



## Record of Decision

DEC 22-H6

In the Matter of

Applicant TRIUMF Accelerators Inc.

Subject Application to Renew Particle Accelerator  
Operating Licence and Transfer Licence to  
TRIUMF Inc.

Public Hearing  
Date March 23, 2022

Record of  
Decision Date June 16, 2022

**RECORD OF DECISION – DEC 22-H6**

Applicant: TRIUMF Accelerators Inc.

Address/Location: 4004 Wesbrook Mall, Vancouver, BC, V6T 2A3

Purpose: Application to Renew Particle Accelerator Operating Licence and Transfer Licence to TRIUMF Inc.

Application received: March 19, 2021

Date of public hearing: March 23, 2022

Location: [Virtual Hearing](#)

Members present: R. Velshi, Chair  
T. Berube  
I. Maharaj

Registrar: D. Saumure

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See Appendix A		

**Licence: Renewed and Transferred**

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## 1.0 INTRODUCTION

1. TRIUMF Accelerators Inc. (TAI) has applied to the Canadian Nuclear Safety Commission<sup>1</sup> for the renewal of its Class IB particle accelerator operating licence. TAI's particle accelerator facilities are located on the campus of the University of British Columbia in Vancouver, British Columbia, and on the unceded territory of the Coast Salish Peoples, including the territories of the x<sup>w</sup>məθkwəyəm (Musqueam), Skwxwú7mesh (Squamish), and Səlilwətaʔ/Selilwitulh (Tsleil-Waututh) Nations. The current operating licence, PA1OL-01.00/2022, expires on June 30, 2022. TAI requested a renewal of the licence for a period of 10 years.
2. TAI's particle accelerator facilities are a Class IB nuclear facility under the [Class I Nuclear Facilities Regulations](#).<sup>2</sup> TAI's current licence authorizes TAI to operate and service 7 particle accelerators including:
  - 1 520-MeV cyclotron;
  - 4 Class II cyclotrons; and
  - 2 Class II linear accelerators.

The licence also authorizes TAI to possess, transfer, use, and store nuclear substances arising from its operations. TAI did not request any new licensed activities in its licence renewal application.

3. TAI requested that the licence, if renewed, be transferred to TRIUMF Inc., a not-for-profit corporation. TRIUMF Inc. currently has a management agreement with TAI to operate the particle accelerators under licence PA1OL-01.00/2022. TAI indicated that, if the Commission authorizes the transfer of the licence, TAI intends to amalgamate with TRIUMF Inc. when the renewed licence term begins on July 1, 2022.
4. The Commission is also being asked to accept TAI's revised financial guarantee consisting of an Escrow Fund in the amount of \$14.78M (as of March 31, 2023) and a Contribution Gap Agreement and a Financial Security and Access Agreement.

### Issues

5. The Commission is required to determine whether and what requirements the [Impact Assessment Act](#)<sup>3</sup> (IAA) imposes in relation to the activities sought to be authorized in TAI's application to renew and transfer its Class IB particle accelerator operating licence. Satisfying any such requirements can be a prerequisite to licensing.

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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> SOR/2000-204

<sup>3</sup> S.C. 2019, c. 28, s. 1

6. Pursuant to paragraph 24(4)(a) and (b) of the [Nuclear Safety and Control Act](#)<sup>4</sup> (NSCA), to renew the licence, the Commission must be satisfied that:
  - a) TAI is qualified to carry on the activity that the licence would authorize; and
  - b) in carrying on that activity, TAI 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.
7. Similarly, pursuant to paragraph 24(4)(a) and (b) of the NSCA, the Commission must be satisfied of the following prior to authorizing the transfer of the licence:
  - a) TRIUMF Inc. is qualified to carry on the activity that the licence would authorize; and
  - b) in carrying on that activity, TRIUMF Inc. 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.
8. As an agent of the Crown, the Commission recognizes its role in fulfilling the Crown's constitutional obligations, along with advancing reconciliation with Canada's Indigenous peoples. The Commission's responsibilities include the duty to consult and, where appropriate, accommodate Indigenous interests where the Crown contemplates conduct which may adversely impact potential or established Indigenous or treaty rights<sup>5</sup>. As such, the Commission must determine what engagement and consultation steps and accommodation measures are called for, respecting Indigenous interests.

### Public Hearing

9. On August 3, 2021, a [Notice of Public Hearing and Participant Funding](#) was published for this matter.
10. Pursuant to section 22 of the NSCA, the President of the Commission established a Panel of the Commission over which she would preside, including Commission Members Dr. T. Berube and Ms. I. Maharaj. The Commission, in making its decision, considered information presented for a public hearing held virtually on March 23, 2022. The public hearing was conducted in accordance with the [Canadian Nuclear Safety Commission Rules of Procedure](#)<sup>6</sup> (the Rules). During the public hearing, the

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<sup>4</sup> S.C. 1997, c. 9

<sup>5</sup> *Haida Nation v. British Columbia (Minister of Forests)*, 2004 SCC 73; *Taku River Tlingit First Nation v. British Columbia (Project Assessment Director)*, 2004 SCC 74

<sup>6</sup> Statutory Orders and Regulations (SOR)/2000-211.

Commission considered written submissions and heard oral presentations from TAI ([CMD 22-H6.1](#), [CMD 22-H6.1A](#), and [CMD 22-H6.1B](#)) and CNSC staff ([CMD 22-H6](#) and [CMD 22-H6.A](#)). The Commission also considered oral and written submissions from 7 intervenors (see Appendix A for a list of interventions). All interventions received were in support of TAI's application. The hearing was webcast live via the CNSC website, and [video archives](#) are available on the CNSC's website.

### Participant Funding Program

11. Pursuant to paragraph 21(1)(b.1) of the NSCA, the Commission has established a [Participant Funding Program](#) (PFP) to facilitate the participation of Indigenous Nations and communities, members of the public and stakeholders in Commission proceedings. In [August 2021](#), up to \$35,000 in funding to was made available through the CNSC's PFP to review TAI's licence renewal application and associated documents, and to provide the Commission with value-added information through topic-specific interventions. No PFP applications were received for this proceeding.

## **2.0 DECISION**

12. Based on its consideration of the matter, and as described in more detail in the following sections of this *Record of Decision*, the Commission is satisfied that:
  - no requirements under the *Impact Assessment Act* (IAA) are imposed in relation to this matter
  - the Commission's responsibility to uphold the honour of the Crown and its constitutional obligations with regard to engagement and consultation respecting Indigenous interests has been satisfied
  - TAI is qualified to carry on the activity that the licence will authorize
  - TAI, in carrying on these 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,

the Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, renews the Class IB particle accelerator operating licence issued to TRIUMF Accelerators Inc. for its particle accelerator facilities located in Vancouver, British Columbia. The renewed licence, PA1OL-01.00/2023, is valid from July 1, 2022 until June 30, 2032.

13. Given that the amalgamation of TAI to TRIUMF Inc. would have no substantive impact on the operation of the particle accelerator facilities, and that the facilities will be operated by TRIUMF Inc, with the same staff and under the same programs as TAI, the Commission concludes the following:

- TRIUMF Inc. is qualified to carry on the activity that the licence will authorize
- TRIUMF Inc, in carrying on these 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,

the Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, transfers the renewed licence, PA1OL-01.00/2023, from TRIUMF Accelerators Inc. to TRIUMF Inc.

14. The Commission includes in the licence the conditions as recommended by CNSC staff in CMD 22-H6, with changes to reflect the most recent standardized conditions. The Commission is imposing the licence conditions that are in the licence that goes with this record of decision, which is not as was drafted in CNSC staff's CMD but which reflects updated conditions as discussed in the hearing. The Commission also delegates authority for the purposes of licence conditions G.3, 7.2, 9.4, and 13.2, as recommended by CNSC staff. Licence conditions and delegation of authority are further discussed in section 4.5 of this Record of Decision.
15. The Commission finds the proposed financial guarantee amount of C\$14.78 million (as of March 31, 2023) to be acceptable, and the proposed financial guarantee instruments of an Escrow Fund with a Contribution Gap agreement and the related *CNSC Financial Security and Access Agreement*, to be appropriate. Any administrative changes to the instruments to reflect TRIUMF Inc. as the licensee rather than TAI will be in conformity with this Commission decision, so long as no substantive change is made. The Commission directs the licensee to provide original financial guarantee instrument documentation that conforms with [G-206 Financial Guarantees for the Decommissioning of Licensed Activities](#), within 90 days of the issuance of this decision.
16. With this decision, the Commission directs CNSC staff to report on TRIUMF Inc.'s performance as part of the periodic [Regulatory Oversight Report](#) for Class IB particle accelerators. CNSC staff shall present this report at a public proceeding of the Commission. The Commission also directs CNSC staff to inform the Commission, as part of the *Regulatory Oversight Report*, of any changes made to the Licence Conditions Handbook (LCH). CNSC staff may bring any matter to the Commission's attention as required.

