



Canadian Nuclear  
Safety Commission

Commission canadienne  
de sûreté nucléaire

# Record of Proceedings, Including Reasons for Decision

In the Matter of

Applicant Canadian Nuclear Laboratories

Subject Request for Approval to Decommission Two  
Facilities at Chalk River Laboratories

Hearing Date May 21, 2015

## **RECORD OF PROCEEDINGS**

Applicant: Canadian Nuclear Laboratories

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

Purpose: Request for Approval to Decommission Two Facilities at Chalk River Laboratories

Application received: December 18, 2013 and February 26, 2014

Date of hearing: May 21, 2015

Location: Canadian Nuclear Safety Commission (CNSC)  
280 Slater St., Ottawa, Ontario

Members present: M. Binder, Chair

**Approval:** Granted

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## 1.0 INTRODUCTION

1. Canadian Nuclear Laboratories (CNL) has submitted a request to the Canadian Nuclear Safety Commission<sup>1</sup> (CNSC) for approval to decommission the Fuel Rod Storage and Handling facility and the Plutonium Recovery Laboratory, in accordance with licence condition 4.4 of its Nuclear Research and Test Establishment Operating Licence (NRTEOL), at its Chalk River facility located in Chalk River, Ontario. The current licence, NRTEOL-01.02/2016, expires on October 31, 2016.
2. The Fuel Rod Storage and Handling Bays facility, Building 204A/B, was designed and constructed in the mid-1940's for the storage and handling of fuel rods from the National Research Experimental (NRX) reactor. The main purpose of the bays within this facility was used to store fuel with water providing cooling and shielding. The NRX reactor was shut down in 1992, with all reactor fuel assemblies removed from the bays by September 1995. The Fuel Rod Storage and Handling Bays facility has been maintained in a state of storage with surveillance, which is a safe shutdown state.
3. The Plutonium Recovery Laboratory, Building 220, was designed and constructed in 1947 as part of the Chemical Extraction Facilities to extract plutonium. In 1954, the plant extraction process was shut down, with the dismantling of obsolete extraction equipment beginning in 1955 and continuing intermittently over the next eight years. The rod dissolution capability was, however, retained and continued to be used until 1964. Only the laboratories in the facility remained in use until the 1980s, when all operations in the Plutonium Recovery Laboratory ceased and some preliminary decommissioning work was conducted. This facility is currently unoccupied and in the safe shutdown state of storage with surveillance.
4. Decommissioning of these facilities are initiatives within the Government of Canada's Nuclear Legacy Liabilities Program. Due to the deteriorating condition of the Fuel Rod Storage and Handling Bays and the Plutonium Recovery Laboratory, CNL is proceeding with an application to decommission them at this time. The two facilities are physically connected and CNL anticipates coordinating the decommissioning activities, which will involve demolishing the structures, remediating the land that the facilities occupy and releasing the land for reuse consistent with CNL's business needs.

### Issue

5. In considering the request, the Commission was required to decide:
  - a) if, pursuant to section 67 of the *Canadian Environmental Assessment Act, 2012*<sup>2</sup> (CEAA 2012), the proposed decommissioning projects are not likely to cause significant adverse environmental effects;

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

<sup>2</sup> S.C. 2012, c.19, s.52.

- b) if CNL is qualified to carry on the proposed activity; and
- c) if, in carrying on that activity, CNL would make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.

Panel

- 6. Pursuant to section 22 of the *Nuclear Safety and Control Act*<sup>3</sup> (NSCA), the President of the Commission established a Panel of the Commission to review the request. The Commission, in making its decision, considered information provided for a hearing based on written materials on May 19, 2015. The Commission considered written submissions from CNL (CMD 15-H105.1) and CNSC staff (CMD 15-H105). Written interventions from the public were solicited, but no interventions were received.

**2.0 DECISION**

- 7. Based on its consideration of the matter, as described in more detail in the following sections of this *Record of Proceedings*,

the Commission determines that, pursuant to section 67 of the CEEA 2012, the proposed decommissioning projects are not likely to cause significant adverse environmental effects.

- 8. Therefore,

the Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, approves Canadian Nuclear Laboratory's request to decommission the Fuel Rod Storage and Handling Bays facility in Building 204 A/B and the Plutonium Recovery Laboratory in Building 220 at Chalk River Laboratories in Chalk River, Ontario.

