



Canadian Nuclear
Safety Commission

Commission canadienne
de sûreté nucléaire

Record of Decision

In the Matter of

Applicant Canadian Nuclear Laboratories Ltd.

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

**Public Hearing
Dates** January 23-25, 2018

RECORD OF DECISION

Applicant: Canadian Nuclear Laboratories Ltd.

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

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

Application received: March 30, 2017

Dates of public hearing: January 23-25, 2018

Location: Best Western Pembroke Inn and Conference Centre,
1 International Drive, Pembroke, Ontario

Members present: M. Binder, Chair Mr. R. Seeley
Dr. S. Soliman Dr. S. Demeter
Dr. S. McEwan

Secretary: M.A. Leblanc
Assistant Secretary: K. McGee
Recording Secretary: S. Baskey, P. McNelles
Senior General Counsel: L. Thiele

Licensee Represented By	Document Number
M. Lesinski, President and Chief Executive Officer D. Cox, Vice-President Operations, Chief Nuclear Officer S. Cotnam, Senior Director Compliance, Chief Regulatory Officer, Chief Security Officer K. McCarthy, Vice-President – Research & Development K. Daniels, Vice-President of Health, Safety, Security and Environment K. Kehler, Vice-President of Decommissioning and Waste Management D. Preisig, Vice-President of Capital Projects and Engineering N. Mantifel, General Manager – NRU Reactor P. Quinn, Director of Corporate Communications G. Dolinar, Director of Radiation Protection, Environmental Protection Dosimetry J. Slade, Chief Engineer P. Moss, Senior Scientist	18-H2.1 18-H2.1A
CNSC staff	Document Number
R. Jammal, H. Tadros, J. LeClair, N. Tran, C. Cattrysse, C. Ducros, A. McAllister, M. James, K. Glenn, B. Torrie, R. Stenson, B. Legree, M. Rinker, K. Sauv�, R. Tennant, D. Saul and K. Jones	18-H2 18-H2.A 18-H2.B

Intervenors	Document Number
See appendix A	
Others	
Atomic Energy of Canada Limited: S. Quinn	
Office of the Fire Marshal and Emergency Management: D. Nodwell	
Sécurité civile pour la région de l'Outaouais: G. Lessard	
Environment and Climate Change Canada (ECCC): D. Kim	
CSA Group: S. Ho	

Licence: Renewed

Table of Contents

1.0	INTRODUCTION	1
2.0	DECISION	3
3.0	ISSUES AND COMMISSION FINDINGS	4
3.1	Environmental Assessment	5
3.1.1	<i>Application of the Canadian Environmental Assessment Act, 2012</i>	5
3.1.2	<i>NSCA Environmental Assessment</i>	5
3.1.3	<i>Conclusion on Environmental Assessments</i>	6
3.2	Management System	6
3.2.1	<i>Organization</i>	7
3.2.2	<i>Performance Assessment, Improvement and Management Review</i>	9
3.2.3	<i>Safety Culture</i>	10
3.2.4	<i>Conclusion on Management System</i>	11
3.3	Human Performance Management	11
3.3.1	<i>Personnel Training</i>	12
3.3.2	<i>Personnel Certification</i>	13
3.3.3	<i>Fitness for Duty</i>	14
3.3.4	<i>Conclusion on Human Performance Management</i>	14
3.4	Operating Performance	15
3.4.1	<i>Conduct of Licensed Activity</i>	15
3.4.2	<i>Reporting</i>	17
3.4.3	<i>Severe Accident Management and Recovery</i>	17
3.4.4	<i>Conclusion on Operating Performance</i>	18
3.5	Safety Analysis	18
3.5.1	<i>Deterministic Safety Analysis</i>	19
3.5.2	<i>Probabilistic Safety Assessment</i>	19
3.5.3	<i>Criticality Safety</i>	20
3.5.4	<i>Severe Accident Analysis</i>	21
3.5.5	<i>Conclusion on Safety Analysis</i>	21
3.6	Physical Design	22
3.7	Fitness for Service	23
3.7.1	<i>Equipment Fitness for Service</i>	24
3.7.2	<i>Maintenance</i>	24
3.7.3	<i>Aging Management</i>	25
3.7.4	<i>Structural Integrity</i>	26
3.7.5	<i>Chemistry Control</i>	26
3.7.6	<i>Periodic Inspection and Testing</i>	27
3.7.7	<i>Conclusion on Fitness for Service</i>	27
3.8	Radiation Protection	28
3.8.1	<i>Application of ALARA</i>	29
3.8.2	<i>Worker Dose Control</i>	29
3.8.3	<i>Radiological Hazard Control</i>	30
3.8.4	<i>Control of Dose to the Public</i>	30
3.8.5	<i>Conclusion on Radiation Protection</i>	31

3.9	Conventional Health and Safety	31
3.10	Environmental Protection.....	33
3.10.1	<i>Effluent and Emissions Control (Releases).....</i>	33
3.10.2	<i>Environmental Management System.....</i>	35
3.10.3	<i>Assessment and Monitoring</i>	36
3.10.4	<i>Environmental Risk Assessment.....</i>	38
3.10.5	<i>Fish Impingement and Entrainment and Fisheries Act Authorization</i>	41
3.10.6	<i>Protection of the Public</i>	42
3.10.7	<i>Conclusion on Environmental Protection.....</i>	43
3.11	Emergency Management and Fire Protection	44
3.11.1	<i>Conventional Emergency Preparedness and Response.....</i>	44
3.11.2	<i>Nuclear Emergency Preparedness and Response.....</i>	45
3.11.3	<i>Fire Emergency Preparedness and Response.....</i>	47
3.11.4	<i>Conclusion on Emergency Management and Fire Protection.....</i>	47
3.12	Waste Management	48
3.12.1	<i>Legacy Wastes.....</i>	51
3.12.2	<i>Conclusion on Waste Management.....</i>	52
3.13	Security	52
3.13.1	<i>Cybersecurity.....</i>	54
3.13.2	<i>Conclusion on Security</i>	54
3.14	Safeguards and Non-Proliferation	54
3.15	Packaging and Transport	56
3.16	Aboriginal Engagement and Public Information	58
3.16.1	<i>Participant Funding Program</i>	58
3.16.2	<i>Aboriginal Engagement</i>	59
3.16.3	<i>Public Information.....</i>	61
3.16.4	<i>Conclusion on Aboriginal Engagement and Public Information</i>	63
3.17	Decommissioning Plans and Financial Guarantee	64
3.18	Cost Recovery	65
3.19	Nuclear Liability Insurance.....	65
3.20	Licence Length and Conditions.....	66
4.0	CONCLUSION.....	70
APPENDIX A – INTERVENORS.....		A

1.0 INTRODUCTION

1. Canadian Nuclear Laboratories Ltd. (CNL) has applied to the Canadian Nuclear Safety Commission¹ for a 10-year renewal of its Nuclear Research and Test Establishment Operating Licence (NRTEOL) for the Chalk River Laboratories (CRL). The current operating licence, NRTEOL-01.00/2018, expires on March 31, 2018.
2. The CRL site is located approximately 160 km northwest of Ottawa, Ontario, with a total area of 37 km², including a built-up area of approximately 0.4 km². CRL has been in operation for more than six decades and represents the largest single complex within Canada's science and technology infrastructure. It is operated by CNL and produces medical isotopes, delivers various nuclear services and conducts a wide variety of research and development programs. CRL includes Class I and Class II facilities, as well as nuclear waste management facilities.
3. CRL is owned by Atomic Energy of Canada Limited (AECL), a federal Crown corporation. In 2013, the Government of Canada had announced its decision to engage a private contractor to manage the operations at CRL via a Government-Owned Contractor-Operated (Go-Co) business model.² In 2014, CNL was established as a wholly-owned subsidiary of AECL with the mandate to manage the operations of CNL. In 2015, the management of CNL was contracted to the Canadian National Energy Alliance (CNEA), completing the transition to the Go-Co model under which AECL retained ownership of all CRL assets and CNL remained the CNSC licensee.
4. In June 2017, up to \$75,000 in funding to participate in this licensing process was made available to Indigenous groups, not-for-profit organizations and members of the public through the CNSC's Participant Funding Program (PFP). A Funding Review Committee (FRC) – independent of the CNSC – recommended that up to \$72,199 in participant funding be provided to six applicants. These applicants were required, by virtue of being in receipt of the funding, to submit a written intervention and make an oral presentation at the public hearing commenting on CNL's application.

Issues

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

¹ 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.

² Announcement from Natural Resources Canada, “*The Harper Government Announces New Direction for Nuclear Laboratories*”, source: www.nrcan.gc.ca/media-room/news-release/2013/1773, February 2013.

- c) whether, 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.

Public Hearing

6. In making its decision, the Commission considered information presented for a public hearing held from January 23 to 25, 2018 in Pembroke, Ontario. The public hearing was conducted in accordance with the *Canadian Nuclear Safety Commission Rules of Procedure*.³ During the public hearing, the Commission considered written submissions and heard oral presentations from CNL (CMD 18-H2.1 and CMD 18-H2.1A) and CNSC staff (CMD 18-H2, CMD 18-H2.A and CMD 18-H2.B). The Commission also considered oral and written submissions from 88 intervenors (see Appendix A for a list of interventions). The hearing was webcast live via the CNSC website and video archives are available for at least a three-month period following the hearing. The written transcripts for the hearing have been made available on the CNSC website.

Mandate of the Commission

7. Several intervenors provided the Commission with information about the economic benefits of CRL as well as about its contributions to the advancement of science and technology in Canada. The Commission notes that, as the regulatory authority over nuclear matters in Canada, it has no economic mandate and will not base its decisions on the economic impact or research contributions of a licenced facility. It is the health, safety and security of the public, the protection of the environment, national security and the implementation of international obligations to which Canada has agreed that guide its decisions.
8. Multiple intervenors provided the Commission with information and views regarding the overall management structure of CNL through the Go-Co model. The Commission notes that the Go-Co model, as well as CNEA's management of CNL, is the policy and responsibility of AECL, and by extension the Government of Canada. As such, policy concerns over CNL's management structure would be outside of the Commission's mandate. The Commission wishes to make clear that CNL, as the enduring entity, is the CNSC licensee and therefore is responsible for ensuring that all activities at CRL are performed safely and in accordance with regulatory requirements, and as such CNL is held accountable by the CNSC for the conduct of the licenced activities at CRL. It is with these considerations that the Commission's decision in this matter is made.

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

Scope of this Licence Renewal Application and Public Hearing

9. The Commission wishes to make clear that the purpose of this public hearing is to consider the CNL's licence renewal application for CRL as it currently exists. It does not consider the development of future nuclear or waste management facilities, such as a near-surface disposal facility (NSDF), or the construction of a small modular reactor (SMR). These matters are outside the scope of this hearing and are not considered in the Commission's decision in this matter. Future known applications (NSDF) or other possible activities (SMRs) will be considered in future Commission proceedings. This application relates to continued conduct of activities that have been previously authorized, not new activities.

2.0 DECISION

10. 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 activities that the licence will authorize. The Commission is of the opinion that CNL, in carrying on those activities, 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,
11.

the Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, renews the Nuclear Research and Test Establishment Operating Licence issued to Canadian Nuclear Laboratories for its Chalk River Laboratories, located in Chalk River, Ontario. The renewed licence, NRTEOL-01.00/2028, is valid from April 1, 2018 until March 31, 2028.
12. The Commission wishes to make clear that the issuance of a 10-year licence does not decrease the regulatory requirements or CNSC expectations with respect to CRL, and that this licence may be amended, suspended or revoked at the discretion of the Commission.
13. With this decision, the Commission directs CNSC staff to report annually on the performance of CNL and CRL, as part of an annual *Regulatory Oversight Report* (ROR). CNSC staff shall present this report at a public proceeding of the Commission, where members of the public will be able to participate. The Commission encourages Indigenous groups and members of the public to participate in the proceedings considering the annual ROR.
14. The Commission directs that, at the mid-point of the 10-year licence period, CNL shall present to the Commission a comprehensive midterm update on its licensed activities at CRL. This midterm presentation will take place in a public Commission meeting in the vicinity of the community that hosts CRL. The Commission will plan to offer participant funding for this proceeding, to take place in 2023, as determined by the

Commission's scheduling for that year.

15. The Commission includes in the licence the conditions as recommended by CNSC staff in CMD 18-H2. The Commission also delegates authority for the purposes of licence condition 3.2, as recommended by CNSC staff.
16. The Commission considers the environmental review that was conducted by CNSC staff to be acceptable and thorough.
17. 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 Licence Conditions Handbook (LCH).
18. The Commission is satisfied with the level of Aboriginal engagement and consultation that was undertaken by CNL and CNSC staff in relation to this licence renewal. The Commission expresses its appreciation for the information provided by the intervenors representing Indigenous groups. The Commission heard much information about the ongoing and planned relationship-building and maintenance activities with Indigenous groups and requests the provision of information in relation to these relationships during future presentations to the Commission.
19. The Commission notes that, during their interventions, the Canadian Environmental Law Association and Northwatch requested that the record in this matter remain open to allow additional interventions after the public hearing held from January 23 to January 25, 2018. The Commission concluded that it had the necessary information in order to make a determination on this licence renewal application and closed the record without allowing additional submissions.

3.0 ISSUES AND COMMISSION FINDINGS

20. In making its licensing decision, the Commission considered a number of issues and submissions relating to CNL's qualification to carry out the licensed activities at CRL. The Commission also considered the adequacy of the proposed measures for protecting the environment, the health and safety of persons, national security and international obligations to which Canada has agreed.
21. The Commission examined CNSC staff's assessment of CNL's performance in all 14 safety and control areas (SCAs) and in relation to several other matters of regulatory interest over the current and previous licence periods. The Commission's consideration of information submitted by CNL in support of its licence renewal application, of CNSC staff assessments and of interventions submitted in relation to this matter are provided in the following sections of the *Record of Decision*.

3.1 Environmental Assessment

3.1.1 Application of the Canadian Environmental Assessment Act, 2012

22. In coming to its decision, the Commission was first required to determine whether an environmental assessment (EA) under the *Canadian Environmental Assessment Act, 2012*⁴ (CEAA 2012) was required.
23. The application submitted by CNL is for the CRL licence renewal and CNL is not requesting authorization for new projects or physical activities.⁵ The Commission notes that a licence renewal is not a designated project under CEAA 2012.
24. The Commission also notes that eleven EAs had been completed under federal processes for licensed nuclear facilities and activities at CRL since 2000 under the *Canadian Environmental Assessment Act, 1992*⁶ (CEAA 1992). The Commission further notes that all follow-up monitoring programs associated with these EAs have been followed and reported on.
25. An EA under CEAA 2012 for the NSDF project is currently being carried out at CRL site. The Commission, as the Responsible Authority for this EA, will make decisions on the NSDF in due course, following processes under CEAA 2012 and the NSCA.
26. Based on the information provided for this hearing, the Commission is satisfied that an EA under CEAA 2012 was not required in regard to this licence renewal.

3.1.2 NSCA Environmental Assessment

27. The Commission considered the completeness and adequacy of the EA that CNSC staff conducted under the NSCA for this licence renewal. CNSC staff findings included, but were not limited to:
 - CNL's environmental programs during the current and previous licence periods met CNSC regulatory requirements.
 - The methodology of CNL's site-wide ERA was in compliance with the applicable standards, CNSC staff found the findings acceptable and expects an updated ERA at the end of 2018 in accordance to the 5-year ERA cycle.
 - The results of the CNSC's 2012, 2013 and 2015 Independent Environmental Monitoring Program (IEMP) confirmed that the public and the environment near the CRL site were protected from releases from CRL.

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

⁵ "Projects" as defined in section 66 of CEAA 2012.

⁶ S.C. 1992, c. 37.

28. Based on the EA conducted under the NSCA for this licence application, CNSC staff submitted that CNL had made, and would continue to make, adequate provision for the protection of the environment and the health and safety of persons throughout the proposed licence period.
29. The Commission is satisfied that the environmental assessment that was conducted by CNSC staff for the CRL licence renewal was acceptable and thorough. The Commission notes that the NSCA provides a strong regulatory framework for environmental protection. Whether an EA under CEAA 2012 is required or not, the NSCA and its regulations provide for the protection of the environment and the health and safety of persons.

3.1.3 Conclusion on Environmental Assessments

30. Based on the information provided for this hearing, the Commission concludes that an EA under CEAA 2012 is not required and that an EA conducted under the NSCA and its regulations was appropriate for the CRL licence renewal application. Further, the Commission is satisfied that CNL has made, and will continue to make, adequate provision for the protection of the environment throughout the proposed renewed licence period.

3.2 Management System

31. The Commission examined CNL's Management System which is a framework of processes, programs and practices required at CRL to foster a healthy safety culture, to achieve safety objectives and ensure continuous monitoring of performance against those objectives. CNSC staff rated CNL's performance in this SCA as “below expectations” in 2012 and as “satisfactory” from 2013 to 2017.⁷
32. CNL submitted information to the Commission regarding the improvements it had made to its management system over the current and previous licence periods. CNL reported that, following the 2012 “below expectations” rating for this SCA, a gap analysis of CNL’s management system was conducted against the requirements of CSA N286-05, *Management System Requirements for Nuclear Facilities*.⁸ CNL submitted that a three-phase improvement plan to address those gaps was developed and completed in 2016.
33. CNSC staff confirmed the information provided by CNL, noting that its management system met the specifications of the updated CSA N286-12.⁹ CNSC staff submitted that CNL’s management system met all licensing and regulatory requirements.

⁷ In this *Record of Decision*, all SCA ratings for the year 2017 are considered for the period January 1 to June 30.

⁸ N286-05, *Management system requirements for nuclear facilities*, CSA Group, 2005, (Superseded).

⁹ N286-12, *Management system requirements for nuclear facilities*, CSA Group, 2012, (Re-affirmed 2017).

3.2.1 Organization

34. The Commission examined the information provided by CNL and CNSC staff regarding CNL's organizational structure. CNL submitted that the transition to the new organizational structure was complete and that internal organizational changes were executed in accordance with CNL's Organizational Change Control process to ensure that these changes did not pose a risk to safety or adversely affect safe and reliable operations at CRL.
35. CNSC staff reported that it had conducted regular compliance verification activities at CRL throughout the current and previous licence periods to ensure that CNL had adequately applied all change control procedures in respect of organizational changes during the changes to the Go-Co model. CNSC staff further submitted that CNL's organization was suitable to ensure the continued safe operation of CRL and continued compliance with licensing and regulatory requirements.
36. Asked to clarify the organizational structure of CNL management, CNL submitted additional details on the reporting structure at CNL. The CNL representative explained that CRL's Chief Regulatory Officer had a direct reporting relationship with the CNL President through which any issues or concerns could be raised without any intermediary parties or CNL management. The CNL representative further informed the Commission that CNL management held regular meetings, providing an additional forum for issues or concerns to be raised. The Commission is satisfied that CNL's management structure allows for the direct reporting of any safety issues or concerns at CRL to CNL's President and CEO.
37. In its consideration of the intervention from W. Turner, D. Raman and J. Walker, the Commission enquired about the ten-year plan that CNL had developed for CRL. The AECL representative explained that CNL was contractually obligated to develop a comprehensive ten-year plan which was reviewed and approved by AECL. The AECL representative further explained that CNL's ten-year plan was iterative and therefore subject to changes to business priorities or Government of Canada directions.

CNL Go-Co Model

38. CNL provided the Commission with detailed information about AECL's restructure activities since 2014.¹⁰ CNL submitted that the Canadian National Energy Alliance (CNEA) was selected as the preferred bidder through a Government of Canada procurement process to manage and operate CNL, with the final step in the implementation of the Go-Co model completed in September 2015.

¹⁰ CNSC Record of Proceedings, Including Reasons for Decision – Atomic Energy of Canada Limited, "Request for Five Licence Transfers to, and Request for Two Specific Exemptions for, Canadian Nuclear Laboratories Limited", October 22, 2014.