### **3.0 APPLICABILITY OF THE *IMPACT ASSESSMENT ACT***

17. In coming to its decision, the Commission was first required to determine whether any requirement under the IAA applied to the licence renewal application. Pursuant to the

IAA and the [Physical Activities Regulations](#) made under it, impact assessments are to be conducted in respect of projects identified as having the greatest potential for adverse environmental effects in areas of federal jurisdiction. Neither licence renewal nor transfer is a project designated under the *Physical Activities Regulations*.

18. The Commission is satisfied there is no requirement under the IAA for an impact assessment to be completed. The Commission is also satisfied that there are no other applicable requirements of the IAA to be addressed in this matter.<sup>7</sup> The Commission notes that the NSCA provides a strong regulatory framework for environmental protection and the health and safety of persons. Environmental protection is further discussed in section 4.2.9 of this decision.

#### 4.0 ISSUES AND COMMISSION FINDINGS

19. In making its licensing decision, the Commission considered a number of issues and submissions relating to TAI's qualification to carry out the licensed activities. 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.

20. This decision focuses on the issues relevant for this application, specifically:

- completeness of the licence application
- TAI's performance in the 14 safety and control areas
- Indigenous engagement and consultation
- other matters of regulatory importance, including the financial guarantee
- licence length and conditions, and delegation of authority
- licence transfer

#### 4.1 Completeness of Licence Application

21. TAI submitted a licence renewal application on [March 19, 2021](#) and a request for licence transfer on [November 22, 2021](#). In its consideration of this matter, the Commission examined the completeness of the application and the adequacy of the information submitted by the TAI, as required by the NSCA, the [General Nuclear Safety and Control Regulations](#)<sup>8</sup> (GNSCR), the [Class I Nuclear Facilities Regulations](#)<sup>9</sup>, and other applicable regulations made under the NSCA, including the [Nuclear Security Regulations](#)<sup>10</sup> and the [Radiation Protection Regulations](#)<sup>11</sup>.

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<sup>7</sup> The IAA can impose other requirements on federal authorities in respect of authorizing projects that are not designated as requiring an impact assessment, including projects that are to be carried out on federal lands, or projects outside of Canada. This licence renewal does not engage any such applicable IAA requirements

<sup>8</sup> SOR/2000-202.

<sup>9</sup> SOR/2000-204.

<sup>10</sup> SOR/2000-209.

22. The GNSCR call on an applicant for a licence renewal to provide information regarding any changes in information to the CNSC as part of its application. Section 5 provides:
- An application for the renewal of a licence shall contain
- (a) the information required to be contained in an application for that licence by the applicable regulations made under the Act; and
  - (b) a statement identifying the changes in the information that was previously submitted.
23. TAI's application and supplemental submissions included reasoning for its application, information on the operation of its particle accelerator facilities since issuance of the current licence, information on the measures implemented by TAI to satisfy the requirements of its current licence, and information on how those measures would continue to be implemented under a future licence, if granted. TAI also provided detailed information of the proposed transfer of the licence to TRIUMF Inc. CNSC staff reviewed TAI's application and determined that the information submitted by TAI is complete and satisfies CNSC regulatory requirements, including the NSCA, and associated regulations.
24. The Commission concludes that TAI's licence renewal application is complete and complies with the regulatory requirements respecting an application for licence renewal. The Commission notes that TAI's application is for the renewal of an existing licence to continue operating a Class IB facility, with no substantive changes to the licensing basis, and that section 7 of the GNSCR provides that "An application ...for the renewal... of a licence may incorporate by reference any information that is included in a valid, expired or revoked licence."

#### **4.2 TAI's Performance in the Safety and Control Areas**

25. The Commission examined CNSC staff's assessment of TAI's performance in all 14 [safety and control areas](#) (SCAs) for the purpose of evaluating this application. Throughout the current licence period, CNSC staff rated TAI's performance in all SCAs as "satisfactory" or "fully satisfactory"<sup>12</sup>, with the exception of four "below expectations" ratings, which are discussed in sections 4.2.1 Management System, 4.2.2 Human Performance Management, 4.2.6 Fitness for Service, and 4.2.11 Waste Management.

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<sup>11</sup> SOR/2000-203.

<sup>12</sup> Changes between "satisfactory" and "fully satisfactory" reflect changes in the CNSC's rating methodology and do not necessarily reflect a significant change in TAI's performance.

#### 4.2.1 Management System

26. The Commission examined TAI's management system, which covers the framework that establishes the processes and programs required to ensure that the TAI achieves its safety objectives, continuously monitors its performance against these objectives, and fosters a healthy safety culture.
27. TAI provided information on its management system, including its governing documentation, its organizational structure and recent organizational changes, and its recent safety culture assessment. TAI also provided information on its ongoing improvement initiatives including improvements to its work control, document management and safety management processes.
28. CNSC staff provided information concerning its evaluation of TAI's performance over the licence period. From 2012 to 2017, CNSC staff rated TAI's performance in the management system SCA as "satisfactory", with the exception of 2014. In 2014, CNSC staff rated TAI's performance as "below expectations" due to an incident where an employee was missed during a pre-lockup search of the electron accelerator facility. This incident is discussed further in section 4.2.2 of this Record of Decision.
29. CNSC staff submitted that, in 2016, TAI committed to implement CSA Group standard N286-12, *Management system requirements for nuclear facilities*,<sup>13,14</sup> by 2018. TAI did not meet this implementation deadline and consequently CNSC staff graded TAI's management system SCA performance as "below expectations" from 2018-2020. Despite the incomplete implementation of some clauses of CSA N286-12, CNSC staff's position is that TAI has a management system in place that is sufficient to allow TAI to perform its licensed activities safely.
30. In February 2021, CNSC staff performed an inspection of TAI's progress towards full implementation of CSA N286-12 and issued 20 notices of non-compliance (NNCs), all of which were of low safety significance. CNSC staff reported that TAI implemented an acceptable action plan to address the NNCs. As of March 11, 2022, CNSC staff reported that 16 of the 20 NNCs are closed, with two more targeted for closure before the end of the current licence term. CNSC staff expect the licensee to complete the implementation of CSA N286-12 in the first quarter of 2023 and committed to continue to monitor the licensee's progress through increased regulatory oversight.
31. The Commission asked for the reasoning behind TAI's delayed implementation of CSA N286-12. TAI described that it had taken time to complete a thorough gap analysis of the standard's requirements and implement the necessary organizational changes. The Commission acknowledges the effort required by TAI to implement the full requirements CSA N286-12 but emphasizes the importance of timely compliance with the standard.

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<sup>13</sup> The CSA Group makes its nuclear series standards freely viewable to members of the public on its [website](#) by means of a guest account.

<sup>14</sup> CSA N286-12 *Management system requirements for nuclear facilities*, CSA Group, 2012.