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<sup>3</sup> S.C. 1997, C. 9

9. With this approval, the Commission directs CNSC staff to update the Licence Conditions Handbook (LCH) associated with the CNL operating licence to list the Fuel Rod Storage and Handling Bays and the Plutonium Recovery Laboratory as facilities undergoing decommissioning, as recommended by CNSC staff in CMD 15-H105.

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

10. CNSC staff reported that the licensing applications under consideration were submitted by Atomic Energy of Canada Limited (AECL) in late 2013 and early 2014, prior to the change to CNL. On October 22, 2014, the Commission transferred the operating licence from AECL to CNL. CNSC staff noted that, although the licence has been transferred to the new legal entity, the requirements of the operating licence and associated LCH for the CRL site remain unchanged and, therefore, the transfer does not impact CNSC staff's review, assessment or conclusions on the information provided by AECL in support of the applications to decommission the two facilities.
11. CNSC staff reported that CNL conducted facility condition assessments in 2012. These assessments determined that the Fuel Rod Storage and Handling Bays facility is overall in fair condition, although several components are in poor condition. The Plutonium Recovery Laboratory was found to be in poor condition. CNL concluded that substantial repairs would be required on an ongoing basis to maintain the buildings in a safe state.

### **3.1 Decommissioning Overview**

12. CNSC staff provided the steps required to decommission a facility that is in a safe shutdown state and noted that these activities would be subject to CNL's existing Environmental Protection, Radiation Protection, Occupational Health and Safety, Operating Experience and Waste Management programs for the CRL site.
13. In support of the decommissioning applications, CNL submitted Detailed Decommissioning Plans (DPPs) to CNSC staff for the Fuel Rod Storage and Handling Bays facility and the Plutonium Recovery Laboratory. CNSC staff stated that it reviewed the DPPs for both facilities and assessed them against CNSC Regulatory Guide G-219, *Decommissioning Planning of Facilities Containing Nuclear Substances*<sup>4</sup> and CSA Standard N294, *Decommissioning of facilities containing nuclear substances*<sup>5</sup>, as well as the *Radiation Protection Regulations*<sup>6</sup>. CNSC staff also reported that CNL carried out characterization and hazard assessments for the two facilities which are used to develop decommissioning work plans, documenting the detailed instructions for the proposed activities.

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<sup>4</sup> CNSC Regulatory Guide G-219, *Decommissioning Planning for Licensed Activities*, June 2000.

<sup>5</sup> N294-09: "Decommissioning of facilities containing nuclear substances", CSA Group, 2009.

<sup>6</sup> SOR/2000-203.

14. CNSC staff noted that decommissioning for both facilities would be undertaken in three phases:
- Phase 1: Removal of building superstructures and ensuring that the remainder of the facility is in a condition suitable for a further period of storage with surveillance. These activities are estimated to take approximately three years to complete.
  - Phase 2: Further storage with surveillance until such time that a waste facility for permanent storage of large volumes of contaminated concrete and soil associated with decommissioning is available. This waste storage facility is not expected to be available for several decades.
  - Phase 3: Completion of decommissioning when a location for waste storage has been established. These activities are estimated to take approximately three and a half years to complete.

CNSC staff further provided detailed activities that will be undertaken during each phase of decommissioning.

15. CNL submitted that its proposed quality assurance plan is detailed in the Decommissioning Quality Assurance Plan.
16. CNSC staff reported that CNL has an Operating Experience Program that provides information from within CNL and external industry to identify gaps, improve operating performance, enhance safety and minimize the occurrence and significance of unplanned events. CNSC staff further noted that, at the end of a decommissioning project at CRL, an end-state report is produced to document the final physical, chemical and radiological condition of the facility. This report is submitted to the CNSC and includes a summary of activities performed, lessons learned, ALARA reviews and observations collected during the execution of the work.
17. CNSC staff's review found that CNL's DPPs for the two facilities include all of the required information and adequately address the requirements set out G-219 and CSA N294, as well as in the *Radiation Protection Regulations*.
18. Based on the above information, the Commission is satisfied that CNL's DPPs for the Fuel Rod Storage and Handling Bays facility and the Plutonium Recovery Laboratory meet regulatory requirements, and that CNL is qualified to carry out the proposed decommissioning activities.