39. In its consideration of the several interventions expressing concerns about the Go-Co business at CRL, the Commission requested clarification respecting CNL as the enduring entity and licensee. The AECL representative responded that, although the CNEA was selected to manage CNL in 2015 for a period of time ending prior to the requested ten-year licence period and that another competitive process could be coordinated following the expiration of CNEA's contract, CNL would remain the enduring entity, licensee and the employer at CRL.
40. Further on this topic, the Commission requested additional information about the relationships between AECL, CNL and CNEA, and their individual responsibilities and roles relating to CRL, succession planning at CNL and the development and oversight of CRL long-term plan. The AECL representative informed the Commission that CNL, as the licensee, was responsible for the operations and facilities at CRL and for CNL's employees while AECL's responsibilities were to ensure that all contractual obligations were met and to fulfill its mandate as a federal Crown corporation. The CNL representative also explained that the CNEA Board of Directors oversaw the performance of CNEA appointees whereas the CNL Board of Directors oversaw the day-to-day operations at the CRL site. The Commission is satisfied with the information provided in this regard.
41. The CNL representative provided the Commission with information about how continuity in operations at CRL was maintained throughout management changes. The CNL representative further noted to the Commission that, since the implementation of the Go-Co model at CRL, the safety record at CRL had improved. The Commission is satisfied with the information provided by CNL in respect of maintaining continuity of operations at CRL.
42. The Commission asked about international lessons learned in respect of the Go-Co model, as raised in the interventions from the Concerned Citizens of Renfrew County, the Bonnechere River Watershed Project, the Canadian Coalition for Nuclear Responsibility and several individuals. The AECL representative confirmed that the United Kingdom and United States Go-Co experiences were considered during the development and implementation of the Go-Co model in Canada. The Commission is satisfied that international lessons learned have been considered during implementation of the Go-Co model at CRL.
43. The Commission considered the interventions from the Old Fort William Cottagers' Association and J. Unger that expressed a concern regarding the potential undue influence of profit motives under the Go-Co model and enquired about the management of revenue from CNL operations. The CNL representative responded that CNL's annual budget was determined by AECL and that any revenues earned from additional commercial activities or cost savings due to increased efficiencies in exceedance of its contracted budget were returned to the Government of Canada. The AECL representative confirmed the information provided by CNL. The Commission is satisfied with the information provided on this point.

44. The Commission considered the intervention from Ralliement contre la pollution radioactive and Stop Oléoduc Outaouais which expressed concerns regarding the potential for conflicts of interest for the CNSC resulting from the implementation of the Go-Co model at CRL. CNSC staff responded that, as independent regulator at arm's length from the Government of Canada, the CNSC would hold CNL responsible for the safe operation of CRL, in accordance with licensing and regulatory requirements, and irrespective of the shareholder or relationship to the Government of Canada. The Commission is satisfied that no conflict of interest was introduced between CNL and the CNSC from the implementation of the Go-Co model at CRL.
45. On the topic of worker concerns in respect of the Go-Co model, the Canadian Nuclear Workers' Council (CNWC) representative explained that its experience with the Go-Co transition was positive and that there were effective labour relations and dispute resolution processes in place. The CNWC representative added that there had not been an increase in grievances and that the grievance process had improved since Go-Co implementation at CRL. The Commission has not heard evidence that the implementation of the Go-Co model at CRL has had a negative effect on labour relations.
46. Based on the information provided, the Commission is satisfied that CNL has an appropriate organizational structure in place at CRL to ensure continued safety of persons and the environment throughout the proposed licence period.

3.2.2 Performance Assessment, Improvement and Management Review

47. The Commission assessed the mechanisms for CNL's internal performance review. CNSC staff submitted that CNL's review programs included the:
 - Nuclear Performance Assurance Review Board
 - Corrective Action Review Board
 - Integrated Safety Management Review
 - Contractor Assurance System
48. CNSC staff confirmed that CNL's programs provided for the assessment of the performance effectiveness of the CRL management system. CNSC staff further submitted that it had performed continuous review and verification activities of CNL's assessment mechanisms and found that CNL met CNSC licensing and regulatory requirements in this regard.
49. Based on the information provided, the Commission is satisfied that CNL has adequate programs in place for the performance assessment, improvement and management review of programs and practices at CRL.

3.2.3 Safety Culture

50. The Commission assessed the adequacy of CNL's safety culture at CRL. CNL submitted information about the 2009 implementation of the Voyageur II action plan which had provided numerous corrective and remedial actions across several key safety areas at CRL, as well as about safety culture initiatives that it had carried out since 2014. CNL further submitted detailed information about its monitoring of safety culture through frequent surveys, including a contractor-assisted survey in 2016. CNL explained that a detailed safety culture assessment and follow-up interviews in 2012 had identified new areas of improvement for CNL's safety culture at CRL and that all remaining actions from a self-assessment relating to the Voyageur II action plan had been closed in 2015.
51. CNL informed the Commission about the 2013 implementation of its Nuclear Safety Policy, which was aligned with the nuclear industry's ten *Traits of a Healthy Nuclear Safety Culture*,¹¹ and which was embedded within CNL's leadership training programs. CNL further explained that the establishment of the Practical Training Facility at CRL had enabled employees to participate in human performance-related scenarios and simulations.
52. CNSC staff confirmed the information provided by CNL and submitted that CNL's 2012 safety culture self-assessment had identified several areas for improvement which were incorporated into corrective action plans and that all corrective actions were completed by March 2014. CNSC staff reported that compliance verification activities had shown that CNL had adequate safety culture at CRL and that CNL would continue to carry out regular surveys to monitor safety culture at CRL.
53. In considering the intervention from M. Josey, the Commission requested additional information about how CNL management ensured that employee concerns were heard and addressed. The CNL representative provided a detailed description of outreach and worker communication methods that CNL had employed since September 2015, including meetings between executives and small groups of staff, employee surveys, updated communication methods and discussions with individual employees. The CNL representative noted that many employees were concerned about the upcoming shutdown of the NRU reactor and that CNL had made it a priority to understand and address those concerns, including the provision of redeployment pathways for affected personnel.
54. On the same issue, the CNWC representative informed the Commission that the CNWC's members had just cause protection against arbitrary employer actions, as well as whistleblower protection that allowed a worker to bring any health and safety or environmental concern to the employer or to the CNSC without fear of reprisal. The Commission is satisfied that CNL has appropriate mechanisms in place to ensure that worker concerns were addressed by CNL management.

¹¹ Institute of Nuclear Power Operators (INPO), INPO 12-012, *Traits of a Healthy Safety Culture (Rev. 1)*, April 2013.

55. Following the Commission's request for comment on safety culture at CRL, the Organization of Canadian Nuclear Industries representative responded that the Organization of Canadian Nuclear Industries was of the view that CNL had revitalized the CRL site and that safety culture under CNL's management was as strong as prior to the implementation the Go-Co model.
56. The Commission noted that there was a large variety of work performed at the CNL site and enquired as to how CNL instilled the same safety culture into a diverse group of workers. The CNL representative responded that CNL expected shared work values and behaviours at the site and provided information about new programs and training that CNL had implemented at CRL to further improve safety culture amongst all employees.
57. Based on the information examined for this hearing, the Commission is satisfied that CNL has maintained and will continue to maintain a strong safety culture at CRL during the proposed licence period.

3.2.4 Conclusion on Management System

58. On the basis of the information provided on the record for this hearing, the Commission concludes that CNL has appropriate organization and management structures in place and that the operating performance at CRL during the current licence period provides a positive indication of CNL's ability to adequately carry out the activities under the proposed renewed licence.
59. The Commission acknowledges the interventions that expressed concern in regard to the transition to the Go-Co model at CNL. The Commission recognizes that the AECL restructure and the implementation of the Go-Co model was a Government of Canada decision and that the Commission does not make such organizational decisions. Rather, the Commission assesses a licensee's organization structure to ensure that it meets licensing and regulatory requirements and to satisfy itself that the licensee's organization is effective in ensuring the health, safety and security of workers, the public and the environment. The Commission wishes to make clear that CNL, as the enduring entity, is the licensee and therefore is responsible for ensuring that all activities at CRL are performed safely and in accordance with regulatory requirements.

3.3 Human Performance Management

60. The Commission assessed CNL's human performance management programs which encompass activities that enable effective human performance through the development and implementation of processes that ensure that CRL staff are sufficient in number in all relevant job areas and have the necessary knowledge, skills, procedures and tools in place to safely carry out their duties. CNSC staff rated CNL's

performance in this SCA as “satisfactory” from 2012 to 2017.

61. The Commission examined the information submitted by CNL regarding the CRL human performance program. CNL provided information about its training and leadership enhancement programs, and improvements in capacity to recognize and respond to unsafe conditions and physical hazards. CNL also submitted that both site and departmental event-free day resets¹² (EFDR) were used at the CRL site to identify, track and trend human performance-related events and develop corrective action plans.
62. CNL reported on various human performance initiatives that had been carried out during the current and previous licence period. CNL submitted that a significant increase in EFDRs in 2015 led to putting into place corrective actions plans that significantly decreased EFDRs in 2016 and 2017. CNL further submitted that additional worker support and leadership engagement improvement initiatives were put in place at CRL. CNL also provided information on the retraining and redeployment program for NRU reactor personnel, and explained that some of the affected employees had already been redeployed and that deployment plans were in place for the majority of the remaining personnel.
63. CNSC staff confirmed the information provided by CNL and submitted that CNL had made significant improvements to human performance at CRL through the Voyageur II program and the implementation of various training activities at CRL’s Practical Training Facility. CNSC staff further informed the Commission that, during the proposed licence period, CNSC staff would focus compliance oversight in this SCA on activities that affected the safety performance of workers at CRL and on ensuring that the NRU reactor transition to permanent shutdown was carried out in accordance with regulatory requirements. CNSC staff confirmed that CNL’s human performance program at CRL met regulatory requirements.

3.3.1 Personnel Training

64. The Commission considered CNL’s personnel training programs at CRL, including the assessment, development, implementation and monitoring of training and certification programs. CNL submitted that the Systematic Approach to Training (SAT) was applied to all learning programs for personnel in direct operating positions at CRL and to non-direct operating staff, as needed. CNL further submitted that all contract workers had to undergo general safety training, radiation protection training and facility-specific training prior to working at CRL.
65. CNL reported on several training program improvement initiatives that had been implemented during the current and previous licence periods, including the 2016 CNL Severe Accident Management Program, the Performance Leadership Essentials Program and retraining initiatives for workers affected by the NRU reactor shutdown.

¹² “Event free day resets” are an event tracking tool. These indicate any event that resets the departmental event-free site clock to help track and establish lessons learned for these events.

CNL submitted that training procedures at CRL were aligned with CNSC REGDOC-2.2.2, *Personnel Training*.¹³

66. CNSC staff confirmed the information submitted by CNL and reported that, since 2012, compliance verification activities at CRL confirmed that CNL's training programs met regulatory requirements and aligned with CNL's established training processes.
67. Addressing the issue of the adequacy of new employee training at CRL, as raised in the intervention from CNWC, the Commission requested additional information in this regard. The CNL representative provided detailed information about the orientation and training that CNL provided to new employees and confirmed that CNL ensured that all new employees were qualified to perform their assigned tasks and that the health and safety of CRL employees and the public were protected.
68. Addressing CNL's ability to attract qualified workers to CRL, the CNL representative stated that it had been able to attract new, qualified workers that CNL would need for the expansion of the science and technology areas of CRL.
69. Having examined all of the information provided on the record for this hearing, the Commission is satisfied that CNL has appropriate training programs in place at CRL that meet the specifications of REGDOC-2.2.2.

3.3.2 *Personnel Certification*

70. The Commission assessed CNL's personnel certification programs at CRL. CNL submitted that there were currently 12 certified Senior Reactor Shift Engineers and three certified Health Physicists supporting NRU reactor operations. CNL provided detailed information about the certification of NRU reactor staff during the current and previous licence periods and stated that the training and certification of NRU reactor staff would align with the transitioning of the NRU reactor to a safe shutdown state during the proposed licence period.
71. CNSC staff confirmed the information provided by CNL and reported that its verification of CNL's certification and requalification examinations, as well as the results, showed that certified personnel at CRL had the requisite knowledge and skills to safely perform their duties. CNSC staff submitted that CNL had the required number of personnel in certified positions for the remainder of NRU reactor operations and throughout the safe shutdown period. CNSC staff also confirmed that CNL was in compliance with all CNSC certification examination requirements.
72. Based on the information presented during this hearing, the Commission is satisfied that CNL has appropriate training and certification programs in place at CRL.

¹³ CNSC Regulatory Document REGDOC-2.2.2, *Personnel Training*, Version 2, December, 2016.

3.3.3 *Fitness for Duty*

73. The Commission examined CNL's fitness for duty program at CRL. CNL submitted that it performed pre-employment medical screening and annual physical testing for firefighters and emergency and protective service personnel, with drug and alcohol testing as part of post-incident responses and investigations. CNL also submitted that, since 2015, its fitness for duty program included a fatigue management component with CNL participating in industry meetings with respect to CNSC REGDOC-2.2.4, *Fitness for Duty: Managing Worker Fatigue*.¹⁴ CNL also described the 2015 revisions to its disability management and return-to-work programs along with a third-party contract to support the disability management process for non-occupational illnesses and injuries.
74. CNSC staff confirmed the information provided by CNL and reported that CNL had completed a gap analysis for the implementation of REGDOC-2.2.4 by April 2019. CNSC staff also noted that, following the shutdown of the NRU reactor, REGDOC-2.2.4 would apply only to security personnel at the CRL site. CNSC staff confirmed that it would monitor the implementation of REGDOC-2.2.4 during the proposed licence period and that it was satisfied that CNL's fitness for duty program met regulatory requirements.
75. Asked by the Commission about the requirement for a minimum shift complement for the NRU reactor, the CNL representative responded that CNL had complied with requirements in this regard and noted that the minimum shift complement would no longer be required when the NRU reactor was in safe shutdown state and following the approval of the revised safety case. CNSC staff confirmed the information provided by CNL. The Commission was satisfied with the information provided on this point.
76. Following its examination of the information provided on the record for this hearing, the Commission is satisfied that the fitness for duty programs at CRL are adequate to ensure that workers at CRL remain fit for duty at all times.

3.3.4 *Conclusion on Human Performance Management*

77. Based on its consideration of the information presented on the record for this hearing, the Commission concludes that CNL has appropriate programs in place and that current efforts related to human performance management provide positive indication of CNL's ability to adequately carry out the activities under the proposed licence.
78. The Commission considered the information provided by CNL and CNSC staff and is satisfied that training, certification and recertification programs are adequate and that minimum shift complement requirements for qualified and certified staff are being met at CRL. The Commission anticipates the implementation of REGDOC-2.2.4, *Fitness*

¹⁴ CNSC Regulatory Document REGDOC-2.2.4, *Fitness For Duty: Managing Worker Fatigue*, March, 2017.

for Duty: Managing Worker Fatigue at CRL during the proposed licence period.

3.4 Operating Performance

79. The Commission examined 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 at CRL. Throughout the current and previous licence periods, CNSC staff rated CNL's performance in this SCA as "satisfactory."

3.4.1 Conduct of Licensed Activity

80. The Commission assessed CNL's conduct of the licenced activities at the various facilities and laboratories at CRL. CNL submitted that the Class I and Class II nuclear facilities, as well as the radioisotope laboratories and research facilities at CRL were safely operated in accordance with the operating limits and conditions during the current and previous licence periods. CNL further reported that it had established a process to develop facility-specific Conduct of Operations Plans and that the performance of CRL nuclear facilities was reviewed and assessed quarterly by the Nuclear Performance Assurance Review Board. CNL further submitted that its governing documentation for CRL met the specifications of CSA N286-05, that CSA N286-12 would be implemented during the proposed licence period and that CNL would continue to update this documentation in alignment with changing business needs and priorities at CRL.
81. CNSC staff confirmed the information provided by CNL and reported that compliance verification activities carried out at CRL showed that CNL was operating within its licensing basis. CNSC staff reported that information about operational performance at CRL was included in CNL's annual reports throughout the current and previous licence periods. CNSC staff further submitted that changes to CNL's governing documentation and work activities in relation to new projects at CRL, including fuel packaging and storage facility and the modifications to the Mo-99 production facility, had been closely monitored by CNSC staff.
82. CNSC staff submitted that CNL maintained a comprehensive suite of procedures that supported the conduct of licensed activities at CRL and that CNL continually improved and updated its procedures to support ongoing process improvements at CRL throughout the current and previous licence periods. CNSC staff reported that compliance activities had shown that CNL was meeting CNSC expectations to ensure the safe operation of CRL facilities.
83. The Commission considered the concerns expressed in regard to the management of NRU reactor related initiatives and requested additional information on this matter. The AECL representative acknowledged that the NRU reactor was of significant

importance to Federal Nuclear Science and Technology Work Plan initiatives but explained that, following the NRU reactor shutdown, CNL's ten-year plan would allow CRL to provide meaningful contributions to science and technology initiatives in Canada. The Commission was satisfied with the information provided on this point.

84. The Commission assessed CNL's operating experience (OPEX), including CNL's objectives to use the OPEX program to improve the safety of operations and operational performance at CRL and to reduce the significance and occurrence of unplanned events. CNL provided additional details about its OPEX program, which included the corrective action program, noting that its processes included responding to external events and disseminating lessons learned.
85. CNSC staff confirmed the information provided by CNL and submitted that the CNL OPEX program had matured substantially since 2012. CNSC staff further reported that CNL's OPEX program contributed to safety by integrating the program into the existing processes, procedures and operations. CNSC staff submitted that verifications of CNL's OPEX program at CRL showed that it was effective and met regulatory requirements.
86. The Commission considered the concerns raised in the intervention from the Anishinabek Nation about CNL's management of operations at CRL. The CNL representative provided the Commission with a detailed description of CNL's qualifications for the management of CRL, highlighting CNL's good safety and regulatory compliance track records and reporting on CNL's environmental and CRL site improvement initiatives. The Commission is satisfied that CNL has sufficient expertise and capability to effectively manage the CRL site.
87. In the intervention from the CNA, the Commission noted the information about the 2013 World Association of Nuclear Operators (WANO) peer review at CRL and requested information about future plans for such reviews. The CNL representative responded that the 2013 CRL WANO review provided important lessons learned for the improvement of safety culture and work practices. The CNL representative explained that, since the NRU reactor was shutting down, CNL did not anticipate participating in future reviews of that nature.
88. Asked about the modernization initiative at the CRL site, the CNL representative provided a detailed description of the work that had been and was planned to be performed at the CRL site, including the decommissioning of legacy structures, the development of new research and logistics facilities and improvements to CRL site infrastructure.
89. Asked about CANDU Owners Group Inc.'s (COG) role in providing CNL with expertise during the CRL site revitalization, the COG representative provided the Commission with information on CRL initiatives for which COG members provided additional expertise and OPEX, including waste management and materials properties. The COG representative also provided information on how this expertise would benefit

CRL even after the shutdown of the NRU. The CNL representative informed the Commission that CNL would retain its COG membership after the NRU reactor shutdown to ensure continued operational experience and knowledge transfer from other COG members.

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

3.4.2 Reporting

91. The Commission examined CNL's reporting of unplanned situations and events at CRL. CNL reported that, in 2016, it had revised its reporting procedures document to incorporate additional CNSC reporting requirements for CRL and that the revised procedure was accepted by CNSC staff and was fully implemented in late 2016. CNL also reported that, since 2011, annual compliance reports containing compliance monitoring and operational performance data for CRL were submitted to CNSC staff.
92. CNSC staff confirmed the information provided by CNL and submitted information about reported events at CRL during the current and previous licence periods. CNSC staff informed the Commission that no significant regulatory issues had been identified during its review of CNL's annual compliance monitoring and operational performance reports.
93. The Commission considered the intervention from the Old Fort William Cottagers' Association and requested information on CNL's reporting requirements in the event of a release of radioactive material. CNSC staff informed the Commission that the proposed LCH had a dedicated section on reporting requirements in the event of releases at CRL, that REGDOC-3.1.2, *Reporting Requirements for Non-Power Reactor Class I Facilities and Uranium Mines and Mills*¹⁵ addressed reporting requirements, and that CNSC Duty Officers – who were on call 24 hours per day – were available to receive notices of any events. The Commission was satisfied with the information provided on this point.
94. Based on the information provided, the Commission is satisfied that CNL met all reporting requirements as specified in its operating licence.

3.4.3 Severe Accident Management and Recovery

95. The Commission assessed the detailed information provided by CNL regarding severe accident management and recovery programs at CRL. CNL submitted detailed

¹⁵ CNSC Regulatory Document REGDOC-3.1.2, *Reporting Requirements for Non-Power Reactor Class I Facilities and Uranium Mines and Mills*, 2018.

information about

- the Severe Accident Management Program (SAMP) and the development of Severe Accident Management Guidelines (SAMGs) for the NRU reactor
 - the revision of CNL's emergency operating procedures
 - severe accident management training
 - severe accident management validation
96. CNSC staff confirmed the information provided by CNL and submitted that CNL's SAMGs and emergency operating procedures met CNSC expectations.
97. Based on the information provided by CNL and CNSC staff, the Commission is satisfied that CNL has adequate programs in place to manage and respond to a severe accident at the CRL site, including the NRU reactor.

