

# Record of Proceedings, Including Reasons for Decision

In the Matter of

Proponent Atomic Energy of Canada Limited

Subject Screening Environmental Assessment for the  
Decommissioning of the Heavy Water  
Upgrading Plant at Chalk River Laboratories

Date of  
Hearing May 15, 2008

## RECORD OF PROCEEDINGS

Proponent: Atomic Energy of Canada Limited

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

Purpose: Screening Environmental Assessment for the Decommissioning of the Heavy Water Upgrading Plant

Letter of intent: August 29, 2001

Date of hearing: May 15, 2008

Location: Ajax Convention Centre, 550 Beck Crescent, Ajax, Ontario

Members present: M. Binder, Chair  
C.R. Barnes  
A.R. Graham  
B.J. Barriault  
A. Harvey  
M.J. McDill

Secretary: M. Leblanc  
Recording Secretary: P. Reinhardt  
General Counsel: J. Lavoie

<b>Proponent Represented By</b>	<b>Document Number</b>
<ul style="list-style-type: none"><li>• J. Miller, Vice-president and General Manager of Decommissioning and Waste Management</li><li>• S. Kenny, Manager of Decommissioning and Planning</li><li>• M. Klukas, Section Head, Environmental Assessment</li></ul>	CMD 08-H9.1 CMD 08-H9.1A
<b>CNSC staff</b>	
<ul style="list-style-type: none"><li>• P. Thompson</li><li>• B. Torrie</li><li>• J. Clarke</li><li>• M.Santini</li></ul>	CMD 08-H9

**Date of Release of Decision:** June 25, 2008

## Table of Contents

<b>Introduction</b> .....	1
<b>Decision</b> .....	2
<b>Issues and Commission Findings</b> .....	3
<b>Completeness of the Screening Report</b> .....	3
<b>Likelihood and Significance of Environmental Effects</b> .....	4
<i>Adequacy of the Assessment Methods</i> .....	5
<i>Effects of the Project on the Environment</i> .....	6
<i>Effects of the Environment on the Project</i> .....	8
<i>Effects of Accident and Malfunction Events</i> .....	8
<i>Cumulative Effects</i> .....	9
<i>Follow-Up Monitoring Program</i> .....	9
<i>Conclusions on the Likelihood and Significance of Adverse Environmental Effects</i> .....	10
<b>Nature and level of Public Concern</b> .....	10
<b>Conclusion</b> .....	11

## Introduction

1. Atomic Energy of Canada Limited (AECL) has applied for an authorization to decommission the Heavy Water Upgrading Plant (HWUP) located at Chalk River Laboratories (CRL) in Chalk River, Ontario. The HWUP occupies buildings 210 and 212 in the controlled area of the CRL site. The facility was designed to remove contaminants and upgrade the isotopic composition of heavy water using an electrolytic process. The facility has been in a safe shut-down state since August 1998.
2. Before the Canadian Nuclear Safety Commission<sup>1</sup> (CNSC) can make a licensing decision pursuant to the *Nuclear Safety and Control Act*<sup>2</sup> (NSCA) with respect to the proposed project, it must, in accordance with the requirements of the *Canadian Environmental Assessment Act*<sup>3</sup> (CEAA), make a decision on the Environmental Assessment (EA) screening of the proposal.
3. The CNSC is, under the CEAA, a Responsible Authority<sup>4</sup> (RA) for this EA. Natural Resources Canada (NRCan) is also a Responsible Authority (RA) for this EA, as it will be providing funding for the project under the Nuclear Legacy Liabilities Program (NLLP).
4. Guidelines for the EA (EA Guidelines), under sections 15 and 16 of the CEAA, including statements of the scope of the project and scope of the assessment were prepared by CNSC staff. Pursuant to the *CEAA Federal Coordination Regulations*, the following federal authorities were notified of the project and invited to participate in the preparation of the Draft EA Guidelines and the Draft EA Study Report: the two RAs, Fisheries and Oceans Canada, Environment Canada, Health Canada and Indian and Northern Affairs Canada. The Ontario Ministry of the Environment (OMOE) was also provided with an opportunity to comment on the draft EA Guidelines. The EA Guidelines were reviewed and approved by a Designated Officer on September 13, 2002.
5. Using these guidelines, the conduct of the technical studies for the screening of this project was delegated to AECL on November 1, 2002, in accordance with subsection 17(1) of the CEAA. AECL prepared a draft EA Study Report (EASR) which was sent, in 2003 and 2004 to the RAs and Federal Authorities and the OMOE for review and comment. The preparation of the draft EASR also involved the community, stakeholders, the public and the First Nations. The revised EASR was then used by CNSC staff for the preparation of the draft EA Screening Report (Screening Report). Stakeholders, including the FAs, were provided an opportunity to review the draft Screening Report prior to its finalization and submission to the Commission for this hearing and decision.
6. This *Record of Proceedings* describes the Commission's consideration of the Screening Report and its reasons for decisions on the results. The Screening Report is attached as an appendix to CMD 08-H9.