32. On the topic of increased regulatory oversight of TAI's management system, CNSC staff explained that its increased oversight activities began with mandatory monthly progress reports from TAI and have moved to weekly progress meetings with TAI. Next, CNSC staff will be entering a phase of more frequent inspections, with the next inspection planned in May 2022. CNSC staff will continue to assess TAI's compliance with N286-12 through regular updates, document reviews and inspections throughout the proposed licensing period. The Commission is satisfied that TAI has an appropriate plan in place to fully implement CSA N286-12 and that CNSC staff will verify, through regulatory oversight activities, that the licensee continues to ensure that the risk to the public and the environment from its operations remains low.
33. The Commission asked why CNSC staff considered the management SCA to be of "moderate risk" per Table 2.1 in CMD 22-H6. CNSC staff explained that SCA risk rankings are relative across different licensed facilities. CNSC staff rank SCAs based on the likelihood and magnitude of potential harm associated with each SCA and then use that ranking to inform how CNSC staff expend resources for compliance inspections. The Commission is satisfied with the information provided by CNSC staff regarding SCA risk rankings.
34. On safety culture, TAI submitted that it underwent an independent safety culture assessment from 2017-2018. TAI stated that it received positive feedback on safety culture from its staff. In response to the assessment findings, TAI created a plan to bolster identified strengths and make changes where areas for improvement were identified, such as conventional health and safety. TAI also hired a new Chief Safety Officer to prioritize implementation of the safety culture improvement plan. The Commission is satisfied with the measures taken by TAI to strengthen its existing safety culture.
35. The Commission finds that TAI has appropriate organization and management structures in place to carry on the licensed activities and acceptable programs in place to foster a healthy safety culture. The Commission is satisfied that the outstanding management system deficiencies are of low safety significance and do not pose an unreasonable risk to safe operation of the facility, or to the safety and security of the public and the environment. The Commission comes to this conclusion on the basis that:
- the Commission agrees with CNSC staff's assessment that, despite TAI's incomplete implementation of CSA N286-12, TAI has an adequate management system in place to operate the facility
  - the Commission agrees with CNSC staff's assessment that TAI has an action plan in place to fully implement CSA N286-12 by 2023
  - CNSC staff will conduct increased oversight activities to verify TAI's timely implementation of N286-12
  - the Commission is satisfied that the evidence presented by TAI demonstrates that TAI has an acceptable safety culture and has implemented a sufficient plan to further improve

The Commission highlights the importance of compliance with CSA N286-12 and expects TAI to meet the requirements of the standard in a timely manner. The Commission expects to be informed of the licensee's progress to fully implement CSA N286-12 through the *Regulatory Oversight Report*, or through other means, as appropriate.

#### 4.2.2 Human Performance Management

36. The Commission assessed TAI's human performance management program. Human performance management encompasses activities that ensure that TAI 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.
37. Regarding personnel training, TAI submitted that it has three major training areas consisting of safety training, operator training, and group/task specific training. TAI explained that it develops all training courses according to the systematic approach to training (SAT) framework, and has instated an inter-department training implementation panel to oversee training programs site-wide. TAI added that it audits all training plans at least every 5 years. CNSC staff reported that it conducted 4 inspections and numerous document reviews of TAI's training program over the current licence term. CNSC staff found that TAI has implemented a training program in compliance with [REGDOC 2.2.2 Personnel Training](#). The Commission is satisfied that TAI has a personnel training program in place that meets regulatory requirements.
38. Asked about how operators are trained as new accelerator facilities come online, a TAI representative explained that operators for new accelerators receive a significant amount of on-the-job training. The TAI representative described TAI's process for commissioning new equipment, and noted that the commissioning team develops training plans that are used to train operators on the new equipment. The Commission is satisfied that TAI has implemented training programs for new accelerator facilities.
39. Regarding staffing levels at TAI, CNSC staff confirmed that TAI met the requirements for minimum staff complement over the current licensing period. CNSC staff noted that, during the licence period, TAI added new personnel for core safety-related programs in the areas of environment, health and safety, quality management, training, and computing, to correct an identified lack of resources. The Commission is satisfied that TAI has a sufficient number of staff in all relevant job areas.
40. In 2014, CNSC staff rated TAI's performance in both the management system and human performance management SCAs as "below expectations" following a near-miss event in which a worker was missed during the pre-lockup search executed prior to electron accelerator operation. The worker exited the area when the pre-irradiation warning alarm sounded and did not incur any radiation exposure. Following an event root cause analysis, TAI undertook corrective actions which included a training improvement plan. CNSC staff conducted an inspection and numerous reviews to

ensure the effectiveness of the corrective actions. CNSC staff reported that all corrective actions were implemented in a timely manner. The Commission is satisfied that TAI implemented adequate corrective actions in response to the near-miss event.

41. The Commission concludes that TAI's employees are appropriately trained and qualified and that TAI has appropriate human performance management programs in place for the conduct of the requested licensed activities. The Commission comes to this conclusion on the basis that:
- the Commission agrees with CNSC staff's assessment that TAI has a sufficient number of staff in all relevant job areas
  - the Commission agrees with CNSC staff's assessment that TAI has a SAT-based training program in place that meets regulatory requirements
  - the Commission agrees with CNSC staff's assessment that TAI has implemented adequate corrective actions in response to the 2014 near-miss event

#### *4.2.3 Operating Performance*

42. The Commission examined TAI's operating performance, which includes an overall review of the conduct of the licensed activities and the activities that enable effective performance.
43. TAI provided information on its operations and configuration management programs, its process for tracking faults and non-conformities, as well as its key operating performance indicators. TAI noted that it submits annual compliance reports to the CNSC that include a summary of its yearly licensed activities.
44. CNSC staff assessed TAI's operating performance over the current licence term through desktop reviews of program documents and event reports, as well as through 2 SCA-specific inspections. CNSC staff confirmed that TAI's operating procedures meet regulatory requirements and adequately describe TAI's operations. CNSC staff further confirmed that TAI operated in accordance with its procedures throughout the current licence period. The Commission is satisfied that TAI has operated in accordance with regulatory requirements over the current licence period and that its operating programs meets regulatory requirements.
45. The Commission concludes that TAI remains qualified to carry out the activities under the proposed licence. The Commission is satisfied that TAI has operated in accordance with regulatory requirements over the current licence period and that TAI has adequate operation performance-related programs in place to provide for the protection of the health and safety of persons and the environment over the proposed licence term. The Commission comes to this conclusion on the basis that:
- the Commission agrees with CNSC staff's assessment that TAI meets the regulatory requirements of the operating performance SCA

- the Commission agrees with CNSC staff's assessment that TAI operated in accordance with regulatory requirements over the current licence period

#### 4.2.4 *Safety Analysis*

46. The Commission assessed TAI's safety analysis, which is a systematic evaluation of the potential hazards associated with the conduct of the licensed activity or the operation of a facility and considers the effectiveness of preventive measures and strategies in reducing the effects of such hazards. TAI submitted that it maintains safety analysis reports (SARs) for all TAI facilities to document hazard analyses and hazard mitigation measures. TAI explained that it revises its SARs whenever a facility is modified or undergoes significant changes in its operating regime.
47. CNSC staff reported that TAI's SARs are comprehensive, and that TAI meets regulatory requirements for the safety analysis SCA. CNSC staff verified TAI's performance in the safety analysis SCA through oversight activities including desktop reviews and a safety analysis-focused inspection conducted in 2017.
48. The Commission is satisfied that TAI's safety analysis program meets regulatory requirements, and that TAI has SARs in place that demonstrate the adequacy of the design of its facilities. The Commission concludes that TAI has systematically evaluated potential hazards and adequately prepared for reducing the effects of such hazards for the operation of the facility under the proposed license. The Commission comes to this conclusion on the basis that:
- the Commission agrees with CNSC staff's assessment that TAI's safety analysis reports are adequate
  - the Commission agrees with CNSC staff's assessment that TAI meets the regulatory requirements for the safety analysis SCA

#### 4.2.5 *Physical Design*

49. The Commission examined the physical design of TAI's particle accelerator facilities. Physical design relates to activities that impact the ability of structures, systems, and components to meet and maintain their design basis, given new information or activities arising over time and taking changes in the external environment into account.
50. TAI submitted information on the safety-related systems incorporated in the design of its particle accelerator facilities, including shielding, radiation monitors, and access control systems. TAI also described improvements made to its radiation monitoring, access control, and oxygen deficiency monitoring systems over the current licence term. TAI explained that it manages the implementation of design changes under its engineering design, manufacture, and assembly process.