3.4.4 Conclusion on Operating Performance

98. Based on the above information, the Commission concludes that the operating performance at CRL during the current and previous licence periods provides a positive indication of CNL's ability to carry out the activities under the proposed licence.
99. On the basis of its review of the above information, the Commission is satisfied that CNL will continue to ensure that appropriate operation performance-related programs are in place at CRL to ensure the health and safety of persons and the environment.
100. The Commission expects CNSC staff to continue to closely monitor the operational changes at CRL to ensure that CNL's operational programs continue to comply with regulatory requirements.

3.5 Safety Analysis

101. The Commission assessed safety analysis at CRL, which includes a systematic evaluation of the potential hazards associated with the conduct of the licensed activities or the operation of facilities, and considers the effectiveness of preventive measures and strategies in reducing the effects of such hazards. Safety analysis supports the overall CRL safety case. CNSC staff reported that, throughout the current and previous licence periods, CRL was operated safely and within licence limits, with CNL's performance in this SCA rated as "satisfactory" from 2012 to 2017.
102. CNL informed the Commission that its safety analysis program at CRL was continuously updated based on lessons learned since the initial implementation of that program in 2011. CNL submitted that, following an internal audit in 2014-2015, improvements were made to safety analysis programs for the NRU reactor and the overall CRL site.

103. CNSC staff confirmed the information provided by CNL and submitted that, pursuant to requirements of the *Class I Nuclear Facilities Regulations*,¹⁶ CNL prepared formal Safety Analysis Reports (SAR) for its Class I nuclear facilities. CNSC staff also reported that CNL's safety analysis program adequately ensured that the potential hazards associated with licensed activities at CRL were evaluated and mitigated, and that the program met regulatory requirements and CNSC expectations.
104. CNL provided information to the Commission about the safety-related activities planned to enable the NRU reactor's and Mo-99 production facility's transition to a safe shutdown state after March 2018. CNL confirmed that safety analysis activities would continue at the CRL site on an as-required basis to support all new and modified facilities and operational activities in the proposed licence period.

3.5.1 *Deterministic Safety Analysis*

105. The Commission considered the deterministic safety analyses carried out at CRL. CNL submitted details about the significant updates and improvements that had been made to the CRL SARs and facility authorizations during the current and previous licence periods.
106. CNSC staff confirmed the information provided by CNL and submitted that safety analyses for CRL facilities were primarily deterministic and that CNL maintained adequate SARs that complied with CNL's licensing basis for all Class I nuclear facilities at CRL. CNSC staff further submitted that CNL maintained similar documentation for Class II nuclear facilities and prescribed equipment at the CRL site.
107. Based on the information provided on the record for this hearing, the Commission is satisfied that CNL's current deterministic safety analyses for the facilities at CRL are adequate.

3.5.2 *Probabilistic Safety Assessment*

108. The Commission assessed the conduct of probabilistic safety assessments (PSA) at CRL. CNSC staff submitted that a Level 1 and Level 2 PSA to support the safety analysis for the NRU reactor was carried out in accordance with the criteria of REGDOC-2.4.2, *Probabilistic Safety Assessment (PSA) for Nuclear Power Plants*.¹⁷ and that the PSA was accepted by CNSC staff. CNSC staff further submitted that, with the upcoming shutdown of the NRU reactor, CNL was assessing the requirement for an update to the NRU reactor PSA in the proposed licence period, with CNSC staff monitoring CNL's progress in this regard.

¹⁶ SOR/2000-204.

¹⁷ CNSC Regulatory Document REGDOC-2.4.2, *Probabilistic Safety Assessment (PSA) for Nuclear Power Plants*, 2014.

109. Noting the concern about a geological fault near the CRL site in the intervention from the Provincial Council of Women of Ontario, the Commission asked about the seismic qualification of systems, structures and components at CRL. The CNL representative responded that the design of CRL site facilities considered design basis¹⁸ earthquake parameters that were based on data from the Geological Survey of Canada and provided additional information in this regard. The CNL representative added that the *National Building Code of Canada 2010*,¹⁹ was used for the design of newer buildings at CRL and that, for older buildings and facilities, seismic margin assessments were carried out and upgrades performed as required. The Commission is satisfied that CNL adequately considered seismic hazards in its hazards analysis for the CRL site.
110. Based on the information provided on the record for this hearing, the Commission is satisfied that CNL's PSA for the NRU reactor is adequate and demonstrates that adequate safety margins exist in this regard.
111. The Commission expects CNSC staff to continue monitoring CNL's assessment regarding the safety benefits of carrying out an update to the PSA for the NRU reactor.

3.5.3 Criticality Safety

112. CNL provided the Commission with detailed information about the nuclear criticality safety program at CRL, submitting that the program provided oversight and direction to all nuclear criticality controlled areas. CNL also submitted that criticality safety documents were, and would continue to be, updated on a risk-graded approach and provided additional information about criticality safety-related initiatives that CNL would implement in the proposed licence period, including criticality accident alarm systems.
113. CNSC staff confirmed the information provided by CNL and submitted that CNL maintained a nuclear criticality safety program that met the specifications of RD-327, *Nuclear Criticality Safety*.²⁰ CNSC staff confirmed that CNL's criticality program at CRL met regulatory requirements.
114. Based on the information provided the Commission is satisfied that CNL is maintaining appropriate programs to ensure criticality safety at CRL.

¹⁸ The "design basis" is defined as the range of conditions, according to established criteria, that the facility must withstand without exceeding authorized limits for the planned operation of safety systems.

¹⁹ IRC-10NBC, *National Building Code of Canada 2010*, National Research Council, 2010.

²⁰ CNSC Regulatory Document RD-327, *Nuclear Criticality Safety*, 2010.

3.5.4 *Severe Accident Analysis*

115. The Commission assessed the information provided by CNL regarding severe accident analyses that were undertaken at CRL to evaluate residual risk. CNL submitted that its SAMGs and supporting documentation incorporated lessons learned from the Fukushima Daiichi accident and provided information about its Fukushima Response Action Project that was launched in 2013. CNL also submitted that its SAMGs and severe accident management program applied only to the NRU reactor and that the SAMGs were validated by third party subject matter experts and implemented in 2015.
116. CNSC staff confirmed the information provided by CNL and submitted that CNL's severe accident analysis for the NRU reactor met the specifications of REGDOC-2.3.2, *Accident Management*, version 2.²¹ CNSC staff also submitted that CNL had implemented the results from the severe accident analysis into its NRU reactor severe accident management program, which was found to adequately incorporate lessons learned from the Fukushima Daiichi accident and which met regulatory requirements.
117. Noting the concern about accidents at CRL expressed in several interventions from groups and individuals, the Commission requested additional information on how the CRL site risk profile would change with the shutdown of the NRU reactor. The CNL representative responded that safety analyses had shown that, following the shutdown of the NRU reactor, there would be no potential for offsite consequences in the event of an accident at the CRL site. Based on the information provided, the Commission is satisfied that the risk posed by an accident at the CRL site following the shutdown of the NRU reactor is greatly diminished.
118. On the basis of the information provided, the Commission is satisfied that the severe accident analysis performed by CNL was adequate to evaluate and further mitigate residual risks at CRL.
119. The Commission is satisfied that CNL has adequately addressed and incorporated lessons learned from the Fukushima Daiichi accident at CRL.

3.5.5 *Conclusion on Safety Analysis*

120. On the basis of the information presented, the Commission concludes that the systematic evaluation of the potential hazards and the preparedness for reducing the effects of such hazards is adequate for the operation of facilities at CRL and the activities under the proposed licence. The Commission finds that CNL's safety analysis program for CRL meets regulatory requirements and that CNL has adequate preventive measures and strategies in place to ensure the protection of workers, members of the public and the environment and that the facilities at CRL meet safety requirements.

²¹ CNSC Regulatory Document REGDOC-2.3.2, *Accident Management*, version 2, 2015.

121. The Commission recognizes that, as the NRU reactor transitions from operation to the safe shutdown state and then to storage with surveillance, the scope of the safety analysis will change. The Commission understands that CNL will update its safety analyses to reflect the operational state of all CRL facilities and expects CNSC staff to monitor and verify these changes to ensure that CRL site activities continue to comply with regulatory requirements and CNL's licensing basis for CRL. The Commission anticipates that annual ROR updates will keep the Commission apprised of these transitions.

3.6 Physical Design

122. 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" from 2012 to 2017.
123. The Commission examined the physical design and associated activities of the facilities at CRL, which is managed by CNL under its Design Authority and Design Engineering Program. CNL submitted information about how its Design Engineering Program complied with CSA N286-12 and CSA N285.0, *General Requirements for Pressure-Retaining Systems and Components in CANDU Nuclear Power Plants*,²² noting that the program applied to all design activities at CRL.
124. CNL submitted information regarding its Configuration Management Program which provided the framework to maintain and control the physical configuration of all structures, systems and components and which applied to all design, operation, decommissioning and maintenance activities at CRL. CNL reported that, throughout the current and previous licence periods, design oversight and change control at CRL were strengthened with process improvements that were benchmarked against Canadian Nuclear Utilities and WANO performance objectives. CNL also provided the Commission with information regarding planned improvements and key initiatives for the proposed licence period.
125. CNSC staff confirmed the information provided by CNL and submitted that CNL's design governance programs met CNSC expectations. CNSC staff also submitted that CNL's site characterization documentation was up to date, met regulatory requirements and appropriately characterized the CNL site. CNSC further reported that CNL met regulatory requirements in respect of facility design, with new buildings designed to meet modern codes and standards.

²² N285.0, *General requirements for pressure-retaining systems and components in CANDU nuclear power plants*, CSA Group, 2012.

126. On the basis of the information presented, the Commission concludes that CNL continues to implement and maintain an effective design program at CRL and that the design of facilities at the CRL site is adequate for the operation period included in the proposed licence.

3.7 Fitness for Service

127. 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" from 2012 to March 2017 and as "satisfactory" for the balance of the current licence period. CNSC staff noted that the NRU reactor was assessed separately from the rest of the CRL site in this SCA, with the CRL site assessed as having a "satisfactory" rating in August 2016. Furthermore, during the April 12, 2017 Commission meeting,²³ the Commission was satisfied that CNL had reached a "satisfactory" in the fitness for service for the NRU reactor, as well as the overall SCA, and closed the action requiring regular updates from CNSC staff in this regard.²⁴
128. CNSC staff submitted that CNL's fitness for service programs met the specifications of CSA N291-15, *Requirements for safety-related structures for CANDU nuclear power plants*²⁵ and REGDOC-2.6.3, *Aging management*,²⁶ and that these documents were included in the CNL's technical basis for the proposed renewed licence. CNSC staff further submitted that, with the shutdown of the NRU reactor, the scope of CNL's fitness for service programs would be adjusted to focus on areas at the CRL site that would provide the greatest safety benefit, with CNSC staff ensuring that any such changes were made in accordance with regulatory requirements.
129. The Commission enquired about how CNL planned to ensure that it would maintain a "satisfactory" fitness for service rating in the proposed licence period. The CNL representative responded that CNL was applying lessons learned from its recent fitness for service improvement activities and provided the Commission with detailed information about how CNL intended to ensure improvements in this regard throughout the proposed licence period. CNSC staff confirmed the information provided by CNL and noted its satisfaction with CNL's implementation of lessons learned in this regard.

²³ *Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held on April 12, 2017*, paragraph 25.

²⁴ CNSC Record of Decision – Canadian Nuclear Laboratories, "Application to Renew and Amend the Nuclear Research and Test Establishment Operating Licence for Chalk River Laboratories, July 2016.

²⁵ N291-15, *Requirements for safety-related structures for CANDU nuclear power plants*, CSA Group, 2015.

²⁶ CNSC Regulatory Document REGDOC-2.6.3, *Aging Management*, 2014.

3.7.1 Equipment Fitness for Service

130. The Commission considered the information provided by CNL and CNSC staff regarding the fitness for service of equipment at CRL. CNL submitted information regarding an extensive capital investment program that had been undertaken to modernize CRL and improve equipment reliability. CNL also reported that Phase 1 of the IIP for the NRU reactor was completed in January 2017, leading to a significant improvement in the operability of the NRU reactor, including a large improvement in the mean time between reactor trips and forced shutdowns for the NRU reactor. CNL further submitted that, during the proposed licence period, equipment fitness for service initiatives would continue at CRL and that equipment performance would continue to improve through capital investments and refurbishment projects.
131. CNL provided the Commission with details about the environmental qualification program for the NRU reactor and the major activities through which the environmental assessment basis was developed. CNL noted that, once the NRU reactor was completely defueled, an environmental qualification program at CRL would no longer be required.
132. CNSC staff confirmed the information provided by CNL and submitted that, although CNL had experienced challenges with equipment at CRL due to aging, CNL had implemented many initiatives at CRL to address aging effects and improve site-wide conditions. CNSC staff informed the Commission that it was satisfied with the progress CNL had made in respect to equipment fitness for service and that, where required, CNL had risk control measures in place that met CNSC expectations.
133. Based on the information presented on the record for this hearing, the Commission is satisfied that CNL has adequate processes in place to ensure that the equipment at CRL will remain fit for service throughout the proposed licence period.

3.7.2 Maintenance

134. The Commission assessed the adequacy of CNL's maintenance programs at CRL. CNL provided the Commission with detailed information about the site maintenance department that supports all CRL site operations. CNL submitted that, in November 2016, CRL's Site Management and Work Management groups became an integrated team and provided information about efficiencies that this integration had provided to CRL maintenance activities. CNL informed the Commission that, during the proposed licence period, maintenance management would focus on efficiencies to provide optimal programs for equipment and facilities at CRL.
135. CNL provided the Commission with detailed information on maintenance and preventive maintenance programs and backlogs during the current and previous licence periods, noting that the backlogs had been significantly reduced. CNL reported that its predictive maintenance program reflected current industry practice and guidelines from

the Electric Power Research Institute (EPRI), the IAEA and the Institute of Nuclear Power Operations (INPO) and provided details about how this program monitored equipment health, provided advance warnings of equipment failure and improved equipment reliability. CNL provided the Commission with details on planned maintenance initiatives for the proposed licence period which would further improve CNL's preventive and predictive maintenance programs at CRL.

136. CNSC staff confirmed the information provided by CNL and submitted that CNL's maintenance program for the NRU reactor met the specifications of RD/GD-210, *Maintenance Programs for Nuclear Power Plants*.²⁷ CNSC staff submitted that, during the current licence period, CNL had improved its preventive maintenance program by meeting internal preventive maintenance targets each month. CNSC staff reported that, based on CNSC inspections and reviews of CNL's maintenance program, it was of the opinion that CNL met and would continue to meet regulatory requirements in respect of its maintenance program at CRL.
137. After considering the information provided on the record for this hearing, the Commission is satisfied that CNL has adequate maintenance programs in place at CRL for the proposed licence period. The Commission encourages CNL to continue its progress in reducing preventive maintenance backlogs at CRL.

3.7.3 Aging Management

138. The Commission examined the information submitted by CNL and CNSC staff regarding the aging management program at CRL. CNL submitted information about its aging management processes at CRL and provided detailed information about the refurbishment of power systems for the NRU reactor that was carried out. CNL also submitted that significant upgrades to the NRU reactor were achieved due to the change in outage schedule that was approved for the current licence period. In the proposed licence period, CNL reported that critical equipment and systems at CRL would continue to be assessed against aging and obsolescence management requirements.
139. CNSC staff confirmed the information provided by CNL, noting that CNL revised the aging management program at CRL in 2012 to align with CNSC requirements and to implement a full life-cycle approach to aging management. CNSC staff submitted that CNL's aging management program met the specifications of REGDOC-2.6.3 and that it satisfied regulatory requirements.
140. Based on the information provided, the Commission is satisfied that CNL has an appropriate aging management plan in place at CRL.

²⁷ CNSC Regulatory Document/Guidance Document RD/GD-210, *Maintenance Program for Nuclear Power Plants*, 2012.

3.7.4 *Structural Integrity*

141. The Commission examined structural integrity at CRL. CNL submitted that the structural integrity of the NRU vessel had been continuously monitored through the in-service inspection program and the annual fitness for service assessment, and that the structural integrity of the Fissile Solution Storage Tank (FISST) would continue to be monitored throughout the highly enriched uranium (HEU) repatriation project.
142. CNSC staff provided the Commission with information about the structural integrity of the fluid boundary components required for the safe operation of the NRU, which was verified through CNL's Periodic Inspection Programs (PIPs), and submitted that CNL had adequate programs in place in this regard. CNSC staff also confirmed that inspections found that there had been no observed degradation in the NRU vessel that would reduce its structural integrity.
143. CNSC staff further submitted that, with the exception of the NRU reactor and the FISST, all other facilities at the CRL site presented a low safety risk. CNSC staff reported that the structural integrity of the FISST remained an area of focus for CNSC staff but noted that, based on inspections and reviews, CNL was taking appropriate action to ensure suitable structural integrity of the FISST and other elements of the CRL site.
144. In its intervention, the Iroquois Caucus expressed concern regarding the design of the FISST and the Commission requested additional information in this regard. The CNL representative provided detailed information about the design of the FISST, noting that the FISST was subject to inspection programs to confirm its structural integrity. The Commission was satisfied with the information provided on this point.
145. The Commission requested additional information about how the structural integrity of structures that were exposed to radiation was monitored. The CNL representative provided detailed information and an example about how CNL's structural integrity programs would be applied in this regard through a graded approach based on the safety-sensitive nature of the components. The Commission was satisfied that the structural integrity of structures exposed to radiation was, and would continue to be, adequately monitored by CNL.
146. Based on the information provided, the Commission is satisfied that CNL has adequate programs and processes in place to ensure the structural integrity at CRL.

3.7.5 *Chemistry Control*

147. CNL submitted detailed information about its chemistry control program for the NRU reactor and the FISST to the Commission. CNL reported that its chemistry control program for the NRU reactor had established adequate specifications and control methods to ensure suitable chemistry control. CNL also reported that the FISST was

sampled monthly in accordance with licensing requirements, with sampling results reported monthly to the CNSC.

148. CNSC staff confirmed the information provided by CNL and submitted that CNL's chemistry control program had demonstrated that CNL had the appropriate oversight in place and had met regulatory requirements in respect of chemistry control for the NRU reactor and the FISST. CNSC staff informed the Commission that, during the proposed licence period, it would continue to assess the applicability of the chemistry control program to existing and new facilities at CRL.
149. Based on the information provided by CNL and CNSC staff, the Commission is satisfied that CNL has maintained and will continue to maintain an adequate chemistry control program in place at CRL.

3.7.6 *Periodic Inspection and Testing*

150. CNL and CNSC staff provided the Commission with information about CNL's Periodic Inspection and Testing Programs (PIPs), which are only applicable to the NRU reactor. CNSC staff submitted that the PIPs were focused on the NRU fluid boundary components based on the guidance from CSA N285.4-05, *Periodic inspection and testing of CANDU pressure boundary components*.²⁸ and that a graded approach was applied in this regard since the NRU reactor was not a CANDU reactor. CNSC staff further submitted that, since 2012, CNL had made significant progress in respect to its PIPs and that CNL met regulatory requirements in this regard.
151. Based on the information provided, the Commission is satisfied that CNL has adequate processes and programs in place to support safe operations at CRL.

3.7.7 *Conclusion on Fitness for Service*

152. Based on the information provided on the record for this hearing, the Commission is satisfied with the CNL's programs for the inspection and life-cycle management of key safety systems at CRL. The Commission concludes that the equipment as installed at CRL is fit for service and that appropriate programs are in place to ensure that the equipment remains fit for service throughout the proposed licence period.
153. The Commission expects that, with any changes to CNL's fitness for service programs following the NRU reactor shutdown, CNL will focus these program scope changes on areas with the greatest safety benefit. The Commission also expects CNSC staff to ensure that regulatory oversight activities monitor any changes made by CNL to its fitness for service programs and that the programs continue to meet regulatory requirements. Annual ROR presentations will keep the Commission apprised of these changes.