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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. 1997, c. 9.

<sup>3</sup> S.C. 1992, c.37.

<sup>4</sup> Responsible Authority in relation to an EA is determined in accordance with subsection 11(1) of the CEAA.

### Issues

7. In considering the Screening Report, the Commission was required to decide:
  - a) whether the Screening Report is complete; that is, whether all of the factors and instructions set out in the approved EA Guidelines and subsection 16(1) of the CEAA were adequately addressed;
  - b) whether the project, taking into account the mitigation measures identified in the Screening Report, is likely to cause significant adverse environmental effects;
  - c) whether the project must be referred to the federal Minister of the Environment for referral to a review panel or mediator, pursuant to paragraph 20(1)(c) of the CEAA; and
  - d) whether the Commission may proceed with its consideration of an application for a licence under the NSCA, consistent with paragraph 20(1)(a) of the CEAA.

### Hearing

8. Pursuant to section 22 of the NSCA, the President of the Commission established a panel of the Commission to hear this matter.
9. The panel of the Commission (hereafter referred to as the Commission), in making its decision, considered information presented for a public hearing held on May 15, 2008 in Ajax, Ontario. During the hearing, the Commission received written submissions from AECL (CMD 08-H9.1 and CMD 08-H9.1A) and from CNSC staff (CMD 08-H9). The public was invited to participate but no interventions were received for this hearing.

### **Decision**

10. Based on its consideration of the matter, as described in more detail in this *Record of Proceedings*, the Commission decided that:

- a) the Environmental Assessment Screening Report appended to CMD 08-H9 is complete; the scope of the project and assessment were appropriately determined in accordance with sections 15 and 16 of the *Canadian Environmental Assessment Act*, and all of the required assessment factors were addressed during the assessment;
- b) the project, taking into account the mitigation measures identified in the Environmental Assessment Screening Report, is not likely to cause significant adverse environmental effects;
- c) it will not refer the project to the federal Minister of the Environment for his referral to a review panel or mediator;
- d) it will proceed to consider the application for licence amendment under the provisions of the *Nuclear Safety and Control Act*, consistent with paragraph 20(1)(a) of the *Canadian Environmental Assessment Act*.

11. The commission also approves the EA Guidelines, including statements of the scope of the project and scope of the assessment, as reviewed and approved by the Designated Officer on September 13, 2002.

### **Issues and Commission Findings**

12. The Commission addressed the four issues identified in paragraph 7 under three main headings: (1) the completeness of the Screening Report, (2) the likelihood and significance of the environmental effects, and (3) the nature and level of public concern. The Commission's findings in each of these areas are summarized below.
13. The findings of the Commission presented below are based on the Commission's consideration of all the information and submission available for reference on the record for the hearing.

