered the planning for decommissioning activities at CRL. CNSC staff rated CNL's performance as "satisfactory" in this SCA throughout the current licence period.
149. CNL provided the Commission with information regarding future waste management programs and practices at CRL, noting that these were expected to continue at current levels, except for the commensurate waste reduction due to reduced Mo-99 production. CNL also submitted that, during the proposed licence period, it would continue to monitor and manage the status of various decommissioning and waste management projects at CRL.
150. The Commission considered information submitted by CNSC staff regarding waste management program inspections that had been conducted during the current licence period. Based on the information considered, the Commission is satisfied that CNL continued to comply with regulatory requirements throughout the licence period.
151. CNSC staff provided the Commission with information regarding CNL's proposed future waste management activities which could include the decommissioning of CRL facilities and buildings, and the construction of a Near Surface Disposal Facility. CNSC staff noted that CNL would have to submit separate applications for these activities. The Commission expects CNSC staff to continue discussions with CNL in regard to these activities and the related CNSC regulatory requirements, the licensing approach and environmental assessment requirements.
152. In response to an intervention from the Concerned Citizens of Renfrew County, the Commission requested information about CNL's proposed Near Surface Disposal Facility. The CNL representative provided the Commission with information about the proposed low-level waste facility. CNSC staff noted that this proposed facility was, at this time, planned to be licensed separately and that the intervenor's concerns could be considered at that later time. The Commission was satisfied with the information presented on this matter.
153. The Commission enquired about the feasibility of down blending highly enriched uranium as a waste management option, as noted in the intervention from the Concerned Citizens of Renfrew County. The CNL representative responded that the repatriation of highly enriched uranium waste to the United States was CNL's current preferred waste management option for this waste, noting that this decision was based on a high-level agreement between the Canadian and United States governments. The CNL representative also provided the Commission with information regarding other waste disposal options for highly enriched uranium. CNSC staff confirmed the information provided by CNL, noting that CNSC assessments had shown that the down

blending of uranium waste was not a feasible solution with respect to safety or the interests of the Canadian government. The explanations provided by CNL and CNSC staff satisfy the Commission on this matter.

154. In its intervention, the Concerned Citizens of Renfrew County raised concerns about
- legacy wastes at CRL, including the National Research Experimental (NRX) reactor vessel
  - the allocation of funding for the legacy waste liabilities
  - the proposals for their long-term management

The Commission invited the licensee to address this. The CNL representative provided the Commission with information on the NRX vessel and explained that CNL had detailed information, funding and management programs for all of its legacy wastes. The Commission is satisfied that CNL has appropriate programs in place for the management of legacy wastes.

155. The Commission considered the information provided on the record for this hearing in regard to CNL's waste management program and is satisfied that CNL is, and will continue to, safely manage waste and decommissioning activities at CRL.

### **3.12 Security**

156. The Commission examined CNL's security program 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>17</sup> and the *Nuclear Security Regulations*.<sup>18</sup> During the current licence period, CNSC staff rated CNL's performance as "satisfactory" in this SCA.
157. CNSC staff submitted that security inspections and desktop reviews had verified that CNL continued to effectively implement its security program, including the conduct of security drills every 30 days, and a comprehensive exercise every two years. CNSC staff noted that, although the inspections yielded some minor findings, these have been closed, and that action plans and corrective measures were being tracked.
158. CNSC staff reported that it continued to monitor CNL's investigation and response to the security event reported to the Commission in a closed session in January 2016. CNSC staff also reported that CNL was making progress in resolving the actions arising from this event. The Commission is satisfied with this update.

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<sup>17</sup> SOR/2000-202.

<sup>18</sup> SOR/2000-209.