²⁸ N285.4-05, *Periodic inspection and testing of CANDU pressure boundary components*, CSA Group, 2005.

3.8 Radiation Protection

154. 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 how the CRL radiation protection program ensured that both radiation doses to persons and contamination were monitored, controlled and kept as low as reasonably achievable (ALARA), with social and economic factors taken into consideration. Throughout the current and previous licence periods, CNSC staff rated CNL's performance in this SCA as "satisfactory."
155. The Commission considered the information provided by CNL and CNSC staff to assess whether the CRL radiation protection program satisfied the requirements of the *Radiation Protection Regulations*²⁹ (RPR). CNSC staff submitted that, throughout the current and previous licence periods, CNL had implemented an appropriate and effective radiation program at CRL that satisfied regulatory requirements.
156. CNSC staff submitted that amendments to the RPR were proposed and that, when the RPR are amended, CNL would be required to review its radiation protection program to ensure continued compliance with the revised regulatory requirements. CNSC staff also submitted that CNL would be required to revise its radiation protection program in response to changes in the future work planned at the CRL site.
157. The Commission examined the performance assessment of CNL's radiation protection program at CRL, including all associated programs and practices. CNL provided the Commission with details about self-assessments of the radiation protection program, as well as internal audits that were performed by CNL's Nuclear Oversight Auditor and Nuclear Performance Assurance Review Board, about CNSC inspections, including a Type II compliance inspection,³⁰ and the 2013 WANO peer review. CNL further submitted detailed information about the corrective actions that CNL took in response to findings from the audits and inspections and reported that, during the proposed licence period, CNL would continue its implementation of the identified corrective actions.
158. CNSC staff provided the Commission with information about the performance indicators that were used to continuously monitor the radiation protection program at CRL. CNSC staff submitted that CNL met CNSC expectations for the monitoring of the implementation and performance of the radiation protection program at CRL. CNSC staff also confirmed the information provided by CNL, noting that the corrective actions that CNL had implemented in regard to the performance of its

²⁹ SOR/2000-203.

³⁰ A "Type II inspection" is defined as a planned and documented activity to verify the results of licensee processes and not the processes themselves. Type II inspections are typically routine (item-by-item checklist) inspections and rounds of specified equipment and/or facility material systems, or of discrete records, products or outputs from licensee processes. (CNSC Regulatory Document REGDOC-3.6, *Glossary of CNSC Terminology*, December, 2016).

radiation protection program were adequate.

3.8.1 Application of ALARA

159. The Commission considered the application of the ALARA principle at CRL. CNL submitted that the ALARA principle was applied at CRL in order to limit doses to less than those of the regulatory limits and to limit any detrimental health effects to workers and the members of the public. CNL reported that, through the successful implementation of the ALARA program at CRL, individual and collective doses had remained ALARA and that no regulatory limits had been exceeded during the current and previous licence periods.
160. CNSC staff confirmed the information provided by CNL and submitted that CNL carried out ALARA planning for all radiological activities at CRL, with CNL's ALARA program satisfying regulatory requirements.
161. Based on the information considered for this hearing, the Commission is satisfied that the ALARA concept is adequately applied to all CRL site activities.

3.8.2 Worker Dose Control

162. The Commission considered information submitted by CNL and CNSC staff about CNL's worker dose control practices at CRL, including detailed worker dose data for the current and previous licence periods. CNL submitted that all nuclear energy workers (NEWs) and non-NEWs, including site visitors and members of the public, received whole-body doses that were well below regulatory limits.³¹ CNL also submitted information about proposed improvements at CRL that would further improve worker dose control, such as the reduction of high contamination zones and the installation of additional radiation and dose monitoring equipment.
163. CNSC staff reported that the CNL had effectively implemented the radiation protection program at CRL to ensure that doses received by workers remained below regulatory limits. CNSC staff also informed the Commission that CNL operated a CNSC-licenced dosimetry service that was implemented through the radiation protection program and that the dosimetry service met regulatory requirements.
164. Based on the information provided for this hearing, the Commission is satisfied that doses to workers at CRL are adequately controlled and remained below regulatory requirements.

³¹ The effective dose limits for a NEW is set at is set at 50 mSv in any one year and 100 mSv in five consecutive years, and for pregnant NEWs the dose limit is 4 mSv from the time the pregnancy is declared to the end of the term. The dose limits for non-NEWs, including members of the public, is set at 1 mSv per year.

3.8.3 Radiological Hazard Control

165. The Commission examined CNL's identification and control of existing and potential radiological hazards during work activities at CRL. CNL and CNSC staff submitted information regarding CNL's programs for contamination control, radiation dose rate control and airborne monitoring and control at the CRL site.
166. CNL submitted that, consistent with the *Nuclear Substances and Radiation Devices Regulations*,³² CNL's radiation protection program provided for the management and leak testing of sealed sources and that CNL had dedicated staff who were trained in the packaging and transport of radioactive material to minimize dose to persons handling such sources and packages.
167. CNL also informed the Commission that, in 2014, radiological areas at CRL were re-designated to move CNL's radiation protection practices more in-line with IAEA guidance and industry best practices. CNL further submitted that this change improved the control of radiation-related work at CRL and that, in the proposed licence period, CNL would reduce the number of high contamination zones at the site and increase the use of physical barriers, whole-body monitors and signage to minimize the exposure to radiological hazards and the spread of radiological contamination at the source.
168. CNSC staff submitted that CNL's radiological hazard control practices and planned improvements at CRL were adequate, and that CNL met regulatory requirements in this regard.
169. On the basis of the information provided for this hearing, the Commission is satisfied that CNL will continue to adequately identify and control radiological hazards at CRL.

3.8.4 Control of Dose to the Public

170. The Commission considered the effectiveness of CNL's programs to prevent uncontrolled releases of contaminants or radioactive materials to the public from the CRL site. CNL submitted that radiation doses to the public, including visitors to the CRL site, did not exceed the annual dose limit of 1 mSv per year³³ for the most exposed member of the public, as set out in the RPR.
171. CNSC staff confirmed that CNL had effectively controlled the radiological dose to the public. CNSC staff further reported that the maximum effective dose based on all radioactive releases from the CRL site during the current and previous licence periods was 0.081 mSv per year in both 2014 and 2015. CNSC staff informed the Commission that the NRU reactor and Mo-99 production facility accounted for approximately 97% of the radioactive releases from the CRL site and that CNSC staff expected the dose to

³² SOR/2000-207.

³³ The regulatory dose limit for a member of the public is 1 mSv (1,000 µSv) per year and the natural background dose is estimated between 2 mSv – 5 mSv (2,000 µSv – 5,000 µSv) per year.

the public to reduce significantly following the shutdown of the NRU reactor and the closure of the Mo-99 facility.

172. Based on the Commission's assessment of the information provided for this hearing, the Commission is satisfied that CNL is adequately controlling radiological doses to the public from the CRL site.

3.8.5 Conclusion on Radiation Protection

173. 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 and will be in place to control radiation hazards, CNL provides, and will continue to provide, adequate protection to the health and safety of persons and the environment throughout the proposed licence period.
174. The Commission is satisfied that CNL's radiation protection program at CRL meets the requirements of the *Radiation Protection Regulations*.
175. With the shutdown of the proposed NRU reactor and the planned decommissioning and repurposing of buildings at CRL, the Commission expects CNL to continue with updates to its radiation protection documentation and to re-evaluate radiological hazards at the CRL site to ensure that the protection to workers and the public is optimized.

3.9 Conventional Health and Safety

176. The Commission examined the implementation of a conventional health and safety program at CRL, which covers the management of workplace safety hazards. The conventional health and safety program is mandatory for all employers and employees to minimize risk to the health and safety of workers posed by conventional – non-radiological – hazards in the workplace. This program includes compliance with applicable labour codes and conventional safety training. CNSC staff rated CNL's performance in this SCA as "satisfactory" from 2012 to 2017.
177. CNL submitted information about its Occupational Health and Safety (OHS) program at CRL that was mandated by Part II of the *Canada Labour Code*³⁴ (CLC) and its associated regulations,³⁵ and reported that the scope of the OHS program included the processes for the management of health and safety hazards at CNL sites and workplaces. CNL also provided the Commission with details regarding improvement initiatives that had been carried out in respect of the OHS program since 2011.

³⁴ R.S.C., 1985, c. L-2.

³⁵ SOR/86-304.

178. CNSC staff submitted that, in addition to the NSCA, CNL's activities at CRL continued to comply with Part II of the CLC and its associated regulations, as well as all other applicable federal and provincial health and safety acts and regulations. CNSC staff further reported that CNL continued to achieve a high level of personnel safety at CRL through the OHS program.
179. CNL provided the Commission with information about how health and safety awareness was ensured amongst workers at the CRL site, including details about its health and safety training program, the CRL Site Safety and Health Committee and the CRL Health and Safety Policy Committee. CNSC staff confirmed the information provided by CNL, reporting that CNL actively promoted OHS initiatives.
180. CNL reported to the Commission that, since the 2011 licence renewal, there had been an overall improvement in the frequency of recordable lost-time accidents for CRL site workers, as well as an improvement in the trend for the severity of lost-time accidents. CNSC staff confirmed the information provided by CNL and submitted that these statistics represented a key performance indicator of CNL's conventional health and safety program.
181. CNL provided to the Commission with information regarding planned OHS program improvements during the proposed licence period, including CNL's implementation of ISO 45001, *Occupational Safety and Health Management System*.³⁶ and the enhancement of CNL's contractor safety performance assessment.
182. Addressing a question about OHS data for contractors at CRL, the CNL representative stated that contractor injuries were reported and tracked, with a weekly report circulated to CRL staff. The CNL representative also provided the Commission with lost-time injury statistics for contractors during 2016 and 2017. The Commission was satisfied with the information provided on this point.
183. Based on the information presented, the Commission concludes that CNL's conventional health and safety program at CRL satisfies regulatory requirements. The Commission also concludes that the health and safety of workers and the public was adequately protected during the operation of CRL for the current licence period and that the health and safety of persons will continue to be adequately protected throughout the proposed licence period.
184. The Commission notes the decrease in lost-time injuries at CRL and encourages CNL to continue initiatives aimed at maintaining this downward trend during the proposed licence period.
185. The Commission considered interventions from unions and other organizations, noting the high level of collaboration between CNL and these intervenors in regard to worker health and safety at CRL. The Commission encourages this continued collaboration

³⁶ International Organization for Standardization ISO 45001, *Occupational Safety and Health Management System – Requirements*, (Draft)

during the proposed licence period.

3.10 Environmental Protection

186. The Commission examined CNL's environmental protection programs at CRL which identify, control and monitor all releases of radioactive and hazardous substances, and aim to minimize the effects on the environment which may result from the licensed activities. These programs include effluent and emissions control, environmental monitoring and the protection of the public. CNSC staff rated CNL's performance in this SCA as "satisfactory" during the current and previous licence periods.
187. The Commission considered whether CNL's environmental protection programs at CRL adequately met the specifications of REGDOC-2.9.1, *Environmental Protection Policies, Programs and Procedures*.³⁷

3.10.1 Effluent and Emissions Control (Releases)

188. The Commission considered CNL's programs to control the release of effluent and emissions from the CRL site to the environment during the current and previous licence periods. CNL submitted that, during the previous licence period, CNL implemented CSA N288.4-10, *Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills*.³⁸ CNL also submitted information about radiological emissions from the CRL site, including airborne emissions and liquid releases, noting that they were below derived release limits³⁹ (DRL) and regulatory limits. CNL also reported that the DRLs for CRL were updated in 2012 and that these were calculated in accordance with CSA N288.1-08, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*.⁴⁰
189. CNL submitted to the Commission that non-radiological liquid effluents were monitored for compliance against internal CNL guidelines and control limits, CRL licence limits, as well as Ontario's *Wastewater System Effluent Regulations*,⁴¹ as applicable. CNL further informed the Commission that the majority of non-radioactive emissions from the CRL site had remained stable or had reduced slightly over the current licence period and that exceedances were reported in CNL's annual compliance and operational performance monitoring reports.

³⁷ CNSC Regulatory Document REGDOC-2.9.1, *Environmental Policies, Programs and Procedures*, 2013.

³⁸ N288.4, *Environmental monitoring programs at class I nuclear facilities and uranium mines and mills*, CSA Group, 2010 (Reaffirmed 2015).

³⁹ The "derived release limit" (DRL) for a particular radionuclide is the release rate that would result in an annual committed effective radiation dose of 1 mSv to the most exposed group of the public (also known as the critical receptor) for that nuclear substance.

⁴⁰ N288.1-08, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*, CSA Group, 2008.

⁴¹ SOR/2012-139.

190. CNSC staff confirmed the information provided by CNL and submitted that CNL had implemented and maintained adequate effluent monitoring and emissions control programs at CRL during the current and previous licence periods. CNSC staff also reported that a 2015 CNSC review and 2017 inspection of CNL's effluent and emissions control program found that the control, monitoring and reporting of releases at CRL met CNSC expectations and regulatory requirements.
191. CNL submitted to the Commission detailed information regarding action level⁴² exceedances at CRL during the current and previous licence periods, noting that, during 2012 and 2015, there were no action level exceedances. CNSC staff confirmed the information provided by CNL and explained that CNL had adequately investigated the action level exceedances and taken appropriate corrective actions, noting that no regulatory limits for releases had been exceeded. CNSC staff also submitted that, during the proposed licence period, CNL would implement CSA N288.8-17, *Establishing and implementing action levels for releases to the environment for nuclear facilities*.⁴³
192. The Commission noted that total particulate matter airborne releases from CRL had decreased from 2012 to 2015, followed by an increase in 2016, and requested additional information in this regard. The CNL representative responded that the source of these emissions was almost exclusively the smokestack emissions from the heavy oil burning powerhouse at CRL and stated that the heavy oil burning powerhouse had been replaced with a natural gas facility, which should reduce emissions. Asked if CRL decommissioning activities had contributed to the emissions increase, the CNL representative confirmed that they had not. The Commission was satisfied with the information provided regarding the total particulate matter airborne releases from CRL.
193. In its intervention, the Ottawa Riverkeeper expressed a concern regarding CNL being permitted to pump liquid effluent directly into the ground and the Commission called for comments on this matter. CNSC staff responded that the pumping of liquid into the ground was not an authorized activity pursuant to the *Class I Nuclear Facilities Regulations*, and that CNL was not permitted to pump, and had not pumped, liquid effluent directly into the ground. The CNL representative provided additional information regarding CNL's management of liquid effluent to the Commission, including the treatment of liquid effluent at CRL and how CNL ensured that its management of liquid effluent met regulatory requirements. Based on the information provided and the intervenor's concerns, CNSC staff may consider a modification to the LCH to more clearly reflect regulatory requirements in regard to the management of liquid effluent releases, including the prohibition against pumping liquid effluent

⁴² The *Radiation Protection Regulations* define an "action level" as a specific dose of radiation or other parameter that, if reached, may indicate a loss of control of part of a licensee's radiation protection program and triggers a requirement for a specific action to be taken.

⁴³ N288.8-17, *Establishing and implementing action levels for releases to the environment for nuclear facilities*, CSA Group, 2017.

directly into the ground.

194. The Commission noted the concerns expressed in several interventions from the Métis Nation of Ontario (MNO), Concerned Citizens of Renfrew County, Ottawa Riverkeeper, the Old Fort Williams Cottagers' Association, the Ottawa River Institute, Prevent Cancer Now and individuals regarding releases from the CRL site and the site's proximity to the Ottawa River. CNSC staff provided detailed information about the CRL safety case and the thorough environmental monitoring that had been carried out at the site, which showed that CRL did not have a negative impact on the health of the Ottawa River. Notwithstanding its proximity to the Ottawa River, the Commission is, at this time, satisfied with the information provided on this point.
195. On the basis of the information provided for this hearing, the Commission is satisfied that CNL has and will continue to have adequate programs in place for the control of effluent and emissions at CRL to protect the environment and meet regulatory requirements.

3.10.2 Environmental Management System

196. The Commission assessed the information provided by CNL and CNSC staff about the CRL environmental management system (EMS). CNL submitted that its EMS was ISO 14001:2004⁴⁴ certified and that CNL planned to achieve ISO 14001:2015 certification in the proposed licence period. CNSC staff confirmed the information provided by CNL and submitted that the CRL EMS met the specifications of CNSC REGDOC-2.9.1.
197. In its intervention, CELA submitted the concern that only section 4.6 of REGDOC-2.9.1 was referenced in the proposed LCH, not the whole REGDOC-2.9.1 as was done for the current LCH. CNSC staff explained that the previous LCH referenced REGDOC-2.9.1, version 1. CNSC staff further explained that REGDOC-2.9.1, version 1.1⁴⁵ was issued by the CNSC in 2017 and that this version had been greatly expanded, with section 4.6 of REGDOC-2.9.1, version 1.1 including all of the information from the entire REGDOC-2.9.1, version 1. CNSC staff provided additional details and confirmed that compliance criteria for CNL had not been reduced in the proposed licence and LCH. The Commission is satisfied that REGDOC-2.9.1, version 1.1, section 4.6 adequately provides for compliance criteria in respect of CNL's EMS for CRL.
198. Based on the information provided, the Commission is satisfied that CNL has maintained, and will continue to maintain, an adequate EMS at CRL.

⁴⁴ CAN/CSA-ISO 14001:2004, *Environmental Management Systems – Requirements with Guidance for Use*, CSA Group, 2004.

⁴⁵ CNSC Regulatory Document REGDOC-2.9.1, *Environmental Principles, Assessments and Protection Measures*, version 1.1, 2017.

3.10.3 Assessment and Monitoring

199. The Commission considered the information submitted by CNL and in CNSC staff's EA Report for this licence renewal and information regarding past EAs conducted at the CRL site. CNL submitted detailed information about its Integrated Environmental Monitoring Program and explained that this program consisted of effluent, environmental and groundwater monitoring within the CRL site, as well as monitoring locations in downstream and upstream communities in both Ontario and Québec. CNL submitted that, during the previous licence period, CSA N288.4-10, *Environmental monitoring programs at Class I Nuclear Facilities and Uranium Mines and Mills*⁴⁶ had been implemented at CRL. CNL also submitted information about radiation monitoring programs and the implementation of action levels at CRL.
200. CNSC staff confirmed the information provided by CNL and submitted that CNL had maintained an adequate environmental monitoring program at CRL throughout the current and previous licence periods.
201. The Commission examined the intervention from the Algonquins of Ontario (AOO) and, noting that CNL had an extensive off-site environmental monitoring process in place for the CRL site, enquired about whether CNL had invited the AOO to participate in this program. The CNL representative responded that the AOO did not participate in CNL's environmental monitoring programs but noted that, through a 2013 lifestyle and food consumption survey, CNL incorporated traditional land use and food consumption in CRL's environmental modelling. The AOO representative stated that the AOO was not currently involved in environmental monitoring at CRL but was interested in building this relationship with CNL to ensure a deeper understanding of Algonquin traditional knowledge and land use as it related to the CRL site.
202. The Commission noted that several intervenors enquired about the public availability of environmental monitoring data and requested additional information in this regard. The CNL representative responded that environmental monitoring reports for CRL were disseminated through the CNL Environmental Stewardship Council or upon request. The CNL representative also stated that CNL's annual reports included environmental monitoring data and were posted in both official languages on CNL's website or available upon request. The Commission is satisfied with the information provided on this point but nonetheless encourages licensees to release relevant environmental data in a timely manner.

Groundwater Monitoring

203. CNL provided the Commission with details about its groundwater monitoring program (GWMP) at CRL, noting that it included regular sampling around waste management

⁴⁶ N288.4-10, *Environmental monitoring programs at Class I Nuclear Facilities and Uranium Mines and Mills*, CSA Group, 2010.

areas and other facilities that presented a potential source of groundwater contamination. CNL added that both radiological and non-radiological contaminant GWMP sample concentrations were reported annually to CNSC staff.