### **Completeness of the Screening Report**

14. In its consideration of the completeness of the Screening Report, the Commission considered whether the assessment had adequately addressed and appropriately defined the scope of the project and the assessment factors.
15. At the present time the current status of the HWUP at CRL is as follows: bulk inventories of heavy water containing tritium have been removed from tanks; vessels and piping have been drained to the extent possible; and the ion exchange columns and the solid evaporator tank have been removed. The network of tritium in air monitors remains in operation, and the building services remain in place and functional. The proposed project is that the overall end state for the HWUP would qualify all areas for industrial re-use. The duration of the decommissioning project is expected to be six years and would be achieved through three project phases:
  1. Removal of redundant process equipment, removal of all interior storage tanks and piping and qualification of the balance of the facility for a period of Storage with Surveillance;
  2. Storage with Surveillance of the former process area and of the seven outdoor underground storage tanks; and
  3. Removal of the remaining process equipment and qualification of the entire former facility for industrial re-use.
16. The Commission enquired if the eventual demolition of the buildings was included in this project for the purposes of the EA. CNSC staff responded that this matter was discussed with the proponent who confirmed that it did not have the intention to demolish the building nor was it in a position to confirm the end use of the buildings at this time.

17. CNSC staff recommended that the EA Guidelines for the present EA Screening be ratified by the Commission during the current proceeding. CNSC staff noted that the revised Guidelines were reviewed and approved by a CNSC Designated Officer on September 13, 2002 and were then provided to AECL on November 1, 2002 who, pursuant to Section 17 of the *CEEA*, was delegated the conduct of the environmental assessment, including the supporting technical studies and the public consultation.
18. The Ontario Ministry of the Environment (OMOE) was also provided with the opportunity to participate in the preparation of the draft EA Guidelines and the draft EA Screening Report. The OMOE determined that there were no provincial environmental assessment requirements under the Ontario *Environmental Assessment Act*<sup>5</sup> for this project.
19. CNSC staff indicated that it was confident that the EA had identified and assessed the likelihood and significance of the impact of the project.
20. Based on this information and the Commission's review of the EA Guidelines and Screening Report, the Commission concludes that the scope of the project and the scope of the factors for the assessment were appropriate, and that all of the required factors were addressed during the assessment. The Commission thus approves the EA Guidelines as approved by the Designated Officer in 2002.
21. The Commission also concludes that the Screening Report is complete and in accordance with the requirements of the *CEAA*. The Commission is therefore able to proceed to its consideration of the likelihood and significance of the environmental effects of the project, the adequacy of the proposed mitigation measures, and the public concerns about the project.

### **Likelihood and Significance of Environmental Effects**

22. This section contains the Commission's findings with respect to whether the project, taking into account the identified mitigation measures, is likely to cause significant adverse environmental effects. In examining this question, the Commission first considered the adequacy of the study methods used to identify and evaluate the potential environmental effects, including the public consultation process, followed by a consideration of the predicted effects on the relevant components of the environment.

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<sup>5</sup> R.S.O. 1990, c. E.18.

*Adequacy of the Assessment Methods*

23. CNSC staff reported that the assessment of the effects of the project on the environment was carried out following pre-determined steps, including identifying each interaction with the environment and evaluating each interaction to determine any change to the environment and to the Valued Ecosystem Components. CNSC staff further noted that the assessment process also included ways to mitigate the environmental effects and to identify the residual environmental effects. Both radiological and non-radiological effects were assessed.
24. CNSC staff noted that all project activities were examined to identify those that could possibly interact with any of the nine following environmental components: human health, surface water, atmosphere, geology and hydrogeology, terrestrial environment, land resources, cultural heritage and aboriginal environment, and socio-economics conditions. For each environmental component, the assessment considered the possible effects related to:
  - the decontamination and dismantling of the HWUP;
  - the transportation and treatment of contaminated materials;
  - the management (including transport, storage and disposal) of conventional, radioactive and chemically hazardous waste arising from the decommissioning activities;
  - the transport of other equipment and materials to and from the decommissioning project site; and
  - the disposal of material off-site, during normal operations of the facility, and in case of malfunctions and accidents.
25. With respect to the adequacy of consultations, CNSC staff reported that an extensive consultation and information program had been implemented by AECL in August 2001, and that consultation had taken place during the three key stages of the assessment: the scoping, the assessment and the screening report stage. The consultation program involved the general public, elected officials, First Nations, special interest groups and the media. Therefore, CNSC staff concluded that AECL had consulted extensively with the public and stakeholders and that the quantity, variety and quality of the proponent's consultation were of a high standard.
26. CNSC staff noted that the draft EA Screening Report was made available for review for a period of 60 days on CNSC Web site. Copies of the report were sent directly to a list of interested stakeholders (available in section 11.2.5 of the attached Screening Report) and made available at libraries in Pembroke, Deep River and Chalk River (a notice of the availability of the report was also published on CNSC Web site). The documents presented in the Screening Report were also reviewed by a technical review team comprised of staff from the two RAs, CNSC and NRCan and the Federal Authorities. A copy of the Screening Report was sent to the Algonquins of Pikwànanàgàn First Nation.
27. The Commission is satisfied that the methods used to consult with the public during the EA, including opportunities to comment and review the Screening Report, were appropriate and provided a suitable basis for the Commission to evaluate the public concerns about the project. The Commission's findings on the public concerns are discussed further in the section below entitled **Nature and Level of Public Concern**.