159. The Commission expects that CNL will continue to implement the corrective measures that were identified during security program inspections and the improvements to its security program.
160. Based on the information examined, the Commission is satisfied that CNL's performance with respect to maintaining security at CRL has been acceptable and continues to meet regulatory requirements. The Commission concludes that CNL has made adequate provision for the physical security of the facility and is of the opinion that CNL will continue to make adequate provision for it during the proposed licence period.

### **3.13 Safeguards**

161. The Commission evaluated CNL's safeguards program. 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*.<sup>19</sup> Pursuant to the Treaty, Canada has entered into safeguards agreements with the International Atomic Energy Agency (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. During the current licence period, CNSC staff rated CNL's performance in this SCA as "satisfactory".
162. CNSC staff submitted that CNL continued to provide CNSC staff and the IAEA with full cooperation in all activities related to safeguards.
163. Based on the above information, the Commission is satisfied that CNL has adequately provided for, and will continue to adequately provide for, adequate measures in the areas of safeguards and non-proliferation at CRL that are necessary for maintaining national security and measures necessary for implementing international agreements to which Canada has agreed.

### **3.14 Packaging and Transport**

164. The Commission examined CNL's packaging and transport program. 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*<sup>20</sup> (PTNSR) and Transport Canada's

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<sup>19</sup> Information circular of the IAEA, INFCIRC/140, *Treaty on the Non-Proliferation of Nuclear Weapons (NPT)*, United Nations, 1970.

<sup>20</sup> SOR/2000-208.

*Transportation of Dangerous Goods Regulations*<sup>21</sup> for all shipments. Throughout the current licence period, CNSC staff rated CNL's performance in this SCA as "satisfactory".

165. CNSC staff submitted that CNL's radioactive material transportation program was inspected during the current licence period and that no findings were noted during the inspections. Based on this information, the Commission is satisfied that the transport of nuclear substances to and from CRL was performed, and will continue to be performed, in a safe manner.
166. CNSC staff informed the Commission that CNL's work to repatriate waste containing highly enriched uranium (HEU) to the United States, as committed to by the Government of Canada, continued to meet all regulatory requirements. CNSC staff provided the Commission with details of the HEU waste shipments made to date and also reported that the scope of the repatriation of HEU waste was expanded to include additional inventories of HEU materials, including those in liquid form stored in the Fissile Solution Storage Tank (FISST). The Commission expressed its satisfaction with the progress in the repatriation of HEU waste to the United States.

#### *3.14.1 Update to the Commission on the November 2015 Caddy Failure Event*

167. At the January 28, 2016 Commission Meeting,<sup>22</sup> CNSC staff reported to the Commission about an event that occurred at CRL in November 2015 involving the failure of a fuel caddy during the preparation of spent NRX fuel assemblies for transport to the United States as part of the HEU repatriation project. CNSC staff entered onto the record for these proceedings a memorandum updating the Commission on this event.<sup>23</sup>
168. CNSC staff provided the Commission with detailed information on the event, noting that
  - the fuel caddy failure occurred as a result of a faulty weld
  - further shipments following the event were halted
  - new caddies were procured
  - a corrective action plan was developed

CNSC staff also provided the Commission with a list of actions that CNSC staff took to follow-up on this event. CNSC staff reported that CNL's corrective action plan was satisfactory to prevent reoccurrence of this event; however, CNSC staff would increase its regulatory oversight in this area.

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<sup>21</sup> SOR/2001-286.

<sup>22</sup> *Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held on January 28, 2016*, January 2016, e-Doc 4998052.

<sup>23</sup> CNSC Memorandum, *Update to the Commission on the Caddy failure that occurred at the Canadian Nuclear Laboratories*, April 5, 2016, e-Doc 4957388.