51. CNSC assessed TAI's performance in the physical design SCA through a variety of means including desktop reviews, and an SCA-specific inspection in 2017. CNSC staff submitted that TAI's physical design program meets regulatory requirements.
52. The Commission concludes that TAI has implemented an effective design program and that the design of TAI's facilities is adequate. The Commission comes to this conclusion on the basis that:
  - the Commission is satisfied that the evidence presented by TAI demonstrates that TAI has an adequate process in place to safely manage and implement design changes that are within the licensing basis
  - the Commission agrees with CNSC staff's assessment that TAI's physical design program meets regulatory requirements

#### 4.2.6 *Fitness for Service*

53. The Commission considered the measures in place to maintain the fitness for service of TAI's particle accelerator facilities. Fitness for service covers activities that are performed to ensure that systems, structures, and components continue to effectively fulfill their purpose.
54. TAI provided information pertaining to its calibration, inspection, and testing regimes which ensure the fitness for service of its safety systems, radiation monitors, and fire prevention systems. TAI also reported that it has similar calibration, inspection, and testing regimes in place for its oxygen deficiency monitors, flammable gas monitors, differential pressure gauges, and HEPA and charcoal filters.
55. CNSC staff submitted that it verified TAI's implementation of its fitness for service program through oversight activities including a focused inspection conducted in 2017. CNSC staff found that TAI currently meets the regulatory requirements related to the fitness for service SCA.
56. CNSC staff rated TAI's performance related to the fitness for service SCA as "satisfactory" across the current licence period, with the exceptions of one "below expectations" rating in 2013. In 2013, TAI reported 2 events related to the malfunction of safety related systems. Neither event had adverse radiological impact on workers, the public, or the environment. CNSC staff found that TAI implemented adequate corrective actions following these events. The Commission is satisfied with TAI's implementation of corrective actions in response to these 2 events.
57. The Commission is satisfied that TAI has appropriate programs in place to ensure that the equipment at its facilities will remain fit for service throughout the proposed licence period. The Commission comes to this conclusion on the basis that:
  - the Commission agrees with CNSC staff's assessment that TAI's fitness for service program meets regulatory requirements

- the Commission is satisfied that TAI has implemented adequate corrective actions in response to the 2 safety related system events in 2013

#### 4.2.7 Radiation Protection

58. As part of its evaluation of the adequacy of the measures for protecting the health and safety of persons, the Commission considered TAI's past performance in radiation protection. The radiation protection SCA covers the implementation of a radiation protection program in accordance with the *Radiation Protection Regulations*<sup>15</sup> (RPR).
59. TAI submitted that the primary radiation hazard present at its facilities is associated with the prompt radiation<sup>16</sup> fields present outside of shielding during accelerator operation. A lesser radiation hazard is also posed by residual radiation fields from activated components inside shielding when the accelerator is offline for personnel access. TAI specified that most radiation doses received by TAI workers are the result of exposure to residual radiation fields when performing maintenance activities on activated components.
60. CNSC staff verified the compliance of TAI's radiation protection program over the current licence term through 3 focused inspections, as well as other inspections. CNSC staff reported that TAI has adequately addressed all action items raised during radiation protection inspections over the current licence period and that TAI's radiation protection program meets the requirements of the RPR.
61. The Commission considered whether TAI's radiation protection program ensures that contamination and radiation doses to persons are monitored, controlled, and kept as low as reasonably achievable (ALARA), with social and economic factors taken into consideration. TAI submitted that it controls radiation hazards and keeps doses ALARA using shielding, administrative controls, personnel access control systems, and radiation monitoring systems. CNSC staff reported that TAI's application of the ALARA principle has been demonstrated through TAI's implementation of a policy on personnel radiation exposure. The Commission is satisfied with TAI's application of the ALARA principle.
62. In its submission, TAI included detailed personnel dose information for the Commission's consideration. CNSC staff reported that no worker at TAI received a radiation dose in excess of CNSC regulatory limits<sup>17</sup> during the current licence period. The maximum effective doses received by a nuclear energy worker (NEW) and a non-NEW at TAI over the current licence term were 9.18 millisievert (mSv) and 0.67 mSv,

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<sup>15</sup> SOR/200-203.

<sup>16</sup> Gamma rays and neutrons produced by the interactions of the beam of protons hitting targets and appearing less than a second after the interaction.

<sup>17</sup> The regulatory effective dose limit for a nuclear energy worker is 50 mSv per year, and 100 mSv over a 5-year period. The regulatory dose limit for a non-nuclear energy worker is 1 mSv per year.

respectively. The maximum equivalent doses to the skin and to the extremities received by a NEW at TAI over the current licence term were 9.37 mSv/year and 59.8 mSv/year, respectively. CNSC staff informed the Commission that there were two radiological action level<sup>18</sup> exceedances during the licence term and that TAI had investigated both events and implemented corrective actions where required. Based on the dose information provided, the Commission is satisfied that effective and equivalent doses to NEWs and non-NEWs at TAI are being controlled below CNSC regulatory dose limits.

63. The Commission is satisfied that TAI has an adequate radiation protection program in place to protect workers, the public and the environment from radiation hazards associated with TAI's particle accelerator facilities. The Commission comes to this conclusion on the basis that:
- the Commission agrees with CNSC staff's assessment that TAI has implemented a radiation protection program that meets the requirements of the RPR
  - the Commission is satisfied that personnel dose information confirms that radiation doses to workers at TAI were well below CNSC regulatory limits during the current licence term
  - the Commission agrees with CNSC staff's assessment that TAI has adequately applied the ALARA principle over the current licence period
  - the Commission is satisfied that TAI implemented adequate corrective actions in response to the 2 radiation protection-related action level exceedances over the current licence period

#### 4.2.8 *Conventional Health and Safety*

64. The Commission examined TAI's implementation of a conventional health and safety program, which covers the management of conventional (non-radiological) hazards in the workplace. TAI's conventional health and safety program must meet the requirements of British Columbia provincial authority WorkSafeBC's [\*Occupational Health and Safety Regulations\*](#) (OHSR).
65. TAI provided the Commission with information on its conventional health and safety program, reporting that it complies with the mandates of WorkSafeBC. TAI explained that it documents conventional safety hazards in its facility Safety Reports and that it has a Joint Health and Safety Committee in place which conducts regular safety inspections across TAI's site.

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<sup>18</sup> Per the RPR, an action level is 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 specific action to be taken.

66. CNSC staff verified the compliance of TAI's conventional health and safety program with regulatory requirements through several means over the current licence term, including desktop reviews and 4 conventional health and safety related inspections. CNSC staff reported that TAI adequately addressed all findings identified during these inspections and that TAI's conventional health and safety program meets applicable regulatory requirements. The Commission is satisfied that TAI has a conventional health and safety program in place that meets regulatory requirements.
67. TAI reported that, in 2018, the possible uptake of lead by a worker triggered a site-wide investigation for the prevalence of lead. TAI confirmed via bioassays that workers whose job duties may have exposed them to lead did not indicate any uptake, however, TAI found that the areal densities of lead on some surfaces in its experimental halls were above the regulatory threshold. TAI implemented a remedial program which was completed in 2020 when the surfaces in question were found to be below threshold. For ongoing lead hazard mitigation, TAI implemented a lead exposure control plan which was accepted by WorkSafeBC. The Commission is satisfied that TAI has the ongoing monitoring and mitigation measures in place to control potential lead hazards to its workers.
68. On lost-time injuries (LTI) throughout the licence term, TAI submitted that its LTI rates per 100 person-years of employment ranged between 0 and 0.65 (between 0 to 4 LTIs in a given year), which were below or comparable to the yearly average for similar facilities regulated by WorkSafeBC. TAI stated that the most common injuries experienced at its facility were hand injuries and muscle strains. In response, TAI implemented enhanced work instructions and safety sessions to minimize injuries. The Commission encourages TAI to compare its LTI statistics against industry-leading facilities to benchmark performance.
69. The Commission is satisfied that TAI adequately protected the health and safety of workers and the public during the current licence period and that the health and safety of persons will continue to be adequately protected during throughout the proposed licence period. The Commission comes to this conclusion on the basis that:
- the Commission agrees with CNSC staff's assessment that TAI's conventional health and safety program meets regulatory requirements
  - the Commission is satisfied that TAI has adequately addressed inspection findings over the current licence term
  - the Commission is satisfied that the evidence presented by TAI demonstrates that TAI has monitoring and mitigation measures in place to control potential lead hazards

#### 4.2.9 *Environmental Protection*

70. The Commission examined TAI's performance related to the environmental protection SCA. The environmental protection SCA covers programs that identify, control and monitor all releases of radioactive and hazardous substances, and aim to minimize the

effects on the environment which may result from licensed activities. Such programs and measures include effluent and emissions control, environmental management system (EMS), environmental assessment and monitoring, public dose, and environmental risk assessment.