28. Based on its review of the Screening Report and the above information, the Commission concludes that the EA methods were acceptable and appropriate.

*Effects of the Project on the Environment*

29. CNSC staff stated that the environmental assessment considered the following components: human health, surface water, atmosphere, geology and hydrogeology, terrestrial environment, land resources, cultural heritage and aboriginal environment, and socio-economics conditions. For each potential adverse effect associated with an identified possible interaction between the project and a component of the environment, possible mitigation measures were identified to eliminate, reduce or control the adverse effect.
30. CNSC staff submitted that the main project activities expected to result in likely measurable effects, requiring consideration of mitigation measures and assessment of the residual effects, include:
- opening, cleaning and flushing of tanks and piping containing tritium;
  - removal of tanks and process equipment;
  - handling and packaging contaminated components and materials; and,
  - disposal of the wastes, including liquid effluents that result from the decommissioning.
31. The Commission asked AECL if the underground reservoirs containing the heavy water could have leaked. AECL confirmed that the reservoirs have been and continue to be monitored, since 2000, for leakage and that no leaks have been observed. The Commission asked for an estimate of the volume of heavy water left in the tanks at this point in time. AECL answered that only 2% of the original volume was still present and that the liquid left was considered at a low level of radioactivity.
32. The Commission considered the three phases of decommissioning: the removal of redundant process equipment and the removal of all interior storage tanks and piping during the first phase, the storage with surveillance of the former process area and of the seven outdoor underground storage tanks during the second phase and, finally, the removal of the remaining process equipment and qualification of the entire former facility for industrial re-use during the third phase.
33. The Commission enquired why the second phase of the decommissioning plan, “Storage with Surveillance” period, was planned to last as long as five years. AECL explained that it wanted to ensure that, in that transition period from Phase 1 to Phase 3, the decommissioning expertise would be available for Phase 3, which means that all the detailed work plans and radiological plans would be approved on time and that the funding and the workers needed for decommissioning would be available. It also wanted to ensure that the waste management facilities would be ready to receive the waste. Although a lot of work still needs to be completed before Phase 3, AECL assured the Commission that it will do its best to reduce the length of Phase 2 (the Storage with Surveillance period). AECL also assured the Commission that during that storage period, all monitoring will continue.