204. CNSC staff confirmed the information provided by CNL and provided details about the data reviewed along with the measured increases and decreases in specific contaminant concentrations. CNSC staff also described its review of the 2016 report on the NRX rod bay plume and submitted that this plume did not pose a significant risk to human health and the environment. CNSC staff also informed the Commission that, during the proposed licence period, CNL would implement the updated CSA N288.7-15 for its GWMP.
205. The Commission noted the concerns in the intervention from K. Smith regarding the monitoring and remediation of the NRX rod bay plume and requested additional information on this matter. The CNL representative provided further details regarding the NRX rod bay plume and noted that, while it contained a concentration of approximately 30 Bq per litre of strontium-90 and was therefore above the 5 Bq per litre Health Canada drinking water quality guidelines,⁴⁷ the plume was limited to the CRL site and therefore would not enter any drinking water sources. The CNL representative further explained that groundwater plumes at CRL were well characterized, with characterization subject to periodic updates and annual sampling. Based on the information provided on the NRX rod bay plume and other plumes on the CRL site, the Commission is satisfied that contaminant plumes have been adequately characterized by CNL, are being adequately monitored and present no unreasonable risk to the health and safety of people or the environment.
206. The Commission considered the intervention from C. Dexter and enquired about the status of the drinking water in the vicinity of the CRL site. CNSC staff responded that the concentrations of all levels of contaminants in drinking water near CRL were below Health Canada's drinking water quality guidelines for the areas outside of the CRL site and provided detailed information in this regard. CNSC staff also stated that monitoring results from the CNSC's Independent Environmental Monitoring Program (IEMP) showed that the environment outside the CRL site remained protected. Based on the information examined, the Commission is satisfied that the drinking water in the vicinity of CRL remains safe.

Independent Environmental Monitoring Program

207. The Commission examined the information provided by CNSC staff with regard to the CNSC's IEMP. CNSC staff provided detailed results from monitoring that was carried out in 2012, 2013 and 2015 in publicly accessible areas outside the perimeter of the CRL site, noting that the measured radioactivity in all samples was below CNSC

⁴⁷ Health Canada, *Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau*, with the 5 Bq per litre concentration specific to strontium-90, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, ON, 2017.

reference levels⁴⁸ and the results for all radiological and non-radiological contaminants were significantly below Health Canada's drinking water quality guidelines. CNSC staff added that the IEMP results were publicly available on the CNSC website and that they were consistent with CRL environmental monitoring results. CNSC staff informed the Commission that the IEMP results confirmed that the public and the environment near the CRL site were protected.

208. The Commission considered the intervention from G. Charbonneau that expressed a concern regarding the frequency of the IEMP water quality sampling near the CRL site. CNSC staff replied that IEMP sampling results were only one source of data for the assessment of CNL's environmental protection programs and that data from CNL's continuous effluent monitoring in conjunction with other daily environmental monitoring were reported to CNSC staff quarterly and annually.
209. Based on the information submitted by CNSC staff and CNL, the Commission is satisfied that environmental monitoring both within and outside the perimeter of the CRL site will continue to show that CNL will make adequate provision for the protection of the environment, CRL workers and the public.

3.10.4 *Environmental Risk Assessment*

210. The Commission assessed the adequacy of the Environmental Risk Assessment (ERA) carried out by CNL for the CRL site. CNL submitted that a site-wide ERA was submitted to the CNSC in December 2013 and that it was carried out in accordance with CSA N288.6-12, *Environmental risk assessment at Class I nuclear facilities and uranium mines and mills*.⁴⁹ The 2013 ERA resulted in ten recommendations, four of which had been completed, with the remaining six in progress with a December 2018 completion date. CNL added that the status of those recommendations was updated annually in CNL's environmental monitoring reports and that an updated ERA would be submitted to the CNSC by the end of 2018.
211. CNSC staff confirmed the information provided by CNL and submitted information to the Commission regarding key findings from CNL's 2013 ERA for the CRL site. CNSC staff submitted that the ERA and the 2016 remediation option assessment met CNSC expectations and that risks to humans and the environment as a result of CRL operations were determined to be low.
212. CNL provided the Commission with information about the distribution and movement patterns of four turtle species at the CRL site. CNL also reported to the Commission about mitigation measures and conservation initiatives implemented in this regard,

⁴⁸ CNSC reference levels are established based on conservative assumptions about the exposure scenario and using N288.1-14. On this basis, the reference level for a particular radionuclide in a particular medium represents the activity concentration that would result in a dose of 0.1 mSv per year.

⁴⁹ N288.6-12, *Environmental risk assessment at Class I nuclear facilities and uranium mines and mills*, CSA Group, 2012.

including the installation of a new culvert to reduce turtle fatalities resulting from road crossings.

213. CNL also provided the Commission with information regarding the barn swallow, chimney swift and brown bat populations at the CRL site, noting that new habitats for barn swallows and brown bats had been constructed during the current licence period. CNL further submitted information about and the evaluation of impacts on roosting chimney swifts through ongoing roost counts, video surveillance and the installation of temperature and radiation dose monitors in the Mo-99 production facility stack. CNL reported that the resulting radiation dose estimates indicated a very low risk for the chimney swifts and showed potential dose rates to be well below the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) dose guidelines⁵⁰ for terrestrial organisms. CNSC staff confirmed the information provided by CNL and submitted that CNL's September 2017 revised dose limits for chimney swifts were well below the UNSCEAR dose limits and presented a negligible risk to the species.
214. Asked to comment on CNL's ERA, the Environment and Climate Change Canada (ECCC) representative reported to the Commission that ECCC had reviewed CNL's 2013 ERA and had expressed concerns regarding several groundwater plumes and contaminated areas at the CRL site. The ECCC representative further explained that ECCC had concerns with respect to the site's potential impact on species at risk, such as Blanding's turtles, from contamination plumes closest to the wetlands and provided the Commission with information about the applicability of the *Species at Risk Act*.⁵¹ at CRL. The ECCC representative acknowledged that CNL had committed to the implementation of mitigation measures in respect of the contaminant plumes, and noted that ECCC would continue to engage with CNL in this regard throughout the proposed licence period and would assess the impacts of the mitigation measures as reported in CNL's next ERA. The Commission expresses its appreciation for ECCC's contributions to this hearing process and encourages CNL to continue its collaboration with ECCC in this regard.
215. The Commission examined the concerns expressed in the interventions from K. Smith and C. Renault regarding the impacts of radiation on terrestrial biota at the CRL site and requested additional information in this regard. CNSC staff stated that CNL's ERAs and the CNSC's EA Report had considered radiation doses to terrestrial biota at the CRL site and found that any exceedances were localized to small areas of the site and did not pose a risk to human health or terrestrial biota. CNSC staff also confirmed that radiation doses to these receptors were well below UNSCEAR guidelines and that CNL would include any additional information obtained through its monitoring activities in the updated 2018 ERA. The Commission is satisfied that radiation doses to terrestrial biota are being adequately monitored at the CRL site and will be adequately considered in CNL's updated 2018 ERA.

⁵⁰ United Nations, *UNSCEAR 2016 Report, Report to the General Assembly*, United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), 2016.

⁵¹ S.C. 2002, c. 29.

216. The Commission further enquired about whether CNL's annual reports would include updates on the progress with respect to projects relating to species at risk at the CRL site. The CNL representative confirmed that information in this regard would be presented in the annual CRL environmental report. The Commission was satisfied on this point.
217. The Commission requested comments regarding a recommendation in the intervention from the MNO to include Métis-specific knowledge when reviewing receptor locations for the next ERA. CNSC staff responded that it expected CNL to engage with the MNO and other Indigenous groups in this regard and to include receptor location information acquired through these engagement activities in the updated CRL ERA. The CNL representative provided confirmation to the Commission that the updated 2018 CRL ERA would incorporate all available information shared by Indigenous groups through CNL's engagement activities. The Commission strongly encourages and expects CNL to adequately engage with Indigenous groups to ensure that all potential receptors will be considered in the updated ERA.
218. The Commission assessed information regarding the remediation of contaminated sediment in a small area of the Ottawa River caused by historical releases from the NRX reactor. CNL provided detailed information regarding its Ottawa Riverbed Remediation Project, noting that CNL had been sampling and analyzing riverbed sediments adjacent to, upstream of and downstream of the CRL site since the 1950s and that the riverbed was well characterized. CNL submitted that results of the Ottawa Riverbed Remediation Project showed that the potential human health and ecological risks from the presence of contaminated Ottawa River sediments were, and would continue to be, very low and that natural attenuation had been determined to be the most viable remediation option. CNSC staff informed the Commission that CNL's Ottawa Riverbed Remediation Project was carried out adequately and that it was of the opinion that remediation through natural attenuation was an acceptable option.
219. The Commission noted that the intervention from the Ottawa Riverkeeper expressed the concern that CNL's Ottawa Riverbed Remediation Project only included monitoring and no remediation methods other than natural attenuation and requested additional information in this regard. The CNL representative provided additional details about the Ottawa Riverbed Remediation Project that was initiated in 2006, as well as about the remediation methods considered during the project, and stated that, following the conclusion of the project in 2014, monitored natural attenuation was the preferred remediation option since the existing levels of contamination posed very low risks. CNSC staff informed the Commission that, based on its review of the project results, CNSC staff found that a monitored natural attenuation option was an acceptable option. The Commission is satisfied with the acceptability of the results of the Ottawa Riverbed Remediation Project and the acceptability of natural attenuation as a remediation method in this regard.

220. Based on the information presented on the record for this hearing, the Commission is satisfied that the 2013 CRL ERA was carried out satisfactorily and showed that CNL was adequately protecting the environment in the vicinity of the CRL site. The Commission anticipates that CNL's updated ERA will reflect Indigenous considerations, will be submitted to CNSC staff and that the remaining six of ten recommendations contained in the 2013 ERA will be completed by December 2018.

3.10.5 Fish Impingement and Entrainment and Fisheries Act Authorization

221. The Commission assessed the information submitted for this hearing regarding the impingement and entrainment of fish resulting from CRL site operations. CNL provided the Commission with details of its fish impingement monitoring program and the resulting models of the most frequently impinged fish. CNL added that a two-year entrainment study that concluded in 2017 addressed CNSC staff's concerns regarding missing information in a 2015 CNL self-assessment.
222. CNSC staff confirmed the information provided by CNL and submitted that, under the NSCA, CNSC staff had found that there was no unreasonable risk to fish populations from impingement or entrainment and that CRL was licensable in this regard. CNSC staff further submitted that the 2012 changes to the *Fisheries Act*⁵² (FA) introduced the prohibition on serious harm to fish and, in 2015, prompted the CNSC to request that CNL carry out an impact self-assessment in line with Fisheries and Oceans Canada (DFO) guidelines. CNSC staff noted that the two-year entrainment study that concluded in 2017 showed that current CRL operations may result in harm to fish and that a subsection 35(1) FA authorization may be required.

Fisheries Act Authorization

223. The Commission notes that a subsection 35(1) FA authorization from DFO may be required for CRL site operations. The need for an FA authorization is based on the definition of "serious harm" in the FA, which deals directly with impacts to fish rather than the general environmental protection requirements of the NSCA and CEAA 2012, which assess impacts at a population level.
224. CNL submitted that, following CNL's self-assessment of the NRU cooling water intake which concluded that serious harm to fish was occurring at CRL, the CNSC requested that CNL review its self-assessment taking into consideration the implications of the NRU reactor shutdown. CNL provided the Commission with information about tentative plans for a reduction in the water intake rate beginning in March 2018, noting that a revised self-assessment could only be submitted following the NRU reactor shutdown due to the uncertainties in future water use at CRL. CNSC staff confirmed the information provided by CNL and reported that, for the reasons stated by CNL, CNSC staff was not yet in a position to make a recommendation to

⁵² R.S.C., 1985, c. F-14.

DFO regarding the FA authorization.

225. CNSC staff provided the Commission with information about the FA authorization process, including the respective roles outlined in the CNSC-DFO Memorandum of Understanding. CNSC staff explained that it would oversee the CNL self-assessment process, make a recommendation to DFO on whether an FA authorization application was required and, if required, oversee the draft application for the FA authorization. Asked by the Commission to comment further on the FA authorization process, CNSC staff submitted to the Commission additional information about the steps in the process and explained that CNSC staff's assessment had found that the current status of the FA authorization review was not an impediment to the licence renewal. In this same vein, CNSC staff stated that a CNSC licence renewal would not limit DFO's ability to fulfil its mandate under the FA.
226. In reference to the intervention from the AOO, the Commission enquired about the possibility that an FA authorization would not be required for CRL. CNSC staff responded that, in 2005 and 2006, DFO did not require screens on the intake pipes and that there was no trigger for an FA authorization. CNSC staff further stated that the 2012 changes to the FA revised the threshold requirements for an FA authorization and that this requirement would be assessed and determined following the receipt of the self-assessment updates from CNL. The Commission is satisfied with the information provided on this point.
227. The Commission concludes that the environmental protection requirements of the NSCA as they relate to the protection of the environment generally are satisfied. The Commission is satisfied with CNSC staff's assessments regarding the current status of the impingement and entrainment data review and the need to incorporate a revised water intake profile following the NRU reactor shutdown before submitting a subsection 35(1) FA authorization recommendation to DFO for CRL. The Commission notes that the renewal of CNL's licence for CRL is not precluded by the possibility of specific requirements of the FA, and that this licence renewal does not limit the ability of the DFO to fulfill its mandate under the FA.

3.10.6 Protection of the Public

228. The Commission assessed CNL's programs to mitigate risk to members of the public from hazardous substances discharged from the CRL site. CNL submitted that its monitoring activities included the monitoring of ambient air, effluents, Ottawa River water, other surface waters, groundwater and foodstuffs. CNL informed the Commission that, since the 2011 licence renewal, radiation monitoring results verified that the level of contamination outside the CRL site due to its operations did not exceed the annual dose limit of 1 mSv per year for any member of the public. Regarding non-radiological contaminants, CNL submitted that monitoring results for those contaminants were consistent with previous years and remained below both regulatory and licence limits.

229. CNL also submitted that protection of the public from both radiological and non-radiological releases was and would continue to be improved upon through projects including the shutdown of the NRU reactor and the Mo-99 production facility, the conversion of CRL's heavy oil powerhouse to natural gas, the construction of a new sanitary sewage treatment facility and a storm water management system, the installation of a permeable reactive barrier to remediate the groundwater plume coming out of waste management Area A, and a cover on waste management Area C.
230. CNSC staff confirmed the information provided by CNL and reported that, based on the EA carried out under the NSCA for this licence renewal and other CNSC compliance verification activities, CNSC staff had found that CNL has made and will continue to make adequate provision for the protection of the environment and the health of workers and the public.
231. Based on the information provided, the Commission is satisfied that CNL's programs to mitigate risk to members of the public from CRL operations are adequate.

3.10.7 Conclusion on Environmental Protection

232. Based on the assessment of the application and the information provided on the record for this hearing, the Commission is satisfied that, given the mitigation measures and safety programs that are in place to control hazards, CNL will provide adequate protection for the health and safety of persons and the environment throughout the proposed licence period.
233. The Commission is satisfied that the CNL environmental protection programs adequately meet the applicable specifications of REGDOC-2.9.1, as well as the specifications of all other relevant standards and regulatory requirements.
234. The Commission is satisfied that the EA conducted by CNSC staff under the NSCA and the CNSC EA Report were adequate for the Commission's consideration of environmental protection for this licence renewal application.
235. The Commission is satisfied with CNSC staff's description of the review underway to determine the requirement for a subsection 35(1) FA authorization for CRL. It will be DFO that will make any decisions under the FA and the Commission expects CNSC staff to provide updates in this regard during an annual ROR presentation.
236. The Commission expects CNL to implement updated standards during the proposed licence period as described in the information submitted for this hearing. The Commission also expects CNL to submit an updated ERA for the CRL site to the CNSC as detailed during this hearing and to continue its water intake assessments in relation to the FA authorization process.

237. The Commission notes several interventions from groups and individuals expressing the view that CNL had an effective environmental protection program at the CRL site and demonstrated a high level of environmental stewardship.
238. The Commission also notes the interventions from groups including the Ottawa Riverkeeper, CELA, Northwatch, the MNO, the AOO, the Concerned Citizens of Renfrew County and individuals that expressed concerns about environmental protection at CRL. Based on the information examined by the Commission and provided during this hearing, the Commission is satisfied that CNL has an effective environmental protection program in place to ensure the health and safety of persons and the environment. The Commission encourages CNL to continue its engagement activities with the public in this regard.

3.11 Emergency Management and Fire Protection

239. The Commission considered CNL's emergency management and fire protection programs which cover the measures for preparedness and response capabilities implemented by CNL in the event of emergencies and non-routine conditions at CRL. CNSC staff rated CNL's performance in this SCA as "satisfactory" from 2012 to 2017.
240. CNL submitted to the Commission that the CRL Emergency Management Program (EMP) focused on the prevention and mitigation of, the preparedness for, the response to, and the recovery from, abnormal or emergency events. CNL further submitted that the EMP applied to all of the activities at CRL and allowed CNL to provide off-site emergency support, if required.
241. CNL provided information to the Commission regarding improvements to internal and external interoperability of emergency responders, as well as the implementation of improved SAT-based training programs for the CRL Emergency Operations Centre (EOC) members.
242. CNSC staff confirmed the information provided by CNL and reported that, during the current and previous licence periods, CNL had enhanced its emergency preparedness and response capabilities through lessons learned from the Fukushima Daichii accident and OPEX.

3.11.1 Conventional Emergency Preparedness and Response

243. The Commission considered the adequacy of CNL's conventional (non-nuclear) emergency management programs at CRL. CNL submitted that all required annual drills and exercises were completed as required, that Severe Accident Management Guidelines had been implemented and validated, and that several other emergency preparedness plans and procedures were updated. CNL further submitted that several improvements were made to the EMP program, including an upgraded EOC, Severe

Accident Management improvements to the EOC, a Planning Section Room for operational emergencies, and the establishment of an emergency mitigation equipment inventory.

244. CNSC staff confirmed the information provided by CNL and submitted that CNL continued to maintain conventional emergency response programs with emergency personnel available on site 24 hours a day to respond to any type of emergency. CNSC staff further submitted that CNL's conventional emergency response program satisfied regulatory requirements.
245. The Commission requested additional information about the mutual aid agreements that CNL had with Garrison Petawawa. The CNL representative stated that Garrison Petawawa participated in several exercises at CRL and provided information about the mutual aid agreements. The Commission was satisfied with the information provided on this point.
246. Based on the information provided on the record for this hearing, the Commission is satisfied with CNL's programs to manage conventional emergencies at the CRL site.

3.11.2 Nuclear Emergency Preparedness and Response

247. The Commission considered the information submitted by CNL and CNSC staff about nuclear emergency management at CRL. CNL informed the Commission regarding nuclear emergency preparedness measures at CRL, which were governed by the *Chalk River Laboratories Site Emergency Response Plan*.⁵³ (CRL Emergency Response Plan). CNL also provided details regarding the performance of a gap analysis with REGDOC-2.10.1, *Nuclear Emergency Preparedness and Response*.⁵⁴ in preparation for the NRU reactor shutdown and its transition from a Class IA to a Class IB facility.
248. CNL reported that, in May 2014, it had participated in a three-day nuclear emergency preparedness exercise in Southern Ontario along with the municipal, provincial and federal governments. CNL submitted that participation in this exercise had led to improvements in its internal and external interoperability capabilities. CNL also submitted information about nuclear emergency preparedness improvement initiatives for the proposed licence period including a risk-based emergency management framework, improved hazard identification and risk assessment, and a more comprehensive business continuity program.

⁵³ Canadian Nuclear Laboratories, CRL-508730-ERP-001, *Chalk River Laboratories Site Emergency Response Plan*.

⁵⁴ CNSC Regulatory Document REGDOC-2.10.1, *Nuclear Emergency Preparedness and Response*, 2014.

249. CNL provided the Commission with an update on the distribution of potassium iodide (KI) pills to all permanent residents within the CRL Primary Zone,⁵⁵ in accordance with the specifications of REGDOC-2.10.1. CNL reported that all required KI distribution was completed in 2015.
250. CNSC staff confirmed the information provided by CNL and reported that the CRL Emergency Response plan was in-line with the criteria of REGDOC-2.10.1, *Emergency Preparedness and Response*, Version 2.⁵⁶
251. The Commission considered CNL's adoption of the Ontario Provincial Incident Management System in 2015 at CRL.⁵⁷ CNL informed the Commission that that system provided a standard framework regarding emergency response, and was utilized by many emergency response organizations in Ontario.
252. The Commission enquired about how emergency management programs CRL would change following the shutdown of the NRU reactor. CNSC staff provided information regarding the changes that could be made to the emergency management program at CRL following the NRU reactor shutdown, noting that CNL would still have to meet the specifications of REGDOC 2.10.1 and meet CNSC regulatory requirements.
253. Further on this topic, CNSC staff stated that the updated Provincial Nuclear Emergency Response Plan⁵⁸ (PNERP) required that CNL communicate with the Province of Ontario about the updated off-site risks posed by CRL. The Ontario Office of the Fire Marshal and Emergency Management (OFMEM) representative provided the Commission with information about the changes that had been made to the PNERP and about the CRL-specific implementation plans that CNL had submitted to the OFMEM. The OFMEM representative further explained that, following the NRU reactor shutdown, the residual risk at the CRL site would be assessed and that emergency planning within the context of the PNERP would only be modified following this risk analysis to ensure that emergency planning would reflect the actual risk posed by the site.
254. Upon request for comment from the Commission, the Sécurité Civile de la Région de l'Outaouais representative explained that, much like the Province of Ontario's PNERP, the Province of Quebec's emergency planning in respect of CRL would remain unchanged until the residual CRL site risk following the NRU reactor shutdown was reassessed.