71. TAI submitted information on its environmental management system, environmental monitoring program, emissions and effluent data, predicted public dose, and environmental risk assessment. TAI reported that it has an established environmental protection program that it developed to be consistent with regulatory requirements, and that its emissions are well below regulatory limits.
72. Over the current licence term, CNSC staff verified TAI's performance with respect to the environmental protection SCA through compliance oversight activities which included 2 focused environmental protection inspections. CNSC staff informed the Commission that all inspection findings were of low safety significance and all enforcement actions associated with these inspections have been closed.
73. CNSC staff submitted that TAI has an EMS in place per the requirements of [REGDOC-2.9.1 Environmental Protection: Policies, Programs, and Procedures](#). TAI's EMS describes the programs and practices that TAI has implemented to protect the environment. The Commission is satisfied that TAI has an EMS which meets regulatory requirements.
74. With respect to air emissions and liquid effluent releases, TAI submitted that its principal air emissions are short-lived positron ( $\beta^+$ ) emitting radionuclides and Argon-41. These emissions are produced from the neutron activation of air in the immediate vicinity of TAI's accelerators and production targets. CNSC staff explained that TAI's primary source of liquid effluent is tritiated cooling water from its 520 MeV cyclotron. CNSC staff provided detailed monitoring data for TAI's air emissions and liquid effluent releases in Tables 3.10, 3.11, and 3.12 of CMD 22-H6. The monitoring data demonstrates that TAI's total annual air emissions and liquid effluent releases over the current licence term were each less than 1.4% of their respective derived release limits (DRLs)<sup>19</sup> and that no environmental action levels were exceeded. CNSC staff confirmed that TAI maintained releases to the environment below release limits over the current licence period, and that TAI has calculated its DRLs in accordance with CSA standard N288.1-14, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*.<sup>20</sup> Based on the reported release data, the Commission is satisfied that TAI has maintained releases to the environment well below regulatory limits.

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<sup>19</sup> A derived release limit is defined as the release rate that would cause an individual of the most highly exposed group to receive, and be committed to, a dose equal to the regulatory annual dose limit due to release of a given radionuclide to air or surface water during normal operation of a nuclear facility over the period of a calendar year.

<sup>20</sup> CSA N288.1-14, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*, CSA Group, 2014.

75. On environmental monitoring, CNSC staff submitted that TAI has an environmental monitoring program in place that focuses on the monitoring of storm sewer water, radio-assays of building drains and vegetation samples, as well as gamma/beta measurements at the site boundary. CNSC staff provided details on the results of TAI's environmental monitoring activities over the current licence term, including the following:
- water samples taken during the licensing period detected only natural background radioactive isotopes
  - vegetation sampling measured Beryllium-7 activity levels similar to background levels
  - gamma/beta radiation effective dose rates at TAI's fence line were below TAI's maximum dose rate of 150 nanosieverts (nSv) per hour

CNSC staff reviewed TAI's environmental monitoring results and confirmed that no adverse effects on human health or the environment are expected from the operation of TAI's facilities. The Commission is satisfied that TAI has an environmental monitoring program in place that meets regulatory requirements and finds that TAI's environmental monitoring results indicate that human health and the environment remain protected.

76. TAI submitted that estimated dose to the public from its facility was well below the regulatory public dose limit of 1 mSv per year over the current licence term. The maximum estimated dose to the public calculated by TAI over the current licence period was 0.0120 mSv/year. TAI uses data collected by a Health Canada detector located near TAI's most active stack to verify its estimated public dose. TAI submitted that data from the Health Canada detector has shown TAI's estimated public dose calculation to be conservative. The Commission is satisfied that TAI has maintained public dose below regulatory requirements and that TAI has effective radiation protection measures in place to protect public health.
77. In its application, TAI explained that it revised its screening level environmental risk assessment (ERA) in 2017 to identify and quantify contaminants and physical stressors associated with TAI's operations that may pose a risk to the environment. CNSC staff reviewed TAI's revised ERA in 2018 and determined that it met the specifications of CSA N288.6-12 *Environmental risk assessments at Class I nuclear facilities and uranium mines and mills*.<sup>21</sup> In 2021, CNSC staff confirmed that the conclusions of TAI's ERA remain valid and that no new risks have emerged. The Commission is satisfied that TAI has a valid ERA in place that meets regulatory requirements.

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<sup>21</sup> CSA N288.6-12 *Environmental risk assessments at Class I nuclear facilities and uranium mines and mills*, CSA Group, 2012.

78. CNSC staff submitted information on its [Independent Environmental Monitoring Program](#) (IEMP) around TAI's facilities. CNSC staff completed IEMP sampling campaigns in publicly accessible areas near the TAI site in 2016 and 2019. The IEMP results indicate that the public and the environment in the vicinity of the TAI site are protected, with no expected health impacts. The Commission is satisfied that the results of the CNSC's IEMP campaigns support its conclusion that the health of persons and the environment around the TAI site remain protected.
79. The Commission concludes that TAI has implemented an environmental protection program that will provide adequate protection to the health and safety of persons and the environment throughout the proposed licence period. The Commission comes to this conclusion on the basis that:
- TAI has addressed all enforcement actions associated with CNSC staff's environmental protection SCA inspections to CNSC staff's satisfaction
  - TAI has maintained an environmental management system in compliance with REGDOC-2.9.1
  - TAI's air emissions and liquid effluent releases over the current licence term remained well below TAI's derived release limits
  - CNSC staff has confirmed, through regulatory oversight activities, that TAI's environmental monitoring program meets regulatory requirements
  - environmental monitoring data has shown that public dose remained well below the regulatory limit throughout the current licence period
  - TAI has a valid ERA in place that meets regulatory requirements
  - IEMP results have indicated that the health of persons and the environment around the TAI facility remain protected

#### *4.2.10 Emergency Management and Fire Protection*

80. The Commission considered TAI's emergency management program which covers the measures for preparedness and response capabilities implemented by TAI in the event of emergencies and non-routine conditions at the TAI facility.
81. TAI submitted that it maintains mature emergency preparedness and response plans and that it coordinates regular emergency exercises and drills at its facilities. Over the current licence term, TAI executed emergency response exercises including radiation protection and first aid exercises, chemical spill drills, as well as a site-wide emergency evacuation drill. TAI reported that some exercises included external response services such as Vancouver Fire and Rescue Services and BC Ambulance Service.
82. CNSC staff submitted that it assessed TAI's emergency response program through regulatory oversight activities including onsite inspections and desktop documentation reviews. CNSC staff confirmed that TAI's emergency preparedness program, which was updated in 2019, complies with [REGDOC-2.10.1, Nuclear Emergency](#)

[Preparedness and Response, Version 2](#). The Commission is satisfied that TAI maintains an effective emergency management program that meets regulatory requirements.

83. The Commission examined the adequacy of TAI's fire protection program, including TAI's fire prevention measures, preparedness, and fire response capabilities. In its application, TAI provided information on the compliance of its fire protection program with the National Fire Protection Association's *NFPA-801: Standard for Fire Protection for Facilities Handling Radioactive Materials*.<sup>22</sup> TAI also reported that, over the current licence term, it had completed significant fire prevention system improvements, executed fire drills, and underwent multiple third-party fire protection reviews. CNSC staff assessed TAI's fire protection program through inspections and desktop documentation reviews and found it to be in compliance with the [National Fire Code of Canada, 2015](#)<sup>23</sup>, the [National Building Code of Canada, 2015](#)<sup>24</sup>, and NFPA-801. The Commission is satisfied that TAI maintains an effective fire protection program that meets regulatory requirements.
84. TAI submitted that its most recent fire hazards analysis (2019) confirms that the mitigation measures in place at the facility provide adequate protection of the public and the environment. CNSC staff found TAI's analysis to be acceptable. The Commission is satisfied that the evidence provided shows that TAI maintains an acceptable fire hazards analysis, and that TAI has implemented adequate fire mitigation measures.
85. The Commission is satisfied that TAI has acceptable emergency management and fire protection programs in place to protect the health and safety of persons and the environment throughout the proposed licence period. The Commission comes to this conclusion on the basis that:
- the Commission agrees with CNSC staff's assessment that TAI's emergency preparedness program meets regulatory requirements
  - the Commission agrees with CNSC staff's assessment that TAI's fire protection program meets regulatory requirements
  - the Commission agrees with CNSC staff's assessment that TAI's fire hazards analysis is acceptable and that TAI has implemented adequate fire mitigation measures

#### 4.2.11 Waste Management

86. The Commission assessed TAI's waste management program. Waste management covers waste-related programs that form part of TAI's operations up to the point where the waste is removed from the licensed site for storage, treatment, or disposal at

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<sup>22</sup> NFPA 801: *Standard for Fire Protection for Facilities Handling Radioactive Materials*, National Fire Protection Association, 2014.