169. The Commission enquired about the results of the root cause analysis conducted for this event. The CNL representative provided the Commission with information on the three root causes that were identified and stated that a detailed report from the event root cause investigation was provided to CNSC staff on April 1, 2016. The CNL representative further explained the corrective actions that were taken to address the identified root causes, including those in regard to proactive disclosure, which are discussed in greater detail in section 3.15.3 of this *Record of Decision*. The Commission is satisfied that, to date, CNL has appropriately identified and addressed the root causes of the caddy failure event.
170. The Commission requested more details in regard to the lessons learned and corrective actions resulting from the caddy failure event. The CNL representative provided a detailed explanation of corrective actions which included new inspection requirements for caddy manufacturing; CNL staff's presence during the caddy manufacturing process; CNL staff confirming the destruction of non-conforming caddies; and CNL staff ensuring that there were no events related to the shipments that were made using the non-conforming caddies. The CNL representative also stated that extensive quality assurance was conducted during the manufacturing process of the new caddies.

#### *3.14.2 Conclusion on Packaging and Transport*

171. The Commission considered the information on the record and is satisfied that, aside from the caddy failure event, CNL is meeting, and will continue to meet, regulatory requirements regarding packaging and transport.
172. Based on the information provided, the Commission is satisfied that most of the actions taken by CNL following the caddy failure event were appropriate in regard to the technical issues involved in the caddy failure event, and that the corrective action plan should prevent reoccurrence of this event. The Commission notes, however, that CNL's failure to report, as was required by the PTNSR, was not acceptable. The Commission expects CNL to report on any future events in a timely manner and as required in the regulations. The Commission also expects CNSC staff to maintain increased regulatory oversight in this area while the corrective actions are put into place.

### **3.15 Aboriginal Engagement and Public Information**

#### *3.15.1 Participant Funding Program*

173. The Commission assessed the information provided by CNSC staff regarding public engagement in the licensing process provided for by the Participant Funding Program (PFP). CNSC staff submitted that up to \$25,000 was made available through the PFP to assist Aboriginal groups, members of the public and other stakeholders to review

CNL's applications and associated documents, and to submit written interventions to the Commission. The deadline for applications was January 29, 2016.

174. CNSC staff reported to the Commission that the PFP applications were reviewed by the Funding Review Committee (FRC), which was independent of the CNSC, and that a total of \$14,710 in participant funding was awarded to the following three participants:
- Women in Nuclear
  - Concerned Citizens of Renfrew County
  - Canadian Environmental Law Association

These participants were, by virtue of the participant funding agreement, required to submit a written intervention for this public hearing.

175. In its intervention, the Canadian Environmental Law Association expressed concerns that only one week was provided for the preparation of PFP submissions after receiving notice of funding from the FRC. The Commission enquired about the appropriateness of this short timeline. CNSC staff explained that the timeline in this PFP process was not typical; a typical PFP timeline provided a funding recipient up to three months to prepare for a hearing. CNSC staff further explained that, although CNSC staff recognized that the timeline for the PFP offering would be short, it was decided that providing participant funding for this hearing was important. CNSC staff noted that not having a contribution agreement in place did not preclude an intervenor from starting the work for their intervention, nor did the PFP process in these proceedings prevent funding applications or interventions from being submitted. The Commission was satisfied with the information provided on the PFP application process for these proceedings.
176. In its intervention, the Concerned Citizens of Renfrew County expressed disappointment in the lack of accessibility of the CNSC public library. The Commission requested information about the CNSC public library. CNSC staff explained that the public needed to make a request to the CNSC prior to visiting the library. CNSC staff noted that, at the time that this intervention was submitted, the CNSC website had not been updated with this information; however, the website has since been updated. The Commission was satisfied with this information.
177. Based on the information regarding the PFP that was submitted by CNSC staff, the Commission concludes that Aboriginal groups, members of the public and other stakeholders have been encouraged to participate in the licensing process.

