Record of Proceedings, Including Reasons for Decision

In the Matter of

Applicant	Canadian Light Source Inc.
Subject	Application for the Renewal of the Particle Accelerator Operating Licence for Canadian Light Source Incorporated's Facility at the University of Saskatchewan
Date	May 15, 2006

RECORD OF PROCEEDINGS

Applicant:	Canadian Light Source Inc.
Address/Location:	101 Perimeter Rd., Saskatoon, Saskatchewan, S7N 0X4
Purpose:	Application for the renewal of the Particle Accelerator Operating Licence issued to Canadian Light Source Incorporated's Facility at the University of Saskatchewan
Application received:	January 16, 2006
Date(s) of hearing:	March 30, 2006
Location:	Canadian Nuclear Safety Commission (CNSC) Public Hearing Room, 280 Slater St., 14th Floor, Ottawa, Ontario
Members present:	L.J. Keen, Chair A.R. Graham C.R. Barnes M. J. McDill
Secretary:	M.A. Leblanc
Recording Secretary:	P.D. Bourgeau
General Counsel:	J. Lavoie

Applicant Represented By	**Document Number**
• M. Benmerrouche, Manager of Health, Safety and Environment • B. Tomlinson, Executive Director	CMD 06-H7.1 CMD 06-H7.1A
CNSC staff	**Document Number**
• H. Rabski • L. Colligan • G. Cherkas	CMD 06-H7 CMD 06-H7.A
No Intervenors	

Licence: Renewed
Date of Decision: March 30, 2006

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Introduction

1. Canadian Light Source Inc. (CLSI) has applied to the Canadian Nuclear Safety Commission (CNSC[1]) for the renewal of its Class IB Particle Accelerator Operating Licence which authorizes CLSI to operate the Canadian Light Source (CLS) facility at the University of Saskatchewan located in Saskatoon. The current licence for the CLS facility (PA1OL-02.07/2006) expires on May 27, 2006. CLSI has requested an eight-year licence term and updates to its licence as set out in CMD 06-H7 and CMD 06-H7.A.

2. The CLS facility consists of a 2.9 GeV electron synchrotron used as a light source for experiments in diverse fields such as biology, materials research, atomic and molecular science, earth sciences, pharmaceuticals, biomedical imaging and electronics.

Issues

3. In considering the application, the Commission was required to decide, pursuant to subsection 24(4) of the *Nuclear Safety and Control Act*[2]:

   a) if CLSI is qualified to carry on the activity that the licence would authorize; and

   b) if, in carrying on that activity, CLSI 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.

Public Hearing

4. The Commission, in making its decision, considered information presented for a public hearing held on March 30, 2006 in Ottawa, Ontario. The public hearing was conducted in accordance with the *Canadian Nuclear Safety Commission Rules of Procedure*[3]. During the public hearing, the Commission received written submissions and heard oral presentations from CNSC staff (CMD 06-H7 and CMD 06-H7.A) and CLSI (CMD 06-H7.1 and CMD 06-H7.1A). There were no intervenors.

Decision

5. Based on its consideration of the matter, as described in more detail in the following sections of this *Record of Proceedings, Including Reasons for Decision*, the Commission

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[1] In this *Record of Proceedings*, 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] S.C. 1997, c. 9.
[3] SOR/2000-211.

concludes that CLSI is qualified to carry on the activity that the licence will authorize. The Commission is satisfied that CLSI, in carrying on that activity, will make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed. Therefore,

the Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, renews the Particle Accelerator Operating Licence authorizing Canadian Light Source Incorporated to operate the Canadian Light Source facility located in Saskatoon, Saskatchewan. The renewed licence, PA1OL-02.00/2012, is valid from May 28, 2006 to May 31, 2012.

6. The Commission adds to the licence the conditions recommended by CNSC staff, as set out in the draft licence attached to CMD 06-H7.A.