<sup>23</sup> *National Fire Code of Canada 2015*, National Research Council Canada, 2015.

<sup>24</sup> *National Building Code of Canada 2015*, National Research Council Canada, 2015.

another licensed location, and includes waste minimization, segregation, characterization, and storage programs. The waste management SCA also covers planning for decommissioning, however, TAI's decommissioning plans are discussed in section 4.4.2 of this Record of Decision.

87. TAI submitted that it has a waste management program in effect that meets its licensing requirements. TAI's waste classification scheme includes categories for high-level radioactive waste (e.g., irradiated beamline targets), low-level radioactive waste (e.g., used personal protective equipment), and hazardous (non-radioactive) waste. TAI submitted descriptions of the disposal processes for each waste category. TAI explained that it stores high-level waste in the Spent Target Storage Facility where it decays for 2-3 years before being transported to Canadian Nuclear Laboratories in Chalk River, Ontario, for storage. TAI sorts and segregates low-level waste to allow for optimum decay and eventual landfill disposal when radioactivity levels drop below the clearance level. TAI stores hazardous waste in the Hazardous Materials Building for eventual offsite disposal with a third-party facility.
88. CNSC staff reported that it assessed TAI's waste management program over the current licence term through regulatory oversight activities including onsite inspections, program documentation reviews and compliance report reviews. With the exception of inspection findings in 2016, discussed below, CNSC staff found TAI's waste management program to be effective and consistent with regulatory expectations, as described in the Licence Conditions Handbook.
89. CNSC staff reported that, during a 2016 waste management inspection, it identified deficiencies related to TAI's inventory and labelling of radioactive waste, as well as the absence of secondary containment of some hazardous non-radioactive waste. As a result, CNSC staff rated TAI's waste management SCA performance as "below expectations" for the 2016 reporting period. CNSC staff confirmed that TAI had implemented adequate corrective actions during a follow-up inspection in 2017. The Commission is satisfied that TAI adequately addressed the deficiencies identified in its waste management program, and that TAI currently has a satisfactory waste management program in place.
90. The Commission concludes that TAI has adequate measures in place to safely manage its waste. The Commission comes to this conclusion on the basis that:
  - the Commission agrees with CNSC staff's assessment that TAI has implemented a waste management program that meets regulatory requirements
  - the Commission agrees with CNSC staff's assessment that TAI implemented appropriate corrective actions after CNSC staff rated TAI's performance in the waste management SCA as "below expectations" in 2016

#### 4.2.12 Security

91. The Commission examined TAI's security program, which covers the programs required to implement and support the security requirements described in the applicable provisions of the GNSCR and the *Nuclear Security Regulations (NSR)*.<sup>25</sup> In May 2021, TAI provided the CNSC with its revised Site Security Plan, which identifies the security measures implemented by TAI. CNSC staff reviewed TAI's Site Security Plan and determined that it meets applicable regulatory requirements. CNSC staff also conducted 2 security focused inspections at TAI during the current licence period and confirmed that TAI has implemented and maintained all required technical and administrative security measure. The Commission is satisfied that TAI has implemented a security program that meets regulatory requirements.
92. The Commission agrees with CNSC staff's assessment that TAI's Site Security Plan and security program meet regulatory requirements. The Commission is satisfied that TAI has adequate programs and measures in place to provide for the physical security of the TAI facility during the proposed licence period.

#### 4.2.13 Safeguards and Non-Proliferation

93. The Commission examined the adequacy of TAI's safeguards program. 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\*](#) (NPT). Pursuant to the NPT, Canada has entered into a [\*Comprehensive Safeguards Agreement\*](#) and an [\*Additional Protocol\*](#) (safeguards agreements) with the IAEA. The objective of these safeguards agreements 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.
94. TAI submitted that its safeguards program complies with CNSC [REGDOC-2.13.1, \*Safeguards and Nuclear Material Accountancy\*](#), and that it continues to file all required submissions for the inventory of nuclear material. Based on its assessment of TAI's safeguards related documentation and performance, CNSC staff confirmed that TAI's safeguards program meets the requirements set out in REGDOC-2.13.1 and conforms to measures required by the CNSC to meet Canada's international safeguards obligations as well as other measures arising from the NPT. The Commission is satisfied that TAI has a safeguards program in place that meets international and national regulatory requirements.

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<sup>25</sup> SOR/2000-209.

95. CNSC staff reported that the IAEA performed 2 Physical Inventory Verifications and 2 Complementary Accesses at the TAI site during the current licence term, and that the IAEA's inspection results were satisfactory. CNSC staff confirmed that in all cases TAI granted adequate access and assistance to the IAEA. The Commission is satisfied that TAI adequately supported the IAEA's safeguards activities throughout the current licence period.
96. The Commission is satisfied that TAI has adequate programs in place to provide for the implementation of measures in the area of safeguards and non-proliferation and is of the opinion that TAI will continue to do so during the proposed licence period. The Commission comes to this conclusion on the basis that:
- the Commission agrees with CNSC staff's assessment that TAI's safeguards program meets the requirements of REGDOC 2.13.1
  - the Commission agrees with CNSC staff's assessment that TAI has implemented the measures that are necessary for maintaining national security, and for implementing the international agreements to which Canada has agreed
  - the Commission is satisfied that TAI granted adequate access and assistance to the IAEA for safeguards activities during the current licence period, as required

#### *4.2.14 Packaging and Transport*

97. The Commission examined TAI's packaging and transport program. The packaging and transport SCA covers the safe packaging and transport of nuclear substances and radiation devices to and from the TAI site. TAI must adhere to the [\*Packaging and Transport of Nuclear Substances Regulations, 2015\*](#)<sup>26</sup> (PTNSR, 2015) and Transport Canada's [\*Transportation of Dangerous Goods Regulations\*](#)<sup>27</sup> (TDGR) for all shipments.
98. TAI provided information on its packaging and transport program. TAI specified that it manages the shipment of radioactive materials from TAI's facilities and verifies that all regulatory requirements are met for each shipment. TAI noted that regular shipments include the disposal of spent targets to Canadian Nuclear Laboratories.
99. CNSC staff verified the regulatory compliance of TAI's packaging and transport program through regulatory oversight activities including 4 inspections over the current licence term. CNSC staff informed the Commission that all findings from these inspections were of low safety significance and were adequately addressed by TAI. The Commission is satisfied that TAI has implemented a packaging and transport program that meets regulatory requirements.

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<sup>26</sup> SOR/2015-145.

<sup>27</sup> SOR/2001-286.

100. TAI reported 2 transportation events under the PTNSR, 2015 during the current licence period. CNSC staff reported that these events were of low safety significance and that TAI implemented appropriate corrective actions in response. The Commission is satisfied that TAI has adequately addressed the transportation events that occurred during the current licence term.
101. The Commission is satisfied that the evidence provided demonstrates that TAI's packaging and transport program meets regulatory and will continue to do so over the proposed licence period. In reaching its conclusion, the Commission considered CNSC staff's assessment that TAI's packaging and transport program meets regulatory requirements, and that TAI has implemented adequate corrective actions in response to events and inspection findings over the current licence term.

