



Record of Decision

DEC 21-H109

In the Matter of

Applicant Canadian Light Source Inc.

Subject Application to change the licensing basis for the Canadian Light Source Inc. Class IB particle accelerator facility

Date of Decision September 25, 2021

RECORD OF DECISION – DEC 20-H110

Applicant: Canadian Light Source Inc.

Address/Location: 44 Innovation Boulevard, Saskatoon, SK., S7N 2V3

Purpose: Application to change the licensing basis for the Canadian Light Source Inc. Class IB particle accelerator facility

Application received: June 14, 2021

Hearing: Public Hearing in Writing – Notice of Hearing in Writing published on September 1, 2021

Date of decision: September 25, 2021

Panel of Commission: Dr. S. Demeter

Change in licensing basis: Approved

Table of Contents

1.0 INTRODUCTION 1
2.0 DECISION..... 2
3.0 APPLICABILITY OF THE *IMPACT ASSESSMENT ACT*..... 2
4.0 ISSUES AND COMMISSION FINDINGS 2
4.0 CONCLUSION 4

1.0 INTRODUCTION

1. Canadian Light Source Inc. (CLSI) has applied to the Canadian Nuclear Safety Commission¹ (CNSC) for regulatory authorization of a change to the licensing basis for its Class IB particle accelerator facility. Specifically, CLSI applied to allow occupancy of a space where access is currently not permitted while its facility synchrotron is operating. The application represents a change in the licensing basis for CLSI and requires Commission approval under the terms of the current operating licence issued under the [Nuclear Safety and Control Act](#) (NSCA).
2. CLSI's licence to operate a Class IB particle accelerator, PA10L-02.01/2022, expires on May 31, 2022. CLSI operates a Class IB synchrotron facility called the Canadian Light Source (CLS). The CLS is located on the campus of the University of Saskatchewan in Saskatoon.
3. A 2018 failure of CLS's electron source resulted in an extended outage. CLSI has identified the need for a location within its facility to test and develop electron sources so that electron source failures do not result in further extended outages. The proposed Electron Source Lab (ESL) area would be located in the sub-basement of the CLS facility, in rooms 0006 and 0006.1.
4. CLSI has requested a change to its licensing basis for the future establishment of the ESL and has submitted its safety case to the CNSC. The requested change to the licensing basis would allow modification of the existing access control system to facilitate accessing the area of the future ESL while the CLS facility is in use. The area would have shielded walls and doors, and an independent access control system.

Issues

5. This application does not call for a licensing decision that is specifically contemplated under section 24 of the NSCA, since a change to the licensing basis does not necessarily amend the terms of a licence, and would not in this case. What is requested would not change the licensed activities authorized in the current licence. Nonetheless, the Commission has considered:
 - a) whether and what requirements the [Impact Assessment Act](#) (IAA) imposes in relation to this application
 - b) whether CLSI is qualified to carry on the activity that the licence, including the proposed changes to the licensing basis, would authorize; and
 - c) whether, in carrying on that activity in the changed manner contemplated, 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.

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.

Hearing

6. Pursuant to section 22 of the NSCA, the President established a Panel of the Commission, consisting of Dr. Sandor Demeter, to consider the application. A [notice of hearing in writing](#) was published on September 1, 2021. The Commission considered written submissions from CLSI ([CMD 21-H109.1](#)) and CNSC staff ([CMD 21-H109](#)).

2.0 DECISION

7. 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 the request by CLSI is acceptable. The Commission is satisfied that adequate regulatory oversight to accommodate processes and activities in the requested area are in place and would be in place when the synchrotron is operating. Therefore,

the Commission approves the proposed change to the licensing basis for Particle Accelerator Operating Licence PA1OL-02.01/2022, issued to Canadian Light Source Inc. for its Class IB synchrotron facility located on the University of Saskatchewan campus in Saskatoon, Saskatchewan, to permit occupancy of rooms 0006 and 0006.1 when the synchrotron is operating. The licence, PA1OL-02.01/2022, remains valid until May 31, 2022.

3.0 APPLICABILITY OF THE *IMPACT ASSESSMENT ACT*

8. In coming to its decision, the Commission examined whether the [Impact Assessment Act](#) (IAA) had requirements to be met, including whether an impact assessment of the proposal was required. As the proposed change in licensing basis is not a project, is not captured in the IAA's [Physical Activities Regulations](#) and is not contemplated for federal lands, the Commission is satisfied that the IAA does not impose any requirements in relation to this application.

4.0 ISSUES AND COMMISSION FINDINGS

9. The Commission considered the regulatory basis for CLSI's request for Commission approval to change the licensing basis for its Class IB particle accelerator facility. Licence condition 1.1, Licensing Basis, of CLSI's PA1OL² states that

² The Commission expects CNSC staff to ensure that, when the renewal of this licence comes before the Commission in 2022, the licence is updated to incorporate the current standardized licence conditions, particularly as it pertains to activities being in accordance with the licensing basis.

“The licensee shall conduct the licensed activities described in Part IV of this licence in accordance with the licensing basis described in the LCH, unless otherwise authorized by this licence.”

where Part IV refers to the authorized licensed activities.