7. With this decision, the Commission requests that CNSC staff provide the Commission with a report on the performance of the facility at the approximate mid-point in the term of the licence. The mid-term performance report will be presented at a public proceeding of the Commission.

Issues and Commission Findings

8. In making its licensing decision under section 24 of the *Nuclear Safety and Control Act*, the Commission considered a number of issues relating to CLSI's qualifications to carry out the proposed activities and the adequacy of the proposed measures for protecting the environment, the health and safety of persons, national security and international obligations to which Canada has agreed. The Commission's findings on these issues are outlined below.

Radiation Protection

9. As part of its evaluation of the adequacy of the provisions for protecting the health and safety of persons, the Commission considered the past performance and future plans of CLSI in the area of radiation protection.

Worker and Public Protection

10. CNSC staff reported that the CLS synchrotron facility incorporates several safety features for the protection of the workers, the public and the environment. Routine operation can result in two types of radiation hazard in the facility. One type occurs during the operation of the accelerator and the second is a lower level hazard that exists at all times.

11. CNSC staff reported that the protection of the public and CLS workers is accomplished by the shielding surrounding the accelerator and by a lock-up procedure to ensure that no one can be present inside the shielded area during operation of the CLS facility. The adequacy of the shielding and the lock-up procedure has been reviewed and verified on site by CNSC staff and found to be acceptable by CNSC staff. The December 2005 inspection of the facility by CNSC staff reconfirmed this conclusion.

12. CNSC staff reported that when the accelerator is not operating, a lesser radiation hazard (i.e., much lower radiation fields) emanates from the activated parts of the accelerator. These activated parts are locally shielded and are clearly identified with radiation signs indicating the dose rate at the surface. In addition to the posted signs, CLSI surveys the activated segments before any authorized work is allowed to take place in these areas. During the December 2005 inspection, CNSC staff surveyed a number of components within the shielded area of the storage ring that are likely to become activated over time and result in the presence of low-level radiation fields in certain locations. CNSC staff confirmed that all readings were found to be within expected levels.

13. CNSC staff's review of worker dose date for the period 2004-2005 indicated that radiation doses are being adequately controlled. No worker at CLSI received an effective dose in excess of the regulatory limits, as defined in the *Radiation Protection Regulations*[4].

14. CLSI reported that environmental low level dosimeters are deployed around the perimeter of the building in the public access zone and are used to determine exposure to members of the public. CLSI reported that dose to the public during the current licence period remained well below the regulatory limit. CLSI also reported that all CLS employees are monitored for exposure to ionizing radiation at the facility. CLSI reported that during the monitoring period from January 15, 2004 to January 14, 2006, all exposure received by CLS employees were well below the CNSC annual limit for Nuclear Energy Worker.

Conclusion on Radiation Protection

15. Based on this information, the Commission is satisfied that CLSI has made, and will continue to make, adequate provision for the protection of persons from radiation at the CLS facility.

Environmental Protection

16. To determine whether CLSI will make adequate provisions to protect the environment while carrying on the proposed activities at the CLS facility, the Commission considered the potential for the continued operation to adversely affect the environment.

17. CNSC staff reported that CLSI has a CNSC approved Health and Safety Environment Manual which describes the authority, responsibility, and accountability for Health, Safety and Environment (HSE) within the organization.

[4] SOR/2000-203.

18. CNSC staff reported that under routine operation, releases of radioactive materials or hazardous materials from the CLS facility to the environment are negligible. Because of the low average beam power, activation of air or of structural materials is negligible. Furthermore, the activated solid materials do not present any radiological risk at any point outside the facility.

19. Based on the information received, the Commission is satisfied that CLSI has made, and will continue to make, adequate provision for the protection of the environment during the proposed licence period.

Operating Performance

20. The Commission examined operating performance, including aspects of reportable events, routine operation, quality assurance and human performance, as a further indication of the adequacy of CLSI's qualifications and protection measures.