### *3.15.2 Aboriginal Engagement*

178. 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>24</sup>

179. CNSC staff informed the Commission that First Nation and Métis groups who may have an interest in this licence hearing included:

- the Algonquins of Ontario (Algonquins of Pikwàkanagàn)
- Kitigan Zibi Anishinabeg
- the Algonquin of Quebec (Algonquin Anishinabeg Tribal Council)
- the Métis Nation of Ontario

These groups were identified because they had previously expressed interest in being kept informed of CNSC-licensed activities that were being carried out in their asserted traditional territories. CNSC staff further submitted that letters of notification with information on the licensing process and PFP had been sent to the identified groups in November 2015, follow-up phone calls were conducted and that, to date, no issues were raised by the identified groups.

180. The Commission acknowledges the efforts made by CNSC staff in relation to Aboriginal engagement and consultation. The Commission is satisfied that the proposed licence amendment and renewal will not cause adverse impacts to potential or established Aboriginal or treaty rights and that the engagement activities undertaken for this licence renewal were adequate, given that no changes to the licensed activities have been requested.<sup>25</sup>

### 3.15.3 Public Information

181. The Commission examined CNL's public information and disclosure program (PIDP), a regulatory requirement for licence applicants and licensed operators of Class I nuclear facilities. The primary goal of the PIDP, as it relates to licensed activities, is 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".<sup>26</sup>

182. For this proceeding, the Commission considered whether CNL's PIDP met the specifications of RD/GD 99.3, *Public Information and Disclosure*.<sup>27</sup> CNSC staff provided the Commission with information about CNL's PIDP and submitted that it had assessed the PIDP against RD/GD 99.3. CNSC staff was of the opinion that CNL's

<sup>24</sup> *Constitution Act, 1982*, Schedule B to the *Canada Act 1982*, 1982, c. 11 (U.K.).

<sup>25</sup> *Rio Tinto Alcan v. Carrier Sekani Tribal Council*, 2010 SCC 43, [2010] 2 S.C.R. 650 at paras 45 and 49.

<sup>26</sup> *Class I Nuclear Facilities Regulations*, paragraph 3(j), SOR/2000-204.

<sup>27</sup> CNSC Regulatory Document RD/GD 99.3, *Public Information and Disclosure*, March 2012.

PIDP ensured that information about the health, safety and security of persons and the environment, and other issues associated with the lifecycle of its facilities were effectively communicated to the public.

183. The Commission noted the concern expressed by Northwatch in its intervention about the number of reportable events at CNL during the current licence period and that not all information regarding these reportable events was readily available to the public. CNSC staff reported that CNL was required to report to the CNSC in accordance with S-99, *Reporting Requirements for Operating Nuclear Power Plants*<sup>28</sup> and that, overall, reportable events had decreased at CNL during the current licence period. CNSC staff also explained that CNL was actively improving its proactive disclosure procedures and that not all reportable events were posted publicly on the CNSC or CNL websites; however, this information was available to the public upon request.
184. The Commission expressed its dissatisfaction with the proactive disclosure process at CNL and requested information about how CNL had improved its processes since the caddy failure event, which was also discussed in section 3.14.1. The CNL representative stated that, after the event, all CRL employees were informed about CNL's expectation that all events be communicated to senior management. The CNL representative confirmed CNL's commitment to transparency and the proactive disclosure of events that occurred at CRL. The CNL representative stated that, since the caddy failure event, CNL had engaged in improving its proactive disclosure processes, and details about this were provided to the Commission. The Commission is satisfied that CNL was satisfactorily addressing challenges with its proactive disclosure processes; however, the Commission emphasized the importance that the improved process was communicated to and adopted by all staff at CRL.
185. Based on this information, the Commission is satisfied that, overall, CNL's public information program meets regulatory requirements and is effective in keeping Aboriginal communities and the public informed of facility plans and operations. The Commission notes, however, that CNL needs to improve its proactive disclosure processes. The Commission encourages CNL to continue to create, maintain and improve its dialogue with the neighbouring communities. The Commission is also satisfied that CNL is taking appropriate steps in improving its public disclosure program.