### 3.2 Environmental Assessment

19. CNSC staff determined that the proposed decommissioning activities were not classified as “designated projects” pursuant to the *Regulations Designating Physical Activities*<sup>7</sup> under the CEAA 2012 and, as such, they would not require federal environmental assessments under the CEAA 2012.
20. However, for projects on federal lands, before making a licensing decision, the Commission must be satisfied that all applicable requirements of the CEAA 2012 have been fulfilled, in accordance with section 67 of this *Act*. CNSC staff submitted that, in 2014, a CNSC EA with these considerations was completed for these projects.
21. CNL submitted that, in 2006, the proposal to decommission the Fuel Rod Storage and Handling Bays facility underwent an EA under the repealed *Canadian Environmental Assessment Act*<sup>8</sup>, 1992 and that, at that time, the Commission concluded that the project is not likely to cause significant adverse environmental effects. CNL, however, did not proceed with the project at that time. CNSC staff considered the information in the 2006 EA Screening Report in completing a CNSC EA. CNSC staff noted that the current proposed activities are within the bounds of the previously completed EA and confirmed that its assessment and conclusions remain valid.
22. CNL submitted that it provided CNSC staff with an Environmental Effects Review (EER) for the proposed decommissioning of the Plutonium Recovery Laboratory. The EER was completed to address the requirements for assessing potential environmental impacts and identifying mitigation measures under G-219, as well as CNL’s legal obligations under section 67 of the CEAA 2012. CNSC staff noted that it evaluated the EER and found that it adequately assessed the potential environmental interactions associated with the proposed decommissioning activities and that appropriate mitigation measures to reduce adverse environmental impacts were identified.

### 3.3 Environmental Protection

23. CNSC staff submitted that CNL has an Environmental Protection Program that specifies requirements to ensure that potential environmental impacts associated with the operation of the CRL are identified and that mitigation measures are implemented to eliminate or reduce these impacts.

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<sup>7</sup> SOR/2012-147.

<sup>8</sup> S.C. 1992, c. 37.

24. CNSC staff reported that, through the EAs performed, decommissioning activities that could potentially result in adverse environmental effects, as well as mitigation measures to minimize these effects, were identified. Mitigation measures specific to the proposed activities include:
  - erecting special enclosures to contain airborne emissions;
  - using high efficiency particulate air filters to control radioactive emissions; and
  - monitoring airborne emissions.
25. CNSC staff noted that liquid wastes resulting from the proposed decommissioning activities will be treated at the CRL Waste Treatment Centre, resulting in a negligible impact to the Ottawa River.
26. CNSC staff concluded that, under section 67 of the CEEA 2012, the project is not likely to cause significant adverse environmental effects and that adequate provision will be made for the protection of the environment and the health of people.
27. Based on the above information and considerations, the Commission is satisfied that CNSC staff reviewed an assessment of the environmental effects of the proposed decommissioning projects under the NSCA and considered the requirements of section 67 of the CEEA 2012. The Commission therefore concludes that the proposed decommissioning activities will not cause significant adverse environmental effects, taking into consideration the mitigation and control measures.

### **3.4 Radiation Protection**

28. CNSC staff submitted that, in compliance with the *Radiation Protection Regulations*, CNL has an established Radiation Protection Program. CNSC staff noted that facilities at CRL are classified into radiological safety zones, which take into account external radiation fields, dose rates and surface contaminations levels. CNSC staff provided information about CRL's radiological safety zones and noted that they range from radiological safety zone 1, representing a very low-hazard zone which is suitable for unrestricted occupancy, to radiological safety zone 5, representing a very high-hazard zone for which access is permitted only under controlled conditions.
29. CNSC staff reported that the radiological characterization of the Fuel Rod Storage and Handling Bays determined that the facility includes areas categorized as radiological safety zones 3 and 4. The primary radiological hazards to workers in this facility include radiation exposure from alpha and beta/gamma contamination. This contamination results in significant dose rates in several areas of the facility.
30. CNSC staff reported that the radiological characterization of the Plutonium Recovery Laboratory determined that the accessible areas of the facility are categorized as radiological safety zone 3, while the basement and inaccessible areas are categorized as radiological safety zones 4 and 5. The primary radiological hazards to workers in this

facility include widespread alpha contamination, as well as residual radioactive materials, such as plutonium and uranium, in the dissolution tanks and remaining fuel reprocessing equipment. The contamination exists in loose and fixed form.