10. Licence condition 1.2(b), Changes to CLSI Documents, states that

“Changes that are outside of the licensing basis are not permitted without the prior written approval of the Commission.”

11. CLSI is requesting a change in its safety case, which prevents occupancy of the spaces in question while the synchrotron is operating. Since the safety case forms part of CLSI licensing basis, the Commission must approve, in writing, any changes to the safety case. In making its decision in this matter, the Commission considered CLSI’s application with respect to the safety of the facility and the radiation doses to workers in the area in question. CLSI’s hazard analysis of the proposed occupancy of rooms 0006 and 0006.1 identified potential risks associated with radiation protection and fire hazard analysis.

Radiation Protection

12. As noted by CNSC staff, the proposed occupancy increase of the ESL would not change the nature and magnitude of the radiation hazard at the CLS facility. The key change is that the ESL area would become an occupied area.
13. CLSI submitted that it plans to install additional shielding in the ESL in order to reduce dose rates to levels that permit occupancy (<1 mSv/h), in accordance with its current procedures. CLSI proposed the following mitigation measures:
- Use an analytical model to assess the radiation dose rate in the occupied areas during normal and accident conditions
 - Perform radiation measurements to verify radiation dose rate in occupied area
 - Routine radiation surveys during normal operation
14. In its recommendations to the Commission, CNSC staff assessed that CLSI’s existing radiation protection program addresses the high dose rates produced by CLSI’s synchrotron, and that CLSI has proposed appropriate controls, including shielding, to accommodate the change in occupancy for the ESL area. CNSC staff is of the view that CLSI’s radiation protection program, when applied to the ESL area, will ensure that doses resulting from occupancy of the ESL area will be controlled. CNSC staff additionally confirmed that CLSI continues to meet regulatory requirements for radiation protection.

15. The Commission is satisfied with the proposed measures to accommodate the proposed occupancy of rooms 0006 and 0006.1 to establish the ESL, and concludes that workers and the environment will be adequately protected from radiation hazards. The Commission notes that remote monitoring – for ambient radiation levels in the ESL, operational variables, and for analytical/experimental variables resulting from the ESL – could also be used to reduce worker radiation dose as low as reasonably achievable.

Changes in Fire Hazard Analysis

16. According to CLSI, the development in the rooms located in a sub-basement is not in compliance with the [*National Building Code of Canada \(2015\)*](#) and [*National Fire Code of Canada \(2015\)*](#). CLSI submitted that it completed a comprehensive code compliance review to assess the impact of installing ESL shielding on egress, as well as a third-party review of the code compliance review. CLSI stated that it would obtain CNSC approval for changes proposed in the code compliance review, and implement recommendations from the code compliance review.
17. To comply with CSA N393-13, *Fire protection for facilities that process, handle or store nuclear substances*³, and the *National Building Code of Canada (2015)*, CLSI proposed a performance-based approach for the sub-basement. The proposed approach includes limiting the number of people in the ESL at any given time, adding directional exit signage, and restricting materials brought into the ESL.
18. CNSC staff assessed that CLSI's application, hazard analysis and proposed mitigating measures meet the intent of CSA N393-13, and are acceptable.. CNSC staff indicated that it would verify CLSI's implementation of all recommendations from the performance-based assessment, including review and acceptance of CLSI procedures supporting the recommendations.
19. Based on its assessment of the information provided on the record by CLSI and CNSC staff, the Commission is satisfied that CLSI appropriately addressed changes in fire hazard analysis. The Commission is satisfied that the proposed changes meet the intent of CSA N393-13, and concludes that, with the proposed mitigating measures in place, the intended occupancy of rooms 0006 and 0006.1 would not impact the safe operation of the CLS.

5.0 CONCLUSION

20. Based on its assessment of the record before it, the Commission is satisfied that the proposed occupancy of rooms 0006 and 0006.1 would not negatively impact the safe operation of the CLS. The Commission is satisfied that the proposed mitigation measures to accommodate processes and activities from the proposed occupancy of rooms 0006

³ N393-13, *Fire protection for facilities that process, handle or store nuclear substances*, CSA Group, 2013.

and 0006.1 will protect persons and the environment. To keep worker radiation doses as low as reasonably achievable, the Commission encourages remote monitoring, to the extent possible and practicable, for ambient radiation levels in the ESL, operational variables, and for analytical/experimental variables resulting from the ESL.

21. Therefore, the Commission approves the proposed change to the licensing basis for Particle Accelerator Operating Licence PA1OL-02.01/2022, issued to Canadian Light Source Inc., to permit occupancy of rooms 0006 and 0006.1 when the synchrotron is operating. The change in licensing basis and facility modifications shall be reflected in the updated safety analysis and fire protection program.
22. The Commission directs CNSC staff to update the compliance verification criteria in the LCH to reflect the amended licensing basis. The Commission directs CNSC staff to monitor the proposed installations to verify that the implementation of mitigation measures proposed by CLSI adequately addresses the potential hazards brought about by the change in licensing basis.

Sandor Demeter Digitally signed by Sandor Demeter
Date: 2021.09.25 09:43:22 -05'00'

Dr. Sandor Demeter
Member,
Canadian Nuclear Safety Commission

September 25, 2021

Date