### **3.16 Decommissioning Plans and Financial Guarantee**

186. The Commission requires that licensees have operational plans for decommissioning and long-term management of waste produced during the life-span of the facility. In order to ensure that adequate resources are available for safe and secure future decommissioning of CRL, the Commission requires that an adequate financial guarantee for the realization of planned activities is put in place and maintained in a form acceptable to the Commission throughout the licence period.

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<sup>28</sup> CNSC Regulatory Standard S-99, *Reporting Requirements for Operating Nuclear Power Plants*, March 2003.

187. The Commission considered whether the financial guarantees maintained by CRL were determined in accordance with G-219, *Decommissioning Planning for Licensed Activities*<sup>29</sup> and G-206, *Financial Guarantees for Decommissioning of Licensed Activities*.<sup>30</sup>
188. CNSC staff submitted that, although the management of CNL was contracted to CNEA, AECL retained ownership of CRL and all of its assets. Since AECL is a Schedule III, Part 1 Crown Corporation under the *Financial Administration Act*,<sup>31</sup> its liabilities are ultimately liabilities of Her Majesty in Right of Canada, recognized by the Federal Minister of Natural Resources.
189. The Commission is satisfied that the recognition of AECL's liabilities by the Federal Minister of Natural Resources is satisfactory and addresses the need for a financial guarantee.
190. CNSC staff reported that, during the current licence period, CNL applied for, and was granted, Commission approval to decommission several facilities at CRL, as required by its current licence.<sup>32</sup>
191. On the basis of the information provided, the Commission considers that the preliminary decommissioning plans and related Crown funding commitment are acceptable for the purpose of the current application for licence amendment and renewal.

### **3.17 Cost Recovery**

192. The Commission examined CNL's standing under the *Cost Recovery Fees Regulations*<sup>33</sup> (CRFR) requirements for CRL. 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.
193. CNSC staff submitted that CNL was in good standing with CRFR requirements for the CRL site and that, based on previous performance, CNSC staff was satisfied that CNL would continue payment of future cost recovery fees.

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<sup>29</sup> CNSC Regulatory Guide G-219, *Decommissioning Planning for Licensed Activities*, June 2000.

<sup>30</sup> CNSC Regulatory Guide G-206, *Financial Guarantees for Decommissioning of Licensed Activities*, June 2000.

<sup>31</sup> R.S.C., 1985, c. F-11.

<sup>32</sup> CNSC Records of Proceedings, Including Reasons for Decision – Canadian Nuclear Laboratories Limited, “Request for Approval to Decommission Two Facilities at Chalk River Laboratories”, May 21, 2015, e-Doc 4765763; “Request for Approval to Decommission to Facilities at Chalk River Laboratories”, March 28, 2013, e-Doc 4113183; and “Application to Approve the Decommissioning of the Plutonium Tower at the Chalk River Laboratories”, September 25, 2012, e-Doc 4012185.

<sup>33</sup> SOR/2003-212.

194. Based on the information presented, the Commission is satisfied that CNL has met the requirements of the CRFR for the purpose of its licence application.

### **3.18 Nuclear Liability Insurance**

195. The Commission examined CNL's compliance with subsection 15(1) of the *Nuclear Liability Act*.<sup>34</sup>
196. CNSC staff submitted information supporting that CNL had fulfilled and would continue to fulfill its obligations under the *Nuclear Liability Act* throughout the current and proposed licence periods.
197. Based on the information presented on the record for this hearing, the Commission is satisfied that CNL has fulfilled its obligation under the *Nuclear Liability Act*.