31. CNL indicated that further radiation mitigating measures, such as temporary shielding and remote technology, may be employed for work conducted in potentially higher exposure areas. CNSC staff also noted that project-appropriate personal protective equipment will be utilized and that radiation doses will be monitored throughout the proposed decommissioning activities.
32. CNSC staff submitted that preliminary worker dose estimates, representing a conservatively calculated upper bounding case, were prepared for the proposed decommissioning of both facilities. All estimated worker doses were below the annual and 5-year regulatory limits for Nuclear Energy Workers.
33. CNSC staff stated that, taking into account the operational control measures, no significant impacts on worker health are anticipated from radiological hazards.
34. Based on the above information, the Commission is satisfied that the radiological hazards associated with the proposed decommissioning projects have been adequately identified and classified. The Commission is satisfied that, taking into account operational control measures, no significant impacts on worker health are anticipated from radiological hazards.

### **3.5 Occupational Health and Safety**

35. CNSC staff submitted that all decommissioning work is conducted in accordance with the requirements of CNL's Occupational Health and Safety Program. CNSC staff noted that, for all work performed at its sites, CNL employs a Work Permit System which provides a systematic approach to planning work and assessing hazards to ensure that staff are properly qualified and equipped for the work that they are performing.
36. Based on this information, the Commission is satisfied that, taking protective measures into account, no significant impact on worker health is anticipated from conventional health and safety hazards.

### **3.6 Waste Management**

37. CNSC staff submitted that CNL's Waste Management Program includes requirements and processes for the handling, processing, transporting, storing and disposing of wastes from CRL operations. Waste Management Plans for the proposed decommissioning projects contain an estimate of the types and volumes of waste expected to be generated during each decommissioning stage.

38. CNSC staff noted that waste will be monitored at the decommissioning site for radioactive contamination and will be characterized and segregated into the following categories:

- radioactive
- hazardous
- non-radioactive and non-hazardous

CNSC staff provided information on how these wastes, both liquid and solid, will be managed.

39. Based on this information, the Commission is satisfied that CNL will safely manage wastes during the proposed decommissioning projects.

### **3.7 Public Information**

40. CNSC staff submitted that, as a Class I nuclear facility licensee, CNL is required to develop and implement a public information program that includes a disclosure protocol. CNSC staff noted that CNL provides information on activities at the CRL site to members of the public and Aboriginal communities through various methods, including the CRL Environmental Stewardship Council and the CNL public newsletter, which included a section on decommissioning in the winter 2014/15 edition.

41. CNSC staff noted that, for the decommissioning of the Fuel Rod Storage and Handling Bays facility, consultation specific to that project, including letters to local municipal councils, advertisements in newspapers and four public open houses, was completed during the 2006 EA.

42. CNSC staff reported that, for the decommissioning of the Plutonium Recovery Laboratory, additional consultation specific to that project included sending letters notifying stakeholders of the project and providing the opportunity for concerns to be submitted. No concerns were raised as a result of this consultation.

43. The Commission notes that members of the public have been invited to submit written interventions for this hearing, as detailed in a Notice of Hearing published on April 10, 2015. The Commission also notes that no members of the general public or Aboriginal communities have filed submissions.

44. Based on the information provided, the Commission is satisfied that CNL's and CNSC staff's public information activities are effective in keeping the public and Aboriginal communities informed on the facility operations.

#### 4.0 CONCLUSION

45. The Commission is satisfied that all applicable requirements of the CEAA 2012 have been fulfilled.
46. The Commission has considered the information and submissions from CNL and CNSC staff, and is satisfied that the decommissioning projects will not cause significant adverse environmental effects, taking into consideration the mitigation and control measures to be applied by CNL.
47. The Commission is also satisfied that CNL is qualified to carry out the proposed activities. Therefore, the Commission, pursuant to Section 24 of the NSCA, approves CNL's request to decommission the Fuel Rod Storage and Handling Bays facility and the Plutonium Recovery Laboratory at Chalk River Laboratories, located in Chalk River, Ontario.



Michael Binder  
President,  
Canadian Nuclear Safety Commission

MAY 21 2015

Date