#### *4.2.15 Conclusions on Safety and Control Areas*

102. The Commission is satisfied that TAI has adequate programs and measures in place with respect to the 14 SCAs to ensure that the health and safety of workers, the public and the environment will be protected over the proposed 10-year licence term. The Commission is further satisfied that TAI has measures in place to provide for the maintenance of national security and to implement international obligations to which Canada has agreed. The Commission comes to this conclusion on the basis that:
- the Commission agrees with CNSC staff's rating of TAI's performance in the majority of the 14 SCAs as "satisfactory" over the current licence term
  - regarding the SCAs for which CNSC staff rated TAI's performance as "below expectations" over the current licence period, the Commission is satisfied that the evidence shows that TAI has either already improved its performance to a "satisfactory" rating or that TAI has an adequate plan in place to do so in the near future
  - the Commission agrees with CNSC staff's assessment that the remaining Management System SCA deficiencies are of low safety significance
  - the Commission agrees with CNSC staff's assessment of TAI's performance in the 14 SCAs which demonstrates that TAI has the programs, resources, and measures in place to ensure the health and safety of persons and the environment, and the maintenance of security and Canada's international obligations

### **4.3 Indigenous Engagement and Consultation**

103. The Commission considered the information provided by CNSC staff and TAI regarding Indigenous consultation and engagement activities in respect of this application. Indigenous consultation refers to the common law duty to consult with Indigenous Nations and communities pursuant to section 35 of the [\*Constitution Act, 1982\*](#).<sup>28</sup>

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<sup>28</sup> Schedule B to the Canada Act 1982 (UK), 1982, c 11

104. The common law duty to consult with Indigenous Nations and communities is engaged when the Crown contemplates action that may adversely affect established or potential Aboriginal<sup>29</sup> 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 Indigenous Nations and communities. The CNSC ensures that its licensing decisions under the NSCA uphold the honour of the Crown and consider Indigenous Nations and communities' potential or established Indigenous and/or treaty rights pursuant to section 35 of the *Constitution Act, 1982*.
105. The duty to consult is engaged wherever the Crown has "knowledge, real or constructive, of the potential existence of an Aboriginal right or title and contemplates conduct that might adversely affect it".<sup>30</sup> Licensing decisions of the Commission where Indigenous interests may be adversely impacted can engage the duty to consult, and the Commission must be satisfied that it has met the duty prior to making the relevant licensing decision.
106. CNSC staff submitted that this licence renewal will not change the activities authorized by the current licence and therefore will not result in changes to TAI's operations that would cause adverse impacts on potential or established Aboriginal and/or treaty rights. CNSC staff stated that, midway through the current licence term, it assessed the level of interest from Indigenous Nations and communities regarding TAI's operations and did not note any interest or concerns. CNSC staff also reported that no concerns were expressed from local Indigenous Nations and communities regarding TAI's licence renewal and transfer applications. CNSC staff noted that it is open to engagement with any Indigenous Nation or community if interest is expressed.
107. The Commission enquired if CNSC staff had engaged with Indigenous Nations and communities regarding IEMP campaigns around the TAI facility. CNSC staff stated that engagement had not occurred due to a lack of expressed interest from local Indigenous Nations and communities, however, CNSC staff are open to future engagement if interest is expressed.
108. TAI reported that it works closely with UBC to engage with the Musqueam First Nation. UBC has a Memorandum of Understanding with Musqueam First Nation and meets with them monthly to discuss land-use updates including activities at the TAI facility. TAI reported that, with UBC coordination, it also engaged with Musqueam First Nation in summer 2021 to discuss the TAI licence renewal process and participation methods. TAI did not report any concerns raised by Musqueam First Nation regarding the licence renewal application.

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<sup>29</sup> "Aboriginal" is the term used in this document when referring to the Crown's duty to consult as that is the term used in S. 35 of the Constitution Act, 1982. In all other cases, "Indigenous" is the preferred terminology and used accordingly.

<sup>30</sup> *Haida Nation v. British Columbia (Minister of Forests)*, 2004 SCC 73 at para 35

109. The Commission is satisfied that TAI's application for renewal and licence transfer will not authorize any new licenced activities and will not cause novel adverse impacts to any Aboriginal or treaty rights. The Commission acknowledges the efforts made by TAI in relation to Indigenous engagement and notes the lack of participation in this proceeding by local Indigenous Nations and communities. Efforts made by CNSC staff with regard to Indigenous engagement are key to the important work of the Commission toward reconciliation and relationship-building with Canada's Indigenous peoples. The Commission concludes that, for this licence renewal application, the Commission's responsibility to uphold the honour of the Crown and its constitutional obligations with respect to engagement and consultation have been satisfied. The Commission expects CNSC staff to continue to build meaningful long-term relationships with Indigenous Nations and communities as part of the CNSC's reconciliation efforts.

#### **4.4 Other Matters of Regulatory Importance**

##### *4.4.1 Public Information and Engagement*

110. The Commission assessed TAI's public information and disclosure program (PIDP). A public information program is a regulatory requirement for licence applicants and licensed operators of Class I nuclear facilities as detailed in [REGDOC 3.2.1, \*Public Information and Disclosure\*](#). TAI submitted that it maintains a PIDP to ensure the timely communication of information related to the health, safety, and security of persons and the environment to the public. TAI's public engagement initiatives include its public website, public tours of the facility, use of social media, and participation in community events. CNSC staff submitted that TAI has met its public disclosure and reporting obligations throughout the current licence term, and that TAI's PIDP meets the requirements of REGDOC 3.2.1. The Commission is satisfied that TAI has a PIDP in place that meets regulatory requirements.
111. The Commission asked if TAI had received specific concerns from the public through its public engagement initiatives. A representative from TAI informed the Commission that members of the public have previously raised concerns regarding environmental emissions and radiation protection. The TAI representative explained that when concerns are raised by the public, TAI uses those opportunities to inform the public about TAI's programs and the nature of particle accelerators. The Commission is satisfied with TAI's public engagement efforts.
112. The Commission is satisfied that TAI's PIDP meets regulatory requirements and is of the opinion that TAI will continue to communicate to the public information about the health, safety and security of persons and the environment and other issues related to its particle accelerator facilities over the proposed licence term. The Commission is satisfied that the evidence provided demonstrates that TAI met its public disclosure and reporting obligations through the current licence term and is in agreement with CNSC staff's assessment that TAI's PIDP meets the requirements of REGDOC 3.2.1.

#### 4.4.2 Decommissioning Plans and Financial Guarantee

113. The Commission requires that TAI have operational plans for the decommissioning and long-term management of waste produced during the lifespan of TAI's particle accelerator facilities. TAI submitted its updated preliminary decommissioning plan (PDP) and cost estimate to the CNSC in December 2018. Based on the updated PDP, TAI estimated the cost for decommissioning to be \$69.87 million (in 2022 dollars). Based on its review of TAI's revised PDP, CNSC staff found that the PDP meets the requirements described in CNSC regulatory guide [G-219, Decommissioning Planning for Licensed Activities](#), and CSA N294-09, *Decommissioning of Facilities containing nuclear substances*<sup>31</sup>. CNSC staff stated that the cost estimate is adequate for the future decommissioning of the TAI site.
114. The Commission has decided to include a licence condition that the licensee provide and maintain a financial guarantee, in an amount and format acceptable to the Commission, for realization of the planned decommissioning, pursuant to subsection 24(5) of the NSCA. As reported by CNSC staff, TAI currently maintains a financial guarantee for the decommissioning of the TAI facility consisting of an Escrow Fund containing \$12.21 million (as of March 31, 2021) and a Contribution Gap Agreement. In June 2021 the Commission approved an administrative change to the financial guarantee instruments to reflect the transfer of the TRIUMF joint venture's assets and obligations to TRIUMF Inc. The transfer of assets and obligations from the TRIUMF joint venture to TRIUMF Inc. is further discussed in section 4.6 of this Record of Decision.
115. CNSC staff submitted that TAI's proposed revised financial guarantee is composed of \$14.78 million (as of March 31, 2023) in an Escrow Fund, a Contribution Gap Agreement, and the related *CNSC Financial Security and Access Agreement*. CNSC staff recommends that the proposed financial guarantee is adequate and that an Escrow fund is an acceptable financial instrument that meets the requirements of certainty and adequacy of value, ease of liquidity, and continuity of protection, as described in CNSC [G-206 Financial Guarantees for the Decommissioning of Licensed Activities](#) (G-206). CNSC staff noted that newly published regulatory documents [REGDOC-2.11.2, Decommissioning](#) and [REGDOC-3.3.1, Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities](#) will be applicable to the next review cycle in 2023.
116. Regarding the Contribution Gap Agreement, CNSC staff submitted that the agreement requires all of TAI's member universities to cover any funding gaps for TAI's decommissioning liability. The Commission asked for further information on how TAI can ensure that the member universities are able to fulfill their portion of the decommissioning liability. A TAI representative explained that the Escrow Fund is sufficient to cover the cost of the beginning of the decommissioning plan and that, two years into the decommissioning process, TAI plans to sell its assets to cover the remaining decommissioning liability. After the sale of assets, the member universities

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<sup>31</sup> CSA N294-09, *Decommissioning of Facilities containing nuclear substances*, CSA Group, 2009.

would be required to cover the remaining expenses as part of the Contribution Gap Agreement, with each university paying a proportionate share. TAI expects this expense to be minimal.