### **3.19 Licence Period and Conditions**

198. The Commission considered CNL's application for an extension of its current operating licence for a period of 17 months. CNSC staff recommended the renewal of the current operating licence until March 31, 2018, submitting that CNL was qualified to carry on the licensed activities that would be authorized by the licence.
199. The Commission considered CNL's licence amendment request regarding licence conditions 16.1, regarding NRU reactor outages. The Commission amends the licence by removing licence condition 16.1 and approves CNL's proposed NRU reactor outage schedule. The Commission suggests that the proposed outage schedule be detailed in the LCH to ensure that both CNL and CNSC staff have a clear understanding of CNSC regulatory expectations in this regard.
200. The Commission considered CNL's licence amendment request regarding licence conditions 16.3. The Commission approves CNL's plan for the future of the NRU reactor beyond October 31, 2016 in accordance with licence condition 16.3, on the basis that the safety case for the NRU remains unchanged. Therefore, the Commission amends the licence and removes licence condition 16.3.
201. To ensure continuous reporting on progress of the improvements identified the NRU reactor ISR and the IIP status throughout the proposed licence period, the Commission amends licence condition 16.2 by renaming it licence condition 16.1 and modifying it from:

*The licensee shall progress to completion the improvements identified during the NRU Reactor Integrated Safety Review, and shall report the status to the Commission annually starting October 31, 2012 through October 31, 2015.*

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<sup>34</sup> R.S.C., 1985, c. N-28.

to

*The licensee shall progress to completion the improvements identified during the NRU Reactor Integrated Safety Review, and shall report the status to the Commission every three months.*

202. 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 licence conditions that contain the phrase “a person authorized by the Commission” to the following CNSC staff:
- Director, Nuclear Laboratories and Research Reactors Division
  - Director General, Directorate of Nuclear Cycle and Facilities Regulation
  - Executive Vice-President and Chief Regulatory Operations Officer
203. The Commission enquired about when the LCH in the modernized format would be introduced for CRL. CNSC staff explained why it had determined that introducing the modernized LCH in subsequent licence renewals, rather than during this proceeding, would be more appropriate. The Commission was satisfied with the information provided in this regard.
204. The Commission recognized that many intervenors expressed support for the continued operation of CRL. They were of the view that CNL had operated CRL safely and would continue to do so in the proposed licence period.
205. The Commission also noted the concern expressed in several interventions regarding the adequacy of information provided in CNSC staff’s and CNL’s submissions. CNSC staff stated that the original licensing basis approved by the Commission in 2011 remained unchanged with this licensing request.
206. Several intervenors provided recommendations to the Commission and presented concerns about the licensed activities at CRL. CNSC staff confirmed that these matters would be considered in the context of a renewal hearing. The Commission is satisfied on this matter, but expects that, during future licence renewals, comprehensive information about the CNL’s performance, including reportable events, will be provided for the previous licence period, with forward-looking initiatives for the proposed licence period presented as well. The Commission emphasizes that it expects issues from the previous licence period to be resolved prior to future renewal hearings.
207. Based on the information examined by the Commission during the course of this hearing, the Commission is satisfied that a 17-month licence extension is appropriate for CRL. The Commission removes licence conditions 16.1 and 16.3. The Commission

amends licence condition 16.2, with changes as noted. The Commission also accepts CNSC staff's recommendation regarding the delegation of authority, and notes that CNSC can bring any matter to the Commission as required.

#### **4.0 CONCLUSION**

208. 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 written submissions provided by the participants at the hearing.
209. The Commission is satisfied that, given the mitigation measures and safety programs that are in place to control hazards, CNL provides adequate protection to the environment. The Commission notes that the NSCA provides a strong regulatory framework for environmental protection.
210. The Commission is satisfied that the applicant meets the requirements of subsection 24(4) of the *Nuclear Safety and Control Act*. That is, the Commission is of the opinion that CNL is qualified to carry on the activity that the proposed licence will authorize and that CNL 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.
211. Therefore, the Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, renews and amends the Canadian Nuclear Laboratories Limited Nuclear Research and Test Establishment Operating for Chalk River Laboratories located in Chalk River, Ontario. The renewed licence NRTEOL-01.00/2018 will be valid until March 31, 2018. The amendments take effect as of the date of this decision.
212. The Commission also accepts CNSC staff's recommendation regarding the delegation of authority in the LCH. The Commission notes that CNSC staff can bring any matter to the Commission. The Commission directs CNSC staff to inform the Commission on an annual basis of any changes made to the LCH.
213. The Commission amends the licence by removing licence condition 16.1 and approves CNL's proposed NRU reactor outage schedule. The Commission suggests that the proposed outage schedule be detailed in the LCH to ensure that both CNL and CNSC staff have a clear understanding of CNSC regulatory expectations in this regard.
214. Licence condition 16.2 is renamed to licence condition 16.1 and modified from:  
  