21. CLSI reported that the CNSC has previously approved amendments to CLSI's operating licence to authorize the second phase of beamlines of the CLS facility. The second phase includes seven additional x-ray research beamlines including two Biomedical Imaging and Therapy (BMIT) beamlines. The BMIT beamlines are intended to conduct imaging and radiation therapy on animals and plants, with long-range plans for potential human studies. CLSI reported that they expect the technical construction to begin in the first quarter of 2006 and completed by first quarter of 2009. CLSI further stated during their oral presentation that if funded, the northwest of the facility front wall will need to be completed to house these beamlines which are forecast to begin operation by 2012.

Reportable Events

22. CNSC staff reported that its December 2005 inspection of the CLS facility confirmed that there had been no occurrence of any reportable event since the facility began routine operation in July 2004. The results of the inspection did not reveal any significant safety hazard.

23. CNSC staff reported that its review of CLSI's annual report revealed that the licensee met all of its commitments and CNSC staff is of the view that the CLS facility is being operated in an acceptable manner.

Routine Operation

24. CNSC staff reported they found that residual radioactivity levels within the shielded area were acceptable following their visit of the CLS facility on December 15, 2005. CNSC staff also reported that CLSI operated and maintained the facility safely during the current licence period.

25. CNSC staff is of the opinion that the overall operations and maintenance meet requirements and will continue to do so.

Quality Assurance

26. On October 8, 2004, CLSI submitted the *CLSI Management Manual 10.1.1.1 Rev. 0*, dated October 1, 2004 and revised Quality Assurance Manual 10.12.1.1. Rev. 3, dated October 4, 2004. The *CLSI Management Manual* included an updated organization chart outlining the responsibilities for routine operation.

27. CNSC staff reported that they reviewed both documents and found them to be acceptable for routine operation. CNSC staff is of the view that CLSI addresses all Quality Management issues in an acceptable manner at the CLS facility.

Human Performance

28. CNSC staff reported that there have been no reportable events since the September 1, 2004 implementation of the systematic process for root-cause analysis of reportable events. As well, there were no reportable events that occurred requiring a complete root-cause analysis.

29. CNSC staff reported that during its December 15, 2005 inspection, CNSC staff discussed with CLSI the human factors issues associated with the addition needed to accommodate the X-ray BMIT beamlines. CNSC staff reported that CLSI staff committed to review aspects of patient safety, transportation of patients and animals through the facility, isolation of patients from animals, signage, and escape routes in case of emergency. A licence condition requiring prior written CNSC authorization of the documentation and procedures related to BMIT before initial operation has been added to the proposed draft licence in order to ensure that the CNSC conducts an in-depth review of the safety related documentation pertaining to the BMIT.

30. CNSC staff is of the view that CLSI addresses all Human Performance issues in an acceptable manner at the CLS facility.

Conclusion on Operating Performance

31. The Commission concludes that the past operating performance and quality assurance measures at the CLS facility provides a positive indication of the licensee's ability to carry out the proposed activities under the renewed licence.

Decommissioning Plan and Financial Guarantee

32. With respect to the Preliminary Decommissioning Plan (PDP) and related financial guarantee for the CLS facility, CNSC staff reported that it has reviewed the PDP and decommissioning cost estimates documents submitted by CLS and is satisfied that it meets requirements.

33. Based on the above, the Commission concludes therefore that the PDP and financial guarantee for the CLS facility are acceptable for the purpose of the current application for licence renewal.

Public Information

34. With respect to the CNSC's requirement that licensees maintain acceptable public information programs, CNSC staff reported that CLSI has an on-going public information program. CLSI has conducted a varied public information program which includes regular public tours, an internet page site to distribute information, and an outreach coordinator on staff. With respect to public tours, CLSI confirmed that members of the public only have access to supervised designated areas. CNSC staff is of the opinion that CLSI's public information program is acceptable.