⁵⁵ The primary zone is defined as "The area around a nuclear installation within which detailed planning and preparedness are carried out for measures against exposure to a radioactive emission." (source: CNSC REGDOC-2.10.1, *Nuclear Emergency Preparedness and Response*).

⁵⁶ CNSC Regulatory Document REGDOC-2.10.1, *Nuclear Emergency Preparedness and Response*, Version 2, 2016.

⁵⁷ *Incident Management System (IMS)*, Ontario Ministry of Community Safety and Correctional Services, https://www.emergencymanagementontario.ca/english/emcommunity/ProvincialPrograms/IMS/ims_main.html.

⁵⁸ Officer of the Fire Marshal and Emergency Management, *Provincial Nuclear Emergency Response Plan, Master Plan 2017*, Ontario Ministry of Community Safety and Correctional Services, 2017.

255. The Commission enquired about whether the Deep River and District Hospital participated in CNL's emergency planning and exercises. The CNL representative provided the Commission with information about the exercises in which the Deep River and District Hospital had participated during the current licence period.
256. Based on the information submitted for this hearing, the Commission is satisfied that CNL has appropriate emergency plans in place to protect the health and safety of persons and the environment in the event of a nuclear emergency at CRL.

3.11.3 *Fire Emergency Preparedness and Response*

257. The Commission examined the adequacy of the fire protection program at CRL. CNL submitted detailed information regarding a large number of fire response capability improvements that CNL had implemented since 2011 at CRL. CNL reported that improvements included the requalification of all fire response personnel to meet the specifications of NFPA 1081, *Standard for Facility Fire Brigade Member Professional Qualifications*.⁵⁹ and the performance of exercises using the new pre-incident plans and evaluation criteria from CSA N293-07, *Fire protection for CANDU nuclear power plants*.⁶⁰ CNL also informed the Commission that a larger shift complement of the industrial fire brigade (IFB) with increased training and exercises had been implemented at the CRL site.
258. CNSC staff submitted to the Commission that the fire protection programs CRL met the specifications of CSA N393-13, *Fire protection for facilities that process, handle, or store nuclear substances*.⁶¹ CNSC staff also confirmed that CNL had implemented significant physical and programmatic fire protection upgrades at CRL. CNSC staff submitted that the firefighting skills and competencies of the IFB members, as well as all firefighting equipment, were maintained and in good condition and that CNL's fire response program at CRL met regulatory requirements.
259. Based on the information provided, the Commission is satisfied that CNL has an adequate fire protection program in place at CRL that meets regulatory requirements.

3.11.4 *Conclusion on Emergency Management and Fire Protection*

260. Based on the above information provided on the record for this hearing, the Commission concludes that the CRL nuclear and conventional emergency management preparedness programs and the fire protection measures in place, and that will be in place during the proposed licence period, are adequate to protect the health and safety of persons and the environment.

⁵⁹ NFPA 1081, *Standard for Facility Fire Brigade Member Professional Qualifications*, National Fire Protection Association, 2012.

⁶⁰ N293-07, *Fire protection for CANDU nuclear power plants*, CSA Group, 2007 (Reaffirmed 2012).

⁶¹ N393-13, *Fire protection for facilities that process, handle, or store nuclear substances*, CSA Group, 2013.

261. Based on the information submitted for this hearing, the Commission is satisfied that the CNL's EMP and CRL Site Emergency Response Plan meet regulatory requirements.
262. Based on the information considered for this hearing, the Commission is satisfied that the CRL Primary Zone is protective of the public and the environment and that there would be minimal impact outside of the Primary Zone in the event of an emergency at CRL. The Commission looks forward to emergency planning updates for CRL following the NRU reactor shutdown during the presentation of an annual ROR.

3.12 Waste Management

263. The Commission assessed CNL's site-wide waste management program. Throughout the current and previous licence periods, CNSC staff rated CNL's performance in this SCA as "satisfactory."
264. CNL provided the Commission with information about its waste management program at CRL and how CNL's approach to waste management provided for waste processing and storage services that complied with regulatory requirements and ensured the health, safety and security of persons and the environment for future generations. CNL informed the Commission that, through major initiatives such as expansions and other developments within its waste management program, CNL would ensure the continued availability of waste storage facilities CRL. CNL also submitted that, through its waste characterization, storage and disposal procedures, most waste materials were decontaminated and removed from CRL as clean waste.
265. CNSC staff confirmed the information provided by CNL and reported that CNL had implemented a number of waste minimization initiatives at CRL since 2012. CNSC staff submitted that its assessment of CNL's Integrated Waste Strategy showed that CNL's efforts to minimize and effectively manage waste were satisfactory and met CNSC expectations. CNSC staff further informed the Commission that CNL had demonstrated a commitment to the segregation and characterization of legacy and more recent waste through improved and updated classification strategies.
266. Asked by the Commission about the management of complex waste streams, the CNL representative explained that CNL had used commercial vendors for this type of work, including vendors in the United States. The Commission also noted a concern expressed in several interventions regarding the nuclear substances that were returned from the United States following this type of processing and requested additional information in this regard. The CNL representative explained that, when wastes were sent to the United States for segregation or minimization processing, the residual nuclear substances were returned to CNL for disposal. This is contemplated in the *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive*

*Waste Management*⁶² (JC) to which Canada is a signatory. The Commission is satisfied with the information provided on this topic.

267. Following a request for clarification from the Commission on Canada's obligations under the JC, CNSC staff explained that, with Canada being a signatory to the JC, Canadian licensees only accepted waste that was produced in or originally generated within Canada. CNSC staff also stated that the JC required Canada to submit a report about its waste inventories every three years and that a summary of the report was available to the public through the CNSC website, with the full report available on request.
268. The Commission noted that, in its intervention, Northwatch expressed the concern that CNL was not complying with licence application requirements of the *General Nuclear Safety and Control Regulations*⁶³ (GNSCR), nor with several IAEA waste management principles, and requested additional information on this point. In respect of the licence application requirements of the GNSCR, CNSC staff explained that, since CNL held an existing operating licence for CRL and section 7 of GNSCR permitted the licensee to incorporate by reference in the application any information that was included in a licence, CNL's licence renewal application was complete. In this regard, the Commission understands that detailed information about waste is also found in documentation such as the Comprehensive Preliminary Decommissioning Plan (CPDP), Waste Management Program documents and Annual Safety Reports submitted by CNL. In regard to the IAEA waste management principles, CNSC staff explained that, although IAEA waste management principles were guidelines and not regulatory requirements, these principles were considered and captured throughout CNL's licence and LCH in multiple licence conditions. CNSC staff also stated that it had ensured that CNL's licence renewal application had adequately considered the IAEA guidance principles in its programs, the relevant SCAs and that it met regulatory requirements. The Commission is satisfied that CNL's licence application considered all waste management requirements and was complete in this regard.
269. The Commission enquired about CNL's lessons learned from previous remediation activities, noting there would be significant site remediation at CRL during the proposed licence period. The CNL representative explained that CNL had started with the decommissioning of simpler buildings to ensure the development of safe and efficient work processes. The CNL representative also provided the Commission with additional information about its remediation work planning, noting that mechanisms were in place to encourage the sharing of lessons learned with the program group and facilitating the dissemination of these lessons learned to other projects at CRL and other CNL sites through the OPEX program. The CNL representative provided examples of recent lessons learned and further explained that external expertise was integrated into its OPEX program.

⁶² International Atomic Energy Agency, *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*, INFCIRC/546, entered into force on 18 June 2001.

⁶³ SOR/2000-202.

270. The Commission also enquired about whether CNL had consulted with international organizations regarding waste management best practices. The CNL representative responded that it had consulted and considered available information from international sources, including site visits.
271. The Commission considered the interventions from several intervenors, notably G. Charbonneau, M. Brown and E. Barbeau, and requested additional information about CNL's plans to manage its waste over the proposed 10-year licence period. The CNL representative provided the Commission with information about how waste would continue to be safely stored until the approval and licensing of a permanent disposal facility at CRL and confirmed CNL's commitment to effective waste management at CRL. The CNL representative added that any change to its waste management programs that required a new licensing basis would be presented before the Commission. CNSC staff confirmed the information provided by CNL and added that compliance activities and a review of CNL's licence application showed that CNL's waste management programs were adequate for the proposed activities at CRL.
272. The Commission requested details about where waste materials from the deconstruction of buildings at CRL would be stored. The CNL representative confirmed that waste volume assessments had already been conducted in this regard and that the current onsite waste management facilities were adequate for this waste. The CNL representative further stated that contaminated materials would be stored in interim storage at the CRL site, with waste minimization efforts ensuring that as much material as possible could be decontaminated and landfilled. The Commission was satisfied with the information provided in this regard.
273. The Commission requested additional details about the conditions under which waste from other Canadian sites could be disposed of at CRL. CNSC staff explained that, although waste owners were responsible for implementing appropriate waste management solutions, this could include the services from a Canadian third party. The AECL representative also informed the Commission that, through the Go-Co contract, CNL could continue to accept waste from third parties provided that there was no significant increase to the volume or nature of the materials accepted. Based on the information provided, the Commission is satisfied that CNL has adequate measures in place to ensure that any third-party radioactive wastes accepted for storage at CRL meet regulatory requirements.
274. In its consideration of the intervention from the COG, the Commission enquired about COG's collaboration with CNL for on-site remediation, safe storage and long-term storage initiatives. The COG representative stated that COG had collaborated with CNL in regard to remediation activities. The COG representative also stated that COG, CNL and the other Canadian nuclear waste producers formed the Radioactive Waste Leadership Forum with the aim to develop a consistent approach to manage radioactive waste, as well as to share knowledge and lessons learned. The Commission was satisfied with the information provided.

3.12.1 Legacy Wastes

275. CNL provided the Commission with information about its management of legacy wastes at CRL. CNL submitted that, with the change in management structure in September 2015, the Nuclear Legacy Liability program had ended and all responsibilities for legacy wastes had transferred from Natural Resources Canada (NRCan) to AECL. CNL also stated that, through environmental remediation projects as well as conservative management and adequate cleanup, the future risk and liability from legacy wastes at CRL would be decreased.
276. CNL provided the Commission with information about the nuclear legacy liability related projects that had been carried out since 2012, as well as the advancement of key milestones in this regard, including the treatment of 350,000 litres of contaminated bay water from the NRX Rod Bay in 2017. CNSC staff confirmed the information provided by CNL, that CNL was adequately managing legacy wastes at the CRL site and that CNL's legacy waste management met regulatory requirements.
277. Noting the concerns from multiple intervenors including the Canadian Coalition for Nuclear Responsibility, Environment Haliburton!, the Concerned Citizens of Renfrew County and individuals regarding the end of the Nuclear Legacy Liability program in 2015, the Commission requested confirmation that the management of these liabilities was now a regulatory requirement under CNL's waste management program. CNSC staff confirmed that all liabilities at the CRL site and associated financial guarantees were part of CNL's waste management program for CRL. The AECL representative provided the Commission with detailed information about how Canada was moving forward with the legacy wastes clean-up and provided examples regarding specific legacy waste projects that have been undertaken since the change to the Go-Co model. The AECL representative also noted that the transfer of the Nuclear Legacy Liability program to AECL consolidated Canada's radioactive waste liabilities with AECL where the expertise to properly oversee these activities exist. The Commission is satisfied with the information provided in this regard and that the management of legacy wastes is properly considered within the CNL waste management program.
278. The Commission sought clarification regarding the value of the financial liability held by AECL in respect of legacy wastes. The AECL representative explained that the estimated cost to fully remediate the Canadian radioactive liabilities at CRL, Port Hope and Whiteshell sites as well as the Nuclear Power Demonstration, Gentilly-1 and Douglas Point reactors was \$7.6 billion.
279. In its consideration of the intervention from Northwatch, the Commission enquired about what legacy waste management information was available to the public. The CNL representative responded that CNL's annual Safety Analysis Report had information on CRL's waste management activities and that this information was also provided through CNL's website, through the Environmental Stewardship Council or upon request. CNSC staff confirmed the information provided by CNL and noted that

the CNSC also provided annual updates on CNL's legacy wastes management through a ROR. The Commission is satisfied that information about CNL's legacy waste management at CRL is available to the public through a variety of channels.

280. The Commission considered the intervention from L. Jones' which expressed concerns about the adequacy of the burial and storage method of three reactor cores at CRL and requested information in this regard. The CNL representative explained that the calandrias in question were stored in dedicated waste management areas, wrapped and enclosed in structures to prevent the migration of contamination. The CNL representative also stated that CNL monitored the waste management areas extensively and that no contamination plumes specific to the three calandrias in question had been identified. In consideration of future management of these waste calandrias, the CNL representative explained that they would be characterized as intermediate-level waste and provided details about how they would be managed and, eventually, stored in a permanent disposal facility. The Commission is satisfied with the information provided in this regard and that CNL has appropriate measures in place to limit contamination migration from legacy calandrias.
281. Based on the information provided for this hearing, the Commission is satisfied that CNL is adequately managing legacy nuclear wastes at CRL within the context of its waste management program.

3.12.2 Conclusion on Waste Management

282. Based on the above information and consideration of the hearing materials, the Commission is satisfied that CNL has appropriate programs in place to safely manage waste at CRL.
283. The Commission recognizes that several intervenors, including the Canadian Coalition for Nuclear Responsibility and individuals, expressed concerns about the costs incurred by nuclear waste liabilities. The Commission wishes to note that financial matters, except financial guarantees, are not part of the CNSC's mandate and that CNL's performance targets were the responsibility of AECL. The Commission wishes to make clear that the responsibility of the Commission and CNSC staff is to ensure that all operations performed at CRL are performed safely and in a manner that is compliant with regulatory requirements.

3.13 Security

284. The security SCA covers the programs required to implement and support the security requirements stipulated in the regulations, licence, orders or expectations for the facility or activity. The Commission examined CNL's security program at CRL, 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 GNSCR and the *Nuclear Security Regulations*.⁶⁴ CNSC staff rated CNL's performance the security SCA as "satisfactory" from 2012 to 2017.

285. CNL provided the Commission with information about its physical security program. CNL reported that a full time Nuclear Response Force (NRF) was in place at CRL and that it met the requirements of the *Nuclear Security Regulations* and the specifications of REGDOC-2.12.1, *High Security Sites: Nuclear Response Force*.⁶⁵ CNL provided the Commission with information about continuous improvement initiatives that had been carried out to its security program following CNSC inspections, performance testing, self-assessments and peer reviews, and also submitted information about improvements planned for the proposed licence period. CNSC staff confirmed that the CNL NRF met regulatory requirements and that CNL conducted in-house and on-site NRF training courses. CNL provided the Commission with information about previous internal self-assessments and third-party peer reviews.
286. CNL submitted that the fitness for duty of its nuclear security officers (NSO) was managed in accordance with RD-363, *Regulatory Requirements for Physical, Medical and Psychological Fitness for Duty*.⁶⁶ In this regard, CNSC staff reported that inspections had identified some non-compliances related to NSO training documentation during the current and previous licence period and that CNL had implemented corrective actions to the satisfaction of CNSC staff.
287. The Commission considered information submitted by CNL regarding security drills conducted to ensure that NSOs responded to simulated design basis threats in accordance with CNL's Security Tactical Plan. CNL also stated that, in accordance with *Nuclear Security Regulations*, police from nearby jurisdictions were invited to attend drills on an annual basis to improve site and response familiarity. CNL informed the Commission that CNL had conducted several regularly scheduled, CNSC audited, force-on-force exercises at CRL to improve integrated response teams capabilities.
288. CNSC staff confirmed the information provided by CNL and reported that CNL carried out required security drills at least every 30 days and a full exercise every two years. CNSC staff reported that all findings related to CNL's security exercises had been addressed by CNL and closed to the satisfaction of CNSC staff.
289. CNL submitted information to the Commission regarding its site security at CRL, noting that following CNSC inspections, its Site Access Security Clearances had been reviewed and updated. CNSC staff confirmed this information and submitted that CNL had modernized its procedures to enhance its site security program, including upgrades to equipment and site access control measures. CNSC staff further reported that, during the proposed licence period, CNSC staff would review CNL's security procedure updates to ensure alignment with CNL's new management system structure.

⁶⁴ SOR/2000-209.

⁶⁵ CNSC Regulatory Document REGDOC-2.12.1, *High Security Sites: Nuclear Response Force*, 2013.

⁶⁶ CNSC Regulatory Document RD-363, *Nuclear Security Officer Medical, Physical, and Psychological Fitness*, 2008.

3.13.1 Cybersecurity

290. The Commission considered CNL's cybersecurity programs at CRL. CNL informed the Commission that the cybersecurity program at CRL was based on baseline controls defined in NIST SP 800-53⁶⁷ and that CRL's controlled area computing met the specifications of CSA N290.7-14, *Cyber security for nuclear power plants and small reactor facilities*.⁶⁸ CNL also noted that assessments covering a broad spectrum of cybersecurity issues were conducted from July 2014 to March 2017, and that the findings from the assessments were used to improve CNL's cybersecurity program and handbook. CNL further submitted that, during the current and previous licence periods, it had completed a full asset inventory of off-line systems, peripheral devices and systems connected to the CNL business network.
291. CNSC staff confirmed the information provided by CNL and submitted that CNL had developed a company-wide cybersecurity program that was based on modern Canadian and international standards, and that CNL's program aligned with CNL's management system framework. CNSC staff submitted that its assessments had found that CNL's cybersecurity programs met CNSC expectations and regulatory requirements.

3.13.2 Conclusion on Security

292. On the basis of the information provided on the record for this hearing, the Commission is satisfied that CNL's performance with respect to maintaining security at CRL has been acceptable. The Commission concludes that CNL has made adequate provision for the physical security of the CRL site, and is of the opinion that CNL will continue to make adequate provision for security during the proposed licence period. The Commission is also satisfied that CNL's cybersecurity program at CRL is adequate to protect CRL from cyberattacks and other cybersecurity-related concerns.

3.14 Safeguards and Non-Proliferation

293. The Commission examined the adequacy of CNL's safeguards program at CRL. 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*.⁶⁹ (NPT). Pursuant to the NPT, Canada has entered into a safeguards agreement with the International Atomic Energy Agency (IAEA).

⁶⁷ National Institute of Standards and Technology, *Security and Privacy Controls for Federal Information Systems and Organizations*, 800-53, Revision 4, 2013 April.

⁶⁸ N290.7-14, *Cyber security for nuclear power plants and small reactor facilities*, CSA Group, 2014.

⁶⁹ *Treaty on the Non-Proliferation of Nuclear Weapons* (1968), IAEA, INFCIRC/140, 729 UNTS 169, entered into force 5 March 1970 (NPT).

The objective of this agreement and its Canada's Additional Protocol⁷⁰ 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 activity in this country. CNSC staff rated CNL's performance in this SCA as "satisfactory" throughout the current and previous licence periods.