*The licensee shall progress to completion the improvements identified during the NRU Reactor Integrated Safety Review, and shall report the status to the Commission annually starting October 31, 2012 through October 31, 2015.*



to

*The licensee shall progress to completion the improvements identified during the NRU Reactor Integrated Safety Review, and shall report the status to the Commission every three months.*

215. The Commission approves CNL's plan for the future of the NRU reactor beyond October 31, 2016 in accordance with licence condition 16.3 on the basis that the safety case for the NRU remains unchanged. Therefore, the Commission amends the licence by the removal of licence condition 16.3.
216. With this decision, the Commission directs CNSC staff to provide annual reports on the performance of CNL, as part of an annual *Regulatory Oversight Report*. CNSC staff shall present these reports at public proceedings of the Commission, where requests to participate from members of the public can be filed.
217. The Commission expresses its displeasure at CNL's "below expectations" rating in the fitness for service SCA throughout the current licence period. The Commission fully expects that CNL will achieve and maintain a satisfactory rating in all SCAs before returning to the Commission for its next licence renewal hearing.
218. The Commission directs CNSC staff to present updates on CNL's performance in the fitness for service SCA at every public meeting of the Commission, until CNL achieves a satisfactory rating in this SCA. The Commission also directs CNSC staff to update the Commission on the status of the system health program during regular fitness for service updates, as per licence condition 16.1. The Commission instructs that the LCH include clarity of expectations of CNL's performance in the fitness for service SCA to ensure that CNL achieves a "satisfactory" rating in this SCA prior to any future licence renewal hearings.
219. The Commission requests that, in the future, if a licensee SCA rating is not "satisfactory" or above, that the Commission is provided with clear information regarding corrective actions being taken by the licensee to achieve a "satisfactory" rating, and the compliance verification activities being conducted by CNSC. The Commission also requests that it be provided with information on when a licensee would return to a "satisfactory" rating, should this situation arise.
220. The Commission directs CNSC staff to ensure that the glossary in the licence and LCH is aligned with REGDOC-3.6, *Glossary of CNSC Terminology*.



Michael Binder  
President,  
Canadian Nuclear Safety Commission

JUL 06 2016

Date

## Appendix A – Intervenors

<b>Intervenors</b>	<b>Document Number</b>
Town of Petawawa	CMD 16-H2.2
Township of Laurentian Valley	CMD 16-H2.3
John Yakabuski, MPP, Renfrew-Nipissing-Pembroke	CMD 16-H2.4
Frederick Boyd	CMD 16-H2.5
Canadian Environmental Law Association	CMD 16-H2.6
Canadian Nuclear Association	CMD 16-H2.7
Deep River Science Academy	CMD 16-H2.8
Town of Laurentian Hills	CMD 16-H2.9
Women in Nuclear Canada	CMD 16-H2.10
Cheryl Gallant, MP, Renfrew-Nipissing-Pembroke	CMD 16-H2.11
Canadian Nuclear Workers' Council	CMD 16-H2.12
Power Workers' Union	CMD 16-H2.13
Northwatch	CMD 16-H2.14
County of Renfrew	CMD 16-H2.15
Town of Deep River	CMD 16-H2.16
Concerned Citizens of Renfrew County	CMD 16-H2.17