34. The Commission noted that AECL does not have the capacity to treat tritiated water and asked if this was common for such a facility. CNSC staff answered that the current practice at the facilities licensed by CNSC is to collect and monitor tritium to ensure that what is released into the environment is not in concentrations or under conditions that could pose a risk to the public health and the environment. CNSC staff further noted that there is existing technology to treat tritium at very high concentrations but that this technology is not effective for low concentrations like what is present at CRL.
35. The Commission wanted to be reassured on the manner AECL would dispose of Polychlorinated biphenyls (PCBs) and asbestos during the decommissioning. AECL confirmed that its current inventory of PCBs at the site was reduced to light ballasts which will be removed and sent for treatment and proper disposal at an offsite disposal facility. For asbestos, there is an existing operating procedure that follows the Ontario Ministry of Environment guidelines<sup>6</sup> and the Canada Labor Code<sup>7</sup>. Trained qualified workers remove asbestos, package it and prepare it for the landfill. The trained workers that deal with asbestos wear the proper personal protective equipment and work in a proper ventilated and contained environment.
36. CNSC staff submitted that the proposed mitigation measures to reduce or eliminate the expected adverse effects include:
  - adherence to Radiation Protection practices for workers, including training, protective clothing, air supplied respiratory protection;
  - enclosures to limit the dispersal of airborne tritium and particulates, with local High Efficiency Particulate Air (HEPA) filtered exhaust systems for activities that could result in airborne particulates, including asbestos fibres;
  - analysis of liquid effluents for tritium, gross alpha, gross beta/gamma and chemical composition prior to transfer to the CRL Waste Treatment Centre; and,
  - immediate transfer for storage to an appropriate CRL Waste Management Area of process equipment, tanks and piping, except where they can be transferred intact to other CRL facilities for re-use.
37. CNSC staff stated that, after taking into account the implementation of the appropriate mitigation measures, no significant adverse environmental effects are likely to occur.
38. The Commission recognizes the importance of properly implementing mitigation measures to ensure that the effects of the project on the environment are not significant. In this regard, the Commission expects CNSC staff to ensure that appropriate monitoring activities are implemented to verify whether these mitigation measures remain effective.

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<sup>6</sup> Ontario Ministry of the Environment GUIDELINE C-6 (formerly 14-07)

<sup>7</sup> R.S.C. 1985, c. L-2.

39. Based on its review of the Screening Report and the above-noted information provided on the record, the Commission concludes that the proposed project, taking into account the mitigation measures, is not likely to cause significant adverse effects to the environment.

#### ***Effects of the Environment on the Project***

40. CNSC staff considered the effects of extreme weather conditions such as tornadoes or overflows from the Ottawa River on the proposed project. CNSC staff submitted that the probabilities of occurrence of such events are low and the radiological consequences of such events are also low.
41. CNSC staff noted that the consequence of an extreme weather event or flooding is bounded to the analysis of accidents and malfunctions. Considering limited inventories of hazardous materials present and the availability of contingency measures, CNSC staff concluded that adverse environmental effects on the project are not significant.
42. CNSC staff therefore concluded that the environment is not likely to cause significant adverse effects on the project, taking into consideration design and operational measures and contingency plans to prevent or reduce potential effects.
43. Based on the above information, the Commission concludes that the environment is not likely to cause adverse effects on the project.

#### ***Effects of Accident and Malfunction Events***

44. CNSC staff summarized the identification, description, potential effects and prevention and contingency measures to eliminate or minimize the effects of accidents and malfunctions (i.e., fire, spills and leaks and loss of building services). CNSC staff noted that the criteria used to judge the events include the probability of occurrence, potential for effects on worker health and safety, potential for releases to the environment and potential for effects on public health and the environment.
45. CNSC staff concluded that accidents and malfunctions are not likely to cause significant environmental effects, taking into consideration design, prevention measures and contingency plans to prevent, eliminate or minimize the occurrence of accidents or malfunctions.
46. Based on the above information and considerations, the Commission concludes that accidents and malfunctions are not likely to cause adverse effects to humans or the environment.

### ***Cumulative Effects***

47. CNSC staff stated that the environmental components that could potentially experience cumulative effects from the HWUP project, combined with other projects at the CRL site, are the atmospheric environment and the aquatic environment. CNSC staff noted that residual effects were identified for the following environmental components: air quality and surface water quality, and by extension aquatic biota. Ecosystem components for which residual effects were identified are the Ottawa River water quality and aquatic biota.
48. CNSC staff submitted that, overall, cumulative adverse environmental effects from the HWUP decommissioning in combination with other known planned activities of the CRL are not likely to be significant. CNSC staff noted that this conclusion is based on findings that the airborne and liquid emissions from the heavy water upgrading plant decommissioning, combined with those other projects, remained a fraction of AECL's release limits and a small fraction of the public dose limit. CNSC staff noted that a follow-up program will be used to confirm these predictions.
49. Based on the information received, the Commission concludes that, taking into account proper mitigation measures, significant adverse cumulative effects are not expected to occur as a result of the project.