294. The Commission considered the scope of CNL's nuclear non-proliferation program for CRL, which is limited to the tracking and reporting of foreign obligations and the origins of nuclear material. This tracking and reporting assists the CNSC in the implementation of Canada's bilateral nuclear cooperation agreements with other countries. The import and export of controlled nuclear substances, equipment and information identified in the *Nuclear Non-proliferation Import and Export Control Regulations*.⁷¹ require separate authorization from the CNSC, as these activities are not authorized by the CRL licence.
295. CNL provided the Commission with information about its Nuclear Materials and Safeguards Management (NM&SM) program, which was designed to meet the specifications of RD-336, *Accounting and Reporting of Nuclear Material*,⁷² and applied to all nuclear material and safeguards management activities performed at CNL facilities. CNL also informed the Commission that areas containing fissionable materials at CRL were defined as material balance areas and that documentation was in place to ensure CNSC regulatory and IAEA compliance, and material accountancy and international obligations were met. CNL also provided details about how it had implemented the Nuclear Materials Accounting System (NMAS) at CRL to prevent diversion and misuse of fissionable materials and that CNL was submitting reports through the Nuclear Materials Accountancy Reporting (NMAR) portal to ensure accurate and efficient nuclear materials reporting and security verification.
296. CNSC staff confirmed the information provided by CNL, reporting that CNL's submitted nuclear material accountancy information met regulatory requirements. CNSC staff also reported that, as required, CNL submitted quarterly updates and annual reports including the Design Information Questionnaire (DIQ) documents and Additional Protocol submissions.
297. CNL reported to the Commission that it had fully cooperated with the IAEA during safeguards inspections, noting that increased IAEA inspector presence was due to the HEU repatriation activities. CNSC staff further reported that the IAEA also performed equipment maintenance and that the IAEA was present to verify selected nuclear material transfers, including offsite HEU transfers. CNSC staff also submitted that the results of 190 IAEA inspections and verification activities at CRL between 2012 and

⁷⁰ *Protocol Additional to the Agreement between Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons*, IAEA, INFCIRC/164/Add. 1, 11 October 2000.

⁷¹ SOR/2000-210.

⁷² CNSC Regulatory Document RD-336, *Accounting and Reporting of Nuclear Material*, 2010.

2017 were satisfactory.

298. CNSC staff submitted that, in 2016, there were two locations at the CRL site where the IAEA requested additional inspections to verify the nuclear material inventory. CNSC staff confirmed that the additional inspections were completed successfully and that the IAEA had concluded that Canada is in compliance with its international obligations under Canada's safeguards agreements.
299. CNL informed the Commission of future initiatives within its NM&SM program during the proposed licence period including the development and use of a single nuclear material inventory management system for all CNL facilities, and the development and implementation of a new heavy water inventory management software system. CNL also submitted that it would work with the CNSC and the IAEA to implement improvements to IAEA-related activities within the scope of its MN&SM program, including the implementation of the IAEA Protocol Reporter 3.
300. Based on the above information, the Commission is satisfied that CNL is meeting regulatory requirements regarding safeguards and non-proliferation.
301. The Commission commended CNL for their success in automating their safeguards reporting requirements and expressed that CNL's experience and success in this regard should help others in Canada's nuclear industry.

3.15 Packaging and Transport

302. The Commission examined CNL's packaging and transport program at CRL. Packaging and transport covers the safe packaging and transport of nuclear substances and radiation devices to and from the licensed facility. The licensee must adhere to the *Packaging and Transport of Nuclear Substances Regulations, 2015*⁷³ (PTNSR, 2015) and Transport Canada's *Transportation of Dangerous Goods Regulations*⁷⁴ (TDG Regulations) for all shipments to and from CRL. CNSC staff rated CNL's performance in this SCA as "satisfactory" from 2012 to 2017.
303. CNL provided information about its Transportation of Dangerous Goods (TDG) program and reported that this program provided an operational framework for the safe transport of all nine classes of dangerous goods in conformance with all applicable legislation, CNL procedures and international standards. CNL also submitted that its TDG program met the specifications of G-208, *Transportation Security Plans for Category I, II, or III Nuclear Material*⁷⁵ and applied to all activities involving the transportation of dangerous good to or from any CNL sites, by any personnel, and through any mode of transportation.

⁷³ SOR/2015-145.

⁷⁴ SOR/2001-286.

⁷⁵ CNSC Regulatory Guide G-208, *Transportation Security Plans for Category I, II, or III Nuclear Material*, 2003.

304. CNSC staff confirmed the information provided by CNL and submitted that CNSC inspections had shown that CNL's TDG program was effectively implemented and that the transport of nuclear substances to and from CRL was performed in a safe manner and met regulatory requirements. CNSC staff also explained that the PTNSR, 2015 did not apply to onsite transfers at the CRL site, but noted that CNL's procedures in this regard had been verified by CNSC staff and met CNSC expectations.
305. CNL provided the Commission with detailed information about the ongoing HEU repatriation to the United States. CNL submitted that it had been collaborating with the United States to safely repatriate the HEU for permanent disposal, thereby eliminating this liability for future generations of Canadians. CNSC staff confirmed the information provided by CNL, noting that CNL's processes in regard to the repatriation activities met all safety and regulatory requirements.
306. CNL informed the Commission that it was anticipated that the IAEA's updated *Regulations for the Safe Transport of Radioactive Material*⁷⁶ and Transport Canada's updated TDG Regulations would be released during the proposed licence period. CNL confirmed to the Commission that the CNL TDG program would be updated to reflect the new standards and regulations. CNL also submitted that, during the proposed licence period, an increase of radioactive material and dangerous goods shipments due to decommissioning and waste management activities was anticipated. CNL confirmed its commitment to increasing the efficiency and effectiveness of these activities through its TDG program.
307. In its consideration of the intervention from the Iroquois Caucus, the Commission enquired about the reported constituents in the highly enriched uranyl nitrate liquid (HEUNL) and requested additional information in this regard. CNSC staff provided detailed information about the concentration of uranium in the HEUNL and noted that this and other information about the HEU repatriation project was available on the CNSC website. The Commission is satisfied that the HEUNL is appropriately characterized and that this information is available to the public.
308. Further considering the intervention from the Iroquois Caucus, the Commission enquired about whether emergency responders were adequately informed about the hazards presented by the HEUNL. CNSC staff provided the Commission with information about the emergency responder training program that was mandated under the *Transportation of Dangerous Goods Act*⁷⁷ to ensure adequate response capability to transportation-related accidents involving radioactive materials, including HEUNL. CNSC staff also confirmed that first responders along the transportation routes were informed by the CNSC of the HEUNL transport activity, with CNSC staff providing the first responders with detailed information about the Emergency Response Action Plan.

⁷⁶ International Atomic Energy Agency, Specific Safety Requirements, No. SSR-6, *Regulations for the Safe Transport of Radioactive Material*, Vienna, 2012.

⁷⁷ S.C. 1992, c. 34.

309. The Commission further enquired about what means were being taken to protect the health, safety and environment, including the traditional territories of Indigenous peoples, during the transport of the HEUNL. CNSC staff informed the Commission that all HEUNL transportation was conducted using certified packages which were designed to withstand severe conditions such as drops, cold and fire, and provided the Commission with additional information about the extensive regulatory oversight that CNSC carried out in regard to the HEU repatriation project.
310. The Commission noted the concerns about international transport of nuclear materials in the intervention from Northwatch and enquired about the chain of custody for nuclear substance transport packages. CNSC staff informed the Commission that licensees were responsible for ensuring the maintenance of chain of custody for any nuclear transport shipments, with the CNSC ensuring that a licensee's transport activities were being carried out safely and in accordance with regulatory requirements. CNSC staff further provided information about how the CNSC's regulatory framework ensured the safety and security of high-risk transport activities, such as those found in the context of the HEU repatriation project. The Commission was satisfied with the information provided in this regard.
311. Based on the above information, the Commission concludes that CNL is meeting, and will continue to meet, regulatory requirements regarding packaging and transport at CRL.
312. The Commission is also satisfied that the HEU repatriation project is being carried out in accordance with all applicable Canadian and international standards and requirements.

3.16 Aboriginal Engagement and Public Information

3.16.1 Participant Funding Program

313. The Commission assessed the information provided by CNSC staff regarding public engagement in the licensing process as enhanced by the CNSC's Participant Funding Program (PFP). CNSC staff submitted that, in June 2017, up to \$75,000 in funding to participate in this licensing process was made available to Indigenous groups, not-for-profit organizations and members of the public to review CNL's CRL site licence renewal application and associated documents, and to provide the Commission with value-added information through topic-specific interventions.
314. A Funding Review Committee (FRC), independent of the CNSC, recommended that six applicants be provided with up to \$72,199 in participant funding. The following applicants were required, by virtue of being in receipt of participant funding, to submit a written intervention and make an oral presentation at the public hearing commenting on CNL's licence renewal application for CRL.

- Algonquins of Ontario (AOO)
 - Concerned Citizens of Renfrew County
 - Métis Nation of Ontario (MNO)
 - Northwatch
 - W. Turner
 - Women in Nuclear (WiN)
315. The public, Indigenous groups and other stakeholders were informed of the availability of participant funding through a series of public communications. Through the PFP, the CNSC offered support to Indigenous groups, interested members of the public and other stakeholders to prepare for and participate in the Commission's public hearing.
316. Based on the information submitted for this hearing, the Commission is satisfied that Indigenous groups, members of the public and other stakeholders were encouraged to participate in this licence renewal hearing process.
317. The Commission notes that PFP is made possible for participation in Commission proceedings, both directly for hearing-specific interventions as well as, more generally, respecting matters that are relevant to Commission proceedings. The Commission encourages the AOO and other Indigenous groups near the CRL site to apply for funding to assist in the understanding and recording of traditional knowledge and land use, for example, and to better understand activities adjacent to and around the CRL site.

3.16.2 Aboriginal Engagement

318. 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 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*.⁷⁸
319. The Commission examined the information submitted by CNL regarding its ongoing engagement with First Nations and Métis groups near the CRL site. CNL described its ongoing engagement with many local Indigenous communities on matters such as general site operations, employment and learning opportunities, environmental monitoring and information sharing. CNL also expressed its commitment to the establishment of long-term relationship agreements and described that it had

⁷⁸ *Constitution Act, 1982*, Schedule B to the *Canada Act 1982*, 1982, c. 11 (U.K.).

implemented REGDOC-3.2.2, *Aboriginal Engagement*.⁷⁹ and had augmented its Aboriginal engagement activities during the current licence period.

320. CNSC staff provided the Commission with information about five First Nations and Métis groups that were identified as having a potential interest in the CRL licence renewal and the CNSC engagement activities that were carried out with the identified groups. CNSC staff explained that the primary concerns raised by First Nations and Métis groups included the potential impacts on traditional territory from continued CRL operation, potential impacts on fish and the health of the Ottawa River, and meaningful consultation. CNSC staff submitted that offers to meet with Indigenous groups to discuss the proposed CRL licence renewal and answer questions were made and that their participation in this hearing process was encouraged.
321. CNSC staff submitted that since CNL's proposed licence renewal did not propose any new activities, regulatory requirements set out in REGDOC-3.2.2 pertaining to formal consultation do not apply. CNSC staff also submitted that the proposed licence renewal was for an existing site with restricted access, and with no change to the facility's footprint or current licensing basis. CNSC staff also reported that the activities in the proposed licence were not new and would not cause adverse impacts to any potential or established Aboriginal and/or treaty rights. While CNSC staff expressed the view that no formal duty to consult was engaged by licence renewal, CNSC staff submitted that continued communication with interested Indigenous groups was, and would continue to be, a priority for CNSC staff and would continue to be maintained throughout the proposed licence period to ensure that groups received all of the information requested and to establish, maintain and enhance relationships with these groups.
322. The Commission enquired about why the Iroquois Caucus had not been included in the list of Indigenous groups identified as having a potential interest in the CRL licence renewal. CNSC staff explained that its focus had been on identifying Indigenous groups that had potential traditional rights in the vicinity of the CRL site. CNSC staff added that this assessment in no way limited an Indigenous group, including the Iroquois Caucus, from sharing concerns about licensed activities or regulatory requirements and receiving requested information from CNSC staff.
323. In regard to CNL's Indigenous engagement efforts and the concerns raised by several intervenors, including the AOO, the Anishinabek Nation and the MNO, the Commission asked for additional information on activities such as the sharing of archeological findings and historical studies, and opportunities to provide capacity and to fund education and discussions regarding the preparation of land use and traditional knowledge studies. The CNL representative provided detailed information about CNL's efforts at transparency in respect to the sharing of archeological findings and noted the success of past archeological collaborations with Indigenous groups. CNSC staff provided the Commission with information about the activities carried out by the CNSC to further explore Indigenous knowledge and interests in relation to the CRL site. The AOO representative confirmed that communications with CNL for a more

⁷⁹ CNSC Regulatory Document REGDOC-3.2.2, *Aboriginal Engagement*, 2016.

formal relationship were ongoing and the amount of information-sharing and relationship building was positive. The Commission is satisfied with the information provided on this point and encourages CNL and CNSC staff to continue efforts in this regard.

324. The Commission considered the intervention from C. Neveau and enquired about the translation of documents and presentations for Commission proceedings into Indigenous languages. CNSC staff explained that documents have been and would continue to be translated depending on the community or area of the proceeding and provided examples of previous such translations. CNSC staff further noted that no translation requests had been received for this hearing or for hearings near the CRL site. CNSC staff added that, during meetings with Indigenous groups, interpreters were provided if required and that the PFP could be utilized for interpretation services as well.
325. Based on the information provided for this hearing, the Commission is satisfied that Aboriginal engagement activities carried out for this licence renewal were adequate. The Commission anticipates that CNL will continue its expansion of Aboriginal engagement activities as submitted for and discussed during this hearing.
326. The Commission acknowledges the interventions from several Indigenous groups, including AOO, the Anishinabek Nation, the MNO and individuals who submitted that the proposed licence renewal did engage a formal duty to consult. Following its consideration of the evidence provided on the record for this hearing, the Commission is satisfied that CNL's licence application is for a licence renewal, does not propose new activities or a change in footprint at CRL and is satisfied that the honour of the Crown is upheld through the efforts that have been made to date, and which will continue. However, the Commission urged CNL and CNSC staff to engage with Indigenous groups in regularly structured fora to continue these efforts toward reconciliation and understanding.

3.16.3 Public Information

327. The Commission assessed CNL's public information and disclosure program (PIDP) for CRL. A public information program is a regulatory requirement for licence applicants and licensed operators of Class I nuclear facilities. Paragraph 3(j) of the *Class I Nuclear Facilities Regulations*.⁸⁰ requires that licence applications include

“the proposed program to inform persons living in the vicinity of the site of the general nature and characteristics of the anticipated effects on the environment and the health and safety of persons that may result from the activity to be licensed.”

⁸⁰ SOR/2000-204.

328. The Commission also assessed how CNL's PIDP met the specifications of RD/GD-99.3, *Public Information and Disclosure*.⁸¹ CNL provided the Commission with information regarding its community newsletter, local radio broadcasts, in-person open houses, outreach to municipal councils in Pontiac County and Renfrew County, meetings with the Environmental Stewardship Council, participation in community activities and the use of the CNL website and its social media tools. CNSC staff confirmed that its review of CNL's PIDP found that it met regulatory requirements. CNSC staff submitted that, in the proposed licence period, CNL was encouraged to refine and update its PIDP on a regular basis to meet the changing information needs of CNL's target audiences.
329. Considering CNL's francophone audience, the Commission enquired about how CNL ensured effective communication with this audience. The CNL representative informed the Commission that CNL had French-speaking subject matter experts available to make sure that all of its technical, scientific or regulatory information was accessible to audiences in both official languages and to enable CNL's full participation in all public events. The CNL representative stated that CNL strived to post either full versions or summaries of all of its documents in both English and French on the CNL website. The Commission was satisfied on this point.
330. The Commission considered several interventions from both groups and individuals that expressed a concern about the public's access to CNL documents, and requested additional information in this regard. The CNL representatives responded that, while AECL was subject to both the *Access to Information Act*.⁸² and the *Official Languages Act*,⁸³ as a private entity, CNL was not subject to these acts. The AECL representative added, however, that CNL's records for CRL were considered AECL records and that a member of the public could therefore make the access request for CNL records directly to AECL directly. This is not a matter for CNSC's regulatory oversight but should be of use to those seeking such access.
331. In considering the intervention from the Canadian Coalition for Nuclear Responsibility, the Commission asked for additional information about public access to CNL's financial information. The AECL representative responded that, while detailed project specific costs were not available to the public, financial breakdowns for costs associated with research, decommissioning, waste management and general site operations were made available in AECL's annual reports. CNL provided additional details on the costs and progress of projects and remediation activities, and confirmed to the Commission that some of this information was available in AECL's annual reports.
332. Noting the amount of onsite remediation at CRL and the importance of the CPDP, the Commission enquired about whether the CPDP was a public document. The CNL representative informed the Commission that the 2014 CPDP was publicly available

⁸¹ CNSC Regulatory/Guidance Document RD/GD-99.3, *Public Information and Disclosure*, 2012.

⁸² R.S.C., 1985, c. A-1.

⁸³ R.S.C., 1985, c. 31 (4th Supp.).

and that an updated CPDP, was expected to be submitted to the CNSC by the end of March 2018, would also be made available to the public. CNSC staff added that the update to RD/GD-99.3, the proposed REGDOC-3.2.1, *Public Information and Disclosure*,⁸⁴ included provisions requiring licensees to make ERAs and CPDPs available to the public.

333. Based on the information presented for this hearing, the Commission is satisfied that CNL's PIDP has and will continue to communicate to the public information about the health, safety and security of persons and the environment and other issues related to CRL.

3.16.4 Conclusion on Aboriginal Engagement and Public Information

334. Based on the information presented on the record for this hearing, the Commission is satisfied that, overall, CNL's PIDP meets regulatory requirements and is effective in keeping Indigenous groups and the public informed of CRL operations. The Commission acknowledges CNSC staff's commitment to regular, formalized and structured engagement with all Indigenous communities and CNL's past efforts and continuing commitments in relation to Aboriginal engagement.
335. Based on the information presented, the Commission is also satisfied that this licence renewal will not result in changes to CRL operations that would cause adverse impacts to any potential or established Aboriginal and/or treaty rights. The Commission is of the opinion that the engagement activities undertaken for the review of the CRL licence renewal application have been adequate.⁸⁵
336. The Commission considered interventions from several Indigenous groups, including the AOO, MNO and the Anishinabek Nation, expressing the view that CRL was built on traditional and ancestral territories without consultation and that CRL adversely impacted their Aboriginal and/or treaty rights. The Commission acknowledges the intervenors' views. The Commission also acknowledges the current efforts and commitments made by CNL in relation to Aboriginal engagement and CNSC staff's efforts on behalf of the Commission. The Commission notes, however, that it has no authority to address past events of this nature, but seeks to include Indigenous groups' input and knowledge into its regulatory process.
337. The Commission expresses its appreciation for the information provided by the intervenors representing Indigenous groups, members of the public, not-for-profit organizations and municipalities. The Commission recommends the use of traditional knowledge and community information to augment environmental monitoring programs in the vicinity of the CRL site and further recommends that CNSC staff continue to provide guidance on the possible use of the PFP to facilitate matters such as land use studies.

⁸⁴ CNSC Regulatory Document REGDOC-3.2.1, *Public Information and Disclosure*, (Draft).

⁸⁵ *Rio Tinto Alcan v. Carrier Sekani Tribal Council*, 2010 SCC 43[2010] 2 S.C.R. 650 at paras 45 and 49.

3.17 Decommissioning Plans and Financial Guarantee

338. The Commission requires that CNL has operational plans for the decommissioning and long-term management of waste produced during the lifespan of CRL. 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 realization of the planned activities is put in place and maintained in a form acceptable to the Commission throughout the licence period.
339. The Commission considered whether the financial guarantees maintain by CRL were determined in accordance with G-219, *Decommissioning Planning for Licensed Activities*,⁸⁶ and G-206, *Financial Guarantees for Decommissioning of Licensed Activities*.⁸⁷
340. 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*,⁸⁸ its liabilities are ultimately liabilities of Her Majesty in Right of Canada, recognized by the Minister of Natural Resources Canada.
341. CNL provided the Commission with information about its detailed decommission plans for CRL. CNL informed the Commission that 35 redundant structures had been removed from CRL since 2011 and submitted information regarding CNL's decommissioning plans for the proposed licence period, which included the improvement of the efficiency and effectiveness of its decommissioning and waste management activities. CNSC staff confirmed the adequacy of CNL's decommissioning planning for CRL.
342. The Commission requested additional information on the planning of decommissioning and deconstruction activities at CRL. CNSC staff provided the Commission with information about the decommissioning requirements in CNL's licence and LCH, and noted that CNL's plans met the specifications of CSA N294-09, *Decommissioning of facilities containing nuclear substances*.⁸⁹ The CNL representative responded that AECL was reviewing the next update of the CRL CPDP and stated that this review should be completed in the first quarter of 2018. The Commission was satisfied with the information provided on this point.
343. The Commission enquired about the decommissioning plans for the Mo-99 production facility. The CNL representative explained that, if the facility was not repurposed and reused, the facility would be decommissioned. The CNL representative added that CNL would consider leaving the facility's chimney stack due to the ecological

⁸⁶ CNSC Regulatory Guide G-219, *Decommissioning Planning for Licensed Activities*, 2000.