35. The Commission is satisfied that CLSI's public information program for its CLS facility is adequate.

Fire Protection

36. Concerning the requirement for CLSI to make adequate provision for protecting the CLS facility from fire, CLSI has implemented an approved Fire Safety Plan and Building Evacuation Plan as required with the *National fire Code, 1995*. CNSC staff has reviewed and approved both plans.

37. The Commission is therefore satisfied that CLSI has made adequate provision for protecting the CLS facility from fire.

Safeguards and Non-Proliferation

38. CNSC staff reported that there are no applicable safeguard requirements for the CLS facility.

Canadian Environmental Assessment Act

39. Before making a licensing decision, the Commission must be satisfied that all applicable requirements of the *Canadian Environmental Assessment Act*[5] (CEAA) have been fulfilled. CNSC staff stated that the proposal by CLSI to continue the operation of the CLS facility constitutes an operation in relation to a physical work and hence, is a project as set out in section 2 of the CEAA. However, the renewal of a licence under subsection 24(2) of the NSCA is not included in the *Law List Regulations*[6] of the CEAA and, accordingly, is not a

[5] S.C. 1992, c.37.
[6] SOR/94-636.

trigger under paragraph 5(1)(d) of the CEAA. Therefore an environmental assessment is not required before a decision can be made pursuant to the NSCA for the requested renewal of CLSI's operating licence.

40. Therefore, the Commission is satisfied that an environmental assessment pursuant to the CEAA is not required before the Commission may consider and make a decision on the application for renewal of the licence.

Licence Period

41. CLSI requested a licence term of eight years. CNSC staff recommended that the Commission accept the eight-year licence term proposed by CLSI, with hold points and a licence condition in place so that CLSI must seek approval before operating the BMIT beamlines.

42. The Commission sought information from CLSI with regard to the proposed eight-year licence term. CLSI responded that eight years is the projected period of time over which it can expect a stable situation regarding the operation and scope of activities at CLS facility.

43. The Commission considered the safety impact of the on-going and planned significant developments such as the continued expansion to accommodate new beamlines and the BMIT project. CLSI explained that the new beamlines will not differ in commissioning and operation from the present beamlines. CLSI also noted that it did not expect to extend its activities beyond the approved safety processes during the proposed eight-year licence term.

44. The Commission accepts CNSC staff's recommendation to include a licence condition which would ensure that the CNSC conducts an in-depth review of the safety-related documentation pertaining to the BMIT.

45. Based on the information received, the Commission agrees that continued operation of the CLS facility poses a low-risk to persons and the environment. However, considering the anticipated developments at the CLS facility during the next several years and the potential impact that an increase in operational activity could have on the management structure and on health and safety at the facility, the Commission decides that a six-year licence term would be appropriate in this case.

Conclusion

46. The Commission has considered the information and submissions of CLSI and CNSC staff as presented in the material available for reference on the record.

47. The Commission is satisfied that CLSI is qualified to carry on the activity that the licence will authorize. The Commission is also satisfied that CLSI, in carrying on that activity, will

make adequate provision for the protection of the environment, the health and safety of persons, and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.

48. The Commission therefore renews, pursuant to section 24 of the *Nuclear Safety and Control Act*, Particle Accelerator Operating Licence PA1OL-02.07/2006. The renewed licence (PA1OL-02.00/2012) is valid from May 28, 2006 to May 31, 2012, unless suspended, amended, revoked or replaced.

49. The Commission includes in the licence the conditions recommended by CNSC staff, as set out in the draft licence attached to CMD 06-H7.A.

50. With this decision, the Commission requests that CNSC staff provide the Commission with a report on the performance of the facility at the approximate mid-point in the term of the licence. The mid-term performance report will be presented at a public proceeding of the Commission.

Marc A. Leblanc
Secretary,
Canadian Nuclear Safety Commission

Date of decision: March 30, 2006
Date of release of Reasons for Decision: May 15, 2006