### ***Follow-Up Monitoring Program***

50. CNSC staff indicated that, in agreement with the other RA, a follow-up program, as defined by the CEAA, would be warranted for the HWUP decommissioning project. CNSC staff recommend that, if the project was to move forward, AECL should be required to undertake and report on the following:
  - Characterization of the chemical and radiological composition of the residual liquid in HWUP tanks at the time of decommissioning to compare with the estimates provided in the EA Screening Report;
  - Characterization of the radiological contamination of solid wastes (steel, polyvinyl chloride (PVC), etc.) in accordance with a pre-determined sampling plan to confirm that the radionuclide inventories meet the requirements for handling and disposal procedures identified in the EA; and
  - Implementation of an internal bioassay program to confirm that internal doses from tritium inhalation, in addition to external doses monitored under AECL's routine radiation monitoring program, are below the regulatory limits, as predicted in the EA.
51. CNSC staff indicated that the CNSC licensing and compliance program would be used as the mechanism for ensuring the final design and implementation of the follow-up activities and for the reporting of the results, if AECL's decommissioning project was to be approved. The follow-up program would be reported in the AECL *Status Report on Follow-up for Environmental Assessments at Chalk River Laboratories*.

52. The Commission is satisfied with the proposed follow-up program and with the manner AECL would have to report the results to CNSC staff.

*Conclusions on the Likelihood and Significance of Adverse Environmental Effects*

53. Based on the considerations and reasons noted above, the Commission agrees with CNSC staff's conclusion in the Screening Report that the proposed project is not likely to cause significant adverse environmental effects, taking into account the identified mitigation measures.
54. The Commission is also satisfied that the likelihood and significance of the effects have been identified with reasonable certainty.
55. The Commission notes that NRCan will use the Screening Report to meet its CEAA obligation and make its own decision on the EA screening report. The Commission further acknowledges that a letter has been submitted to CNSC to confirm that NRCan is in agreement with the conclusions of the EA screening report although a final decision by this RA has not yet been made.

**Nature and level of Public Concern**

56. CNSC staff reported that an extensive consultation and information program had been implemented by AECL in August 2001, and that consultation had taken place during the three key stages of the assessment: the scoping, the assessment and the screening report stage.
57. CNSC staff reported that no comments were received on the draft Screening Report from members of the public or the Algonquins of Pikwànegàn First Nation. Similarly, no comments were received from any of the other stakeholders who were sent a copy of the draft Screening Report.
58. As noted in paragraph 25 of this Record of Proceedings, the Commission is satisfied that the methods used to consult with the public during the EA, including opportunities to comment and review the Screening Report, were appropriate and provided a suitable basis for the Commission to evaluate the public concerns about the project.
59. As no concerns were received on the draft EA Screening Report and no public interventions were received for this public hearing, the Commission is of the opinion that the public has no concerns with respect to the proposed project that would warrant a referral to the Minister of the Environment.

**Conclusion**

60. The Commission concludes that the EA Screening Report attached to CMD 08-H9 is complete and meets all of the applicable requirements of the CEAA.
61. The Commission concludes that the project, taking into account the appropriate mitigation measures identified in the Screening Report, is not likely to cause significant adverse environmental effects.
62. Furthermore, the Commission also concludes that, at this time, it will not refer the project to the federal Minister of the Environment for a referral to a review panel or mediator in accordance with the provisions of the CEAA.

A handwritten signature in black ink, appearing to read "M. Binder". The signature is fluid and cursive, with a long horizontal stroke at the beginning.

M. Binder  
President  
Canadian Nuclear Safety Commission

Date of decision: May 15, 2008  
Date of Release of Decision: June 25, 2008