⁸⁷ CNSC Regulatory Guide G-206, *Financial Guarantees for Decommissioning of Licensed Activities*, 2000.

⁸⁸ R.S.C., 1985, c. F-11.

⁸⁹ N294-09, *Decommissioning of facilities containing nuclear substances*, CSA Group, 2009; Update 1, 2014.

importance of the chimney swift population that roosted in the stack.

344. The Commission is satisfied that the recognition of AECL's liabilities by the Minister of Natural Resources Canada is satisfactory and addresses the need for a financial guarantee.
345. Based on this information considered at this hearing, the Commission concludes that the preliminary decommissioning plan and related Crown funding commitment for CRL are acceptable for the purpose of the current licence renewal application.
346. The Commission expects CNL to implement CSA N294-09 (2014 Update 1) during the current licence period, with an implementation plan submitted to CNSC staff as specified in the proposed LCH.
347. The Commission expressed its satisfaction with the information in CNSC staff's end state diagrams. The Commission recommends that, in future presentations, CNL adopt similar end state diagrams to assist in communicating timelines of major waste management and decommissioning projects.

3.18 Cost Recovery

348. The Commission examined CNL's standing under the *Cost Recovery Fees Regulations*.⁹⁰ (CRFR) requirements for CRL. Paragraph 24(2)(c) of the NSCA requires that a licence application be accompanied by the prescribed fee, as set out by the CRFR and based on the activities to be licensed.
349. CNL informed the Commission that it was in good standing with regards to the provision of CNSC licensing fees and would continue to pay all fees, as required. CNSC staff reported that after conducting a thorough review of CNL records, CNSC staff had verified that CNL was in good standing with respect to the CRFR requirements, and had paid their cost recovery fees in full.
350. Based on the information submitted by CNL and CNSC staff, the Commission is satisfied that CNL has satisfied the requirements of the CRFR for the purpose of this licence renewal.

3.19 Nuclear Liability Insurance

351. The Commission notes that CNL is required to maintain nuclear liability insurance for CRL. CNSC staff submitted that CNL maintained nuclear liability insurance in accordance with the *Nuclear Liability Act*.⁹¹ (NLA) during the current licence period until December 31, 2016 and since then, with the *Nuclear Liability and Compensation*

⁹⁰ SOR/2003-212.

⁹¹ R.S.C., 1985, c. N-28 (repealed).

*Act.*⁹² (NLCA) that came into force on January 1, 2017. CNSC staff reported to the Commission that Natural Resources Canada, the federal department responsible for the administration of the NLCA, had confirmed that CNL had satisfied and should continue to satisfy its obligation under the NLCA during the balance of the current licence period and throughout the proposed licence period.

352. Based on the information provided on the record for this hearing, the Commission is satisfied that CNL has satisfied, and will continue to satisfy, the requirements for the maintenance of nuclear liability insurance under the NLCA. The Commission expects annual updates on CNL's status in regard to its requirements under the NLCA in the context of an annual ROR.

3.20 Licence Length and Conditions

353. The Commission considered CNL's application for the renewal of the CRL operating licence for a period of ten years. CNSC staff recommended the renewal of the licence for a period of ten years, until March 31, 2028, submitting that CNL is qualified to carry on the licensed activities authorized by the licence.
354. In order to provide adequate regulatory oversight of changes that are administrative in nature or less significant and do not require a licence amendment nor Commission approval, CNSC staff recommended that the Commission delegate authority for certain approval or consent, as contemplated in licence conditions that contain the phrase "a person authorized by the Commission," to the following CNSC staff:
- Director, Nuclear Laboratories and Research Reactors Division
 - Director General, Directorate of Nuclear Cycle and Facilities Regulation
 - Executive Vice-President and Chief Regulatory Operations Officer, Regulatory Operations Branch
355. The Commission considered the views expressed by many intervenors during these proceedings that the proposed changes to the licence conditions and LCH would relax or eliminate regulatory and safety requirements and dilute CNSC oversight and enforcement activities, and requested additional information regarding these concerns. CNSC staff provided a detailed explanation as to how the proposed licence and LCH formats would improve clarity and reduce misinterpretation of both the compliance verification criteria (CVC) and the facts applied in support of compliance verification activities. CNSC staff added that direct references to specific documents and standards replaced paraphrasing of those requirements in both the licence and LCH, thereby reducing the potential for a licensee's misunderstanding of the CVC, regulatory requirements and guidance documents. CNSC staff also provided the Commission with information about CNL's licensing requirements under the proposed licence and LCH and demonstrated how these requirements, nor the CNSC's regulatory oversight, were

⁹² S.C. 2015, c. 4, s. 120.

in any way reduced or relaxed during the proposed licence period.

356. Further on this topic, CNSC staff explained that the proposed licence and LCH were part of a CNSC program to standardize licensing for major facilities. CNSC staff explained to the Commission, and provided examples about, how this standardization of licensing for major facilities did not compromise licensing requirements, regulatory oversight or the safety of people and the environment. CNSC staff further informed the Commission that all licensees were required to comply with the NSCA and its regulations, with CNSC regulatory documents, Canada's international obligations, their licence and the LCH and about how the proposed licensing instruments and CNSC's regulatory oversight ensured compliance with all of these requirements. The CNL representative expressed the view that the specific document references in the proposed LCH provided greater clarity for licensees in respect of regulatory guidance and the requirements that applied to their licensed activities.
357. The Commission also enquired, in response to concerns expressed by several intervenors, about how site-specific matters were accommodated in a standardized licensing approach. CNSC staff explained that the proposed LCH included all of the CRL facilities and activities as provided for in the proposed licence and that licensee-specific CVC incorporated unique aspects of the CRL site. The Commission notes that the CNSC's implementation of a standardized licensing approach for major licensees was in part due to the findings in the *Talisman Report*.⁹³ Specifically, the *Talisman Report* stressed in one of its key findings that there had to be clear regulatory requirements and guidance for licensees and that there should be no disagreement between the regulator and licensee regarding which regulatory standards applied. Based on the information considered, the Commission is of the opinion that the standardized licensing approach provides additional clarity to licensees in respect of regulatory requirements in order to prevent disagreements between the regulator and licensee.
358. The Commission considered the views of several intervenors about the proposed licence length. Intervenor recommendations for licence renewal periods ranged from eighteen months to ten years and included proposals to match the licence length with the management contract between AECL and the CNEA. Intervenors also expressed concerns about impacts associated with different licence periods, the effects of licence length on public participation, and about new projects that could proceed as a result of a longer licence. CNSC staff responded that new projects such as the construction of small modular reactors (SMRs) and a near surface disposal facility (NSDF) were not authorized by the proposed licence, and that such activities would require their own licensing processes, safety cases, environmental reviews, public hearings and licensing decisions made by the Commission. CNSC staff added that public participation was not limited to licence renewals as the public had the option to intervene annually during the ROR review presented to the Commission.

⁹³ Talisman International, L.L.C., *Atomic Energy of Canada Limited National Research Universal Reactor Safety System Upgrades and the Canadian Nuclear Safety Commission's Licensing and Oversight Process*, June 2008.

359. Based on the information examined by the Commission for this hearing, the Commission is satisfied there is no need to match the licence length with the AECL – CNEA management contract. The Commission understands that CNL is the current and enduring licensee no matter who is contracted by AECL to manage and operate CNL. The Commission is also satisfied that the impacts of CRL on the environment and on the health of workers and the public are not related to the proposed length of the licence.
360. The Commission examined concerns raised by several intervenors regarding the challenges and limits experienced when accessing the CSA Group standards referenced in the proposed LCH. CNSC staff provided a detailed explanation on the public's free access to read-only electronic versions of the CSA Group's nuclear-related standards and the steps to be followed should a member of the public want to quote a part of a standard. The CSA Group representative confirmed the public availability of nuclear-related standards. The Commission wishes to remind members of the public that the CNSC ensures free public access to CSA Group standards. Based on the information examined, the Commission is satisfied with the public accessibility of the CSA Group standards. The Commission, however, encourages the CSA Group to provide a more streamlined process for members of the public to access these standards.
361. The Commission acknowledges the views expressed by several intervenors regarding participation in the public review of annual RORs and will consider the recommendations made for the presentation of upcoming RORs. The Commission encourages the public to examine future RORs and participate in the associated Commission meetings. The Commission also wishes to remind members of the public, Indigenous groups and other interested groups that all Commission proceedings can be attended in person or watched live via webcast.

Licence Conditions Handbook

362. The Commission heard the concerns raised by many intervenors that the proposed licence conditions and LCH represented a reduction in CNSC requirements and oversight, and thoroughly considered these concerns. After an extensive review, the Commission is satisfied that, while the proposed licence and LCH appear to be less substantive, this is not the case and that all relevant requirements in the current licence and LCH are also in the proposed licence and LCH, except for NRU-related requirements.
363. The Commission acknowledges that, should the LCH require more clarity or, if omissions are identified, CNSC staff have committed to follow-up with revisions to the proposed LCH to ensure greater clarity. In addition to that commitment, the Commission instructed CNSC staff to make the following changes to the proposed CRL LCH to enhance clarity:

1. Strengthen the “preamble” text in the LCH to include the important regulatory principles (such as the protection of the health and safety of people and the environment), that are articulated in the referenced documents and CVC.
2. Provide general information in the LCH that will explain to the reader that documents referenced by e-Access numbers are references to the internal CNSC electronic filing system, so there is no possibility to link to the documents directly from outside of the CNSC. In addition, identify documents produced by the licensee and provide an explanation on the nature of their non-availability.

To reiterate, these changes are for the benefit of the public understanding, and are not to fill any gaps.

364. As noted above, the Commission is satisfied that there is no reduction in safety requirements or regulatory oversight between the existing licence and LCH and the proposed licence and LCH. To ensure that this is clearly communicated to the public in their review of the proposed licence and LCH, the Commission instructed CNSC staff to:

1. Prepare a detailed chart or table to map and compare the current licence and LCH to the proposed licence and LCH in order to thoroughly demonstrate that no safety or regulatory matters will be lost. The Commission acknowledges the information presented by many intervenors and the continuing misunderstanding of the impact of the proposed changes to the licence and LCH. Therefore, the Commission emphasizes that it is a priority for CNSC staff to complete this mapping exercise and make it available to the public. The Commission instructed that this mapping be made available to the public concurrently with the release of this *Record of Decision*.
2. Conduct a public information session in a community near the CRL site to explain the current CNSC licensing processes. This session shall include a detailed explanation of the individual roles of the NSCA and its regulations, the licence and licence conditions, the LCH, regulatory documents and CSA standards, in the regulatory framework. This explanation should also provide for how these elements of the CNSC’s regulatory framework are applied individually and in concert.

365. Based on the information provided for this hearing, the Commission is satisfied that nothing of substance has been lost because of the new format for the proposed licence and LCH. The Commission recognizes that the only licence conditions that are present in the current licence – but not in the proposed licence – are specific to the NRU reactor and would not be relevant during the proposed licence period once the NRU is shutdown. The Commission acknowledges that references to standards, regulations and other guidance and regulatory documents in the proposed LCH in place of paraphrased

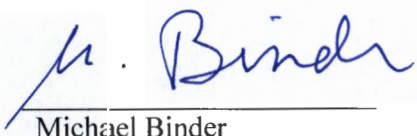
text to describe those documents will reduce duplication, improve clarity and limit misinterpretation of expectations for both CNL and CNSC staff. The Commission further notes that this is considered an international best practice.

366. Based on the information examined by the Commission during the course of this hearing, the Commission is satisfied that a ten-year licence is appropriate for CRL. The Commission accepts the licence conditions as recommended by CNSC staff. The Commission also accepts CNSC staff's recommendation regarding the delegation of authority, and notes that it can bring any matter to the Commission as required.

4.0 CONCLUSION

367. The Commission has considered the information and submissions of the applicant, CNSC staff and all participants as set out in the material available for reference on the record, as well as the oral and written interventions provided or made by the participants at the hearing. In coming to its decision, the Commission concluded that it had the requisite information in order to make a determination on this licence renewal request and closed the record on this matter without accepting additional submissions.
368. The Commission is satisfied that CNL meets the test set out in subsection 24(4) of the *Nuclear Safety and Control Act*. That is, the Commission is of the opinion that CNL is qualified to carry on the activity that the proposed licence will authorize and that it will make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.
369. Therefore, the Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, renews the Nuclear Research and Test Establishment Operating Licence issued to Canadian Nuclear Laboratories for its Chalk River Laboratories, located in Chalk River, Ontario. The renewed licence, NRTEOL-01.00/2028, is valid from April 1, 2018 until March 31, 2028.
370. The Commission includes in the licence the conditions as recommended by CNSC staff in CMDs 18-H2 and the Commission also delegates authority for the purposes of licence conditions 3.2, as recommended by CNSC staff.
371. The Commission considers the environmental review that was conducted by CNSC staff to be acceptable and thorough. The Commission is satisfied that an EA under CEAA 2012 was not required for the CRL licence renewal application. The Commission further notes that the NSCA and its regulations provide for the protection of the environment and the health and safety of persons, and is satisfied that CNL will continue to adequately provide these protections throughout the proposed licence period.

372. The Commission notes that CNSC staff can bring any matter to the Commission as applicable. The Commission directs CNSC staff to inform the Commission on an annual basis of any changes made to the Licence Conditions Handbook.
373. With this decision, the Commission directs CNSC staff to report annually on the performance of CNL and CRL, as part of an annual *Regulatory Oversight Report*. CNSC staff shall present this report at a public proceeding of the Commission, where members of the public will be able to participate. The Commission encourages all interested Indigenous groups and members of the public to participate in the review of the ROR.
374. The Commission directs that, at the mid-point of the 10-year licence period, CNL shall present to the Commission a comprehensive midterm update on its licensed activities at CRL. This midterm presentation will take place in a public Commission meeting in the vicinity of the community that hosts CRL. The Commission will plan to offer participant funding for this proceeding, to take place in 2023, as determined by the Commission's scheduling for that year.
375. The Commission notes that it may, at any time on its own initiative, suspend, amend, revoke or replace a licence.
376. The Commission instructs staff to provide more clarity on the LCH and the CNSC licensing process, as further stated in paragraphs 370 and 371 of this *Record of Decision*.
377. The Commission notes that AECL, and therefore the Government of Canada, retains ownership of CRL and all of its assets, and accepts the recognition of all waste liabilities by the Minister of Natural Resources Canada as an adequate financial guarantee.
378. On the evidence provided, the Commission is satisfied with the level of Aboriginal engagement and consultation that were undertaken in relation to this licence renewal. The Commission expresses its appreciation for the information provided by the intervenors representing Indigenous groups. The Commission also strongly encourages the continued use of formal, structured engagement of Indigenous groups by CNSC staff, CNL and all other relevant governmental organizations. The Commission further recommends the use of traditional knowledge in order to facilitate land use studies and to augment environmental monitoring programs in the vicinity of the CRL site.



Michael Binder
President
Canadian Nuclear Safety Commission

MAR 28 2018

Date

Appendix A – Intervenors

Intervenors	Document Number
Algonquins of Ontario represented by L. Clouthier	18-H2.51 18-H2.51A
Ontario Power Generation represented by R. Manley	18-H2.21
Women in Nuclear Canada represented by L. Mosscrop Kee	18-H2.18
Renfrew County Catholic District School Board	18-H2.2
Garrison Petawawa	18-H2.3
Ed Barbeau	18-H2.4
Esprit Whitewater	18-H2.10
Sheila Marchant	18-H2.47
Concerned Citizens of Renfrew County and Area represented by O. Hendrickson, J. Castrilli and R. Khan	18-H2.8 18-H2.8A
Ottawa Valley Economic Development Partners represented by D. Lemkay	18-H2.7 18-H2.7A
Kim Y. Hanewich	18-H2.6
Danielle Paul	18-H2.11
Green Party of Ontario represented by Mr. Schram	18-H2.31
Alex Thomson	18-H2.45
Sandra Finley	18-H2.53
Ish Theilheimer	18-H2.54
Renfrew County United Way	18-H2.55
Robert Farley	18-H2.56
Town of Petawawa	18-H2.57
Hell or High Water (HOHW)	18-H2.58
Deep River and District Hospital	18-H2.59
Canadian Cancer Society, Renfrew County	18-H2.60
Canadian Association of Physicians for the Environment	18-H2.61
Town of Laurentian Hills	18-H2.63
Renfrew County Regional Science Fair	18-H2.64
Mary Josey	18-H2.65
Christina Anderman	18-H2.66
Kinetrics Inc.	18-H2.67
Judith Maclean Miller	18-H2.68
Paula Tippett	18-H2.69
Francis Style	18-H2.70
Kathleen Eisner	18-H2.71
Allan S. Taylor	18-H2.72
City of Pembroke	18-H2.73
Upper Ottawa Valley Chamber of Commerce	18-H2.74
Emma Manchester	18-H2.75
Renfrew County District School Board	18-H2.76
Pembroke Regional Hospital	18-H2.77
Algonquin College Pembroke Waterfront Campus	18-H2.78

Intervenors	Document Number
Chalk River Professional Employees Group	18-H2.79
United Steelworkers (USW)	18-H2.80
Nordion (Canada) Inc.	18-H2.81
Valerie Needham	18-H2.82
Marilee DeLombard and Robert Wills	18-H2.83
Linda Spagnolo	18-H2.86
Iroquois Caucus	18-H2.87
Canadian Environmental Law Association represented by: J. Castrilli, R. Khan	18-H2.16 18-H2.16A
W. Turner, D. Raman and J. Walker	18-H2.17 18-H2.17A
Kendra Smith	18-H2.22
Canadian Nuclear Association represented by S. Coupland	18-H2.19
Cheslee Dexter	18-H2.25
Ralliement contre la pollution radioactive et Stop Oléoduc Outaouais représenté par G. Provost	18-H2.14
Ginette Charbonneau	18-H2.13
Provincial Council of Women of Ontario represented by G. Janes	18-H2.20
Canadian Nuclear Society represented by D. Gammage	18-H2.23
Corporation of the Town of Deep River represented by Major Lougheed and R. Doncaster	18-H2.5
Ottawa Riverkeeper represented by M. Brown	18-H2.15
County of Renfrew represented by P. Emon and P. Stack	18-H2.12 18-H2.12A
Rick Bradshaw	18-H2.26
Caelhan Wood	18-H2.27
Jean Brereton	18-H2.33
Old Fort William Cottagers' Association represented by J. McCann	18-H2.29
Canadian Nuclear Workers' Council represented by D. Shier and D. Lipton	18-H2.24
Environment Haliburton! represented by C. Coburn	18-H2.30
Organization of Canadian Nuclear Industries (OCNI) represented by Dr. Oberth	18-H2.9 18-H2.9A
Bonnechere River Watershed Project represented by K. Lindsay	18-H2.32
Mark MacKenzie	18-H2.34
David Prentice	18-H2.35
Prevent Cancer Now represented by M. MacKenzie	18-H2.36
Christian Renault	18-H2.37 18-H2.37A
North American Young Generation in Nuclear represented by D. Urrego and H. Bushby	18-H2.28
Maryanne MacDonald	18-H2.41 18-H2.41A

Intervenors	Document Number
Emma March	18-H2.38
Ottawa River Institute represented by C. Keetch and L. Jones	18-H2.39
Métis Nation of Ontario represented by A. Alibhai and G. Conacher,	18-H2.50
CANDU Owners Group Inc. represented by F. Dermakar	18-H2.49
Anishinabek Nation represented by Deputy Grand Chief G. Hare	18-H2.52
Darlene Buckingham	18-H2.40
Bozena Hrycyna	18-H2.43
Northwatch represented by B. Lloyd and K. Blaise	18-H2.46 18-H2.46A
Juan Pedro Unger	18-H2.42 18-H2.42A
Lynn Jones	18-H2.48 18-H2.48A
Society of Professional Engineers and Associates represented by M. Ivanco	18-H2.89
Michel Duguay	18-H2.62
Candace Neveau	18-H2.84
Canadian Coalition for Nuclear Responsibility represented by G. Edwards	18-H2.44
Tim Yearington	18-H2.85
Tom Kelly	18-H2.88