117. CNSC staff informed the Commission that, should the Commission approve the proposed licence renewal and transfer, the licensee would submit updated financial guarantee instruments for the Commission's signature. Noting the licensee's intention to amalgamate TAI with TRIUMF Inc. if the Commission were to authorize the renewal and transfer of the licence, CNSC staff stated that the updated instruments would reflect an administrative change to remove references to TAI and reflect TRIUMF Inc. as the licensee.
118. The Commission agrees with CNSC staff's assessment that TAI's PDP meets regulatory requirements and finds the evidence on the proposed cost estimate to be credible. Therefore, the Commission concludes that TAI's PDP and cost estimate are acceptable for the purpose of this licence renewal and transfer application. The Commission finds the financial guarantee in the form of an Escrow Fund (\$14.78 million as of March 31, 2023) and a Contribution Gap Agreement to be appropriate for the safe and secure future decommissioning of the site. The Commission directs the licensee to provide the original financial guarantee instrument documentation that conforms with G-206 within 90 days from the issuance of this Record of Decision. As financial guarantees remain a matter for Commission acceptance, the Commission will consider any future updates to the financial guarantee as applicable.

#### *4.4.3 Cost Recovery*

119. CNSC staff reported that TAI is a not-for-profit organization and is exempt from the [\*Cost Recovery Fees Regulations\*](#)<sup>32</sup> (CRFR) requirements under section 2(b). The Commission is satisfied that the CRFR do not apply to TAI.

### **4.5 Licence Length, Licence Conditions, and Delegation of Authority**

120. The Commission considered TAI's application for the renewal of its particle accelerator operating licence for a period of 10 years. TAI's current licence, PA1OL-01.00/2022, expires on June 30, 2022.

#### *4.5.1 Licence Length*

121. TAI is requesting a 10-year term for the renewed licence. CNSC staff recommended the renewal of the licence for a period of 10 years, until June 30, 2032, submitting that TAI is qualified to carry on the licensed activities which would be authorized by the proposed licence. CNSC staff noted that TAI's performance has been adequate over

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<sup>32</sup> SOR/2003-212.

the current licence period, and that a 10-year licence term is consistent with the current licence term and with other particle accelerator facilities in Canada. The Commission notes that the public would have the opportunity to provide feedback on TAI's operations during the proposed licence period when CNSC staff present the associated Regulatory Oversight Report to the Commission.

122. The Commission is satisfied that a 10-year licence term is appropriate. The Commission comes to this conclusion on the basis that:
- the Commission agrees with CNSC staff's assessment that TAI is qualified to carry on the licensed activities
  - a 10-year licence term is consistent with TAI's current licence term
  - the Commission is satisfied that the evidence demonstrates that TAI has mature programs in place, with adequate performance and oversight
  - the public will have the opportunity to provide feedback to the Commission on TAI's operations periodically during the renewed 10-year licence period

#### *4.5.2 Licence Conditions*

123. CNSC staff CMD 22-H6 includes a proposed draft licence in a format that incorporates the CNSC's standardized licence conditions applicable to TAI. In CMD 22-H6, CNSC staff proposed the following minor changes to the existing licence conditions:
- the separation of the Safety Analysis SCA and Physical Design SCA sections, to be consistent with other CNSC licences
  - change the period for filing a written report for dose and environmental action level exceedances from 30 working days to 21 days

During its presentation, CNSC staff proposed additional changes to reflect the most recent standardized licence conditions. These changes do not impact the intent or requirements of the licence conditions.

124. The Commission includes in the licence the conditions as recommended by CNSC staff in CMD 22-H6, with changes to reflect the most recent standardized conditions. The Commission is imposing the licence conditions that are in the licence that goes with this record of decision, which is not exactly as was drafted in CNSC staff's CMD but which reflects updated conditions as discussed in the hearing. The Commission finds that the proposed changes to the licence conditions are minor and appropriate.

#### *4.5.3 Delegation of Authority*

125. In order to provide adequate regulatory oversight of changes that are administrative in nature, and do not require a licence amendment nor Commission approval, CNSC staff recommended that the Commission delegate authority for certain approvals or consent, as contemplated in licence conditions that contain the phrase "a person authorized by

the Commission” to specific CNSC staff. CNSC staff noted an error in the delegation of authority as outlined in section 4.7 of CMD 22 H-6 and provided a correction on the record at the hearing. Delegations are as detailed in the following paragraph.

126. As recommended by CNSC staff during the hearing, the Commission delegates its authority for the purposes of licence conditions *G.3 Resolution of Conflict or Inconsistency*, and *7.2 Dose Action Levels*, *9.4 Environmental Action Levels* to the following CNSC staff:

- Director, Accelerators and Class II Facilities Division
- Director General, Directorate of Nuclear Substance Regulation
- Executive Vice-President and Chief Regulatory Operations Officer, Regulatory Operations Branch

The Commission delegates its authority for the purposes of licence condition *13.2 Changes that Would Affect the Implementation of Safeguards Measures* to the following CNSC staff:

- Director, International Safeguards Division
- Director General, Directorate of Security and Safeguards
- Vice President, Technical Support Branch

127. The Commission is satisfied that this approach is reasonable and consistent with the current licence.

#### *4.5.4 Conclusion on Licence Length and Conditions*

128. The Commission is satisfied that a 10-year licence is appropriate. The Commission accepts the licence conditions as recommended by CNSC staff, with the proposed changes described during the hearing to reflect the most recent standardized conditions. The Commission accepts CNSC staff’s recommendation regarding the delegation of authority for the purposes of licence conditions *G.3*, *7.2*, *9.4* and *13.2*.

#### **4.6 Licence Transfer**

129. TAI is requesting that its particle accelerator operating licence, if renewed, be transferred to TRIUMF Inc, a not-for-profit corporation under the [\*Canada Not-for-profit Corporations Act\*](#).<sup>33</sup>
130. TRIUMF, a joint venture between several Canadian universities, incorporated TAI in 2008 to hold the CNSC licence and operate its particle accelerator facilities. On June 1, 2021, the TRIUMF joint venture transferred its assets, obligations, operations, and agreements with TAI, to TRIUMF Inc. TAI indicated that, if the Commission authorizes transfer of the licence, TAI intends to amalgamate with TRIUMF Inc. when

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<sup>33</sup> S.C. 2009, c. 23.

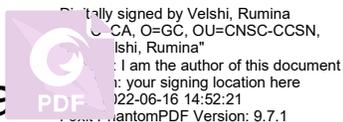
the renewed licence term begins on July 1, 2022. TAI submitted that the amalgamation would have no substantive impact on TRIUMF's operations or management.

131. CNSC staff recommended that the Commission transfer the licence, if renewed, from TAI to TRIUMF Inc. The Commission asked CNSC staff about the risk associated with the proposed licence transfer. CNSC staff stated that the proposed licence transfer would not pose a risk to the safe operations of the facilities, as TRIUMF Inc. is qualified to carry out the activities authorized by the particle accelerator operating licence. CNSC staff explained that, following the licence transfer, the same staff will be responsible for the operation, management, and control of the licensed activities under the same programs. CNSC staff noted that TRIUMF Inc. already assumed TAI's liabilities when the Commission approved the change in financial guarantee signatories in 2021.
132. The Commission is of the opinion that TRIUMF Inc., is qualified to carry on the activity that the transferred 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. Therefore, the Commission is satisfied that TRIUMF Inc. meets the test set out in subsection 24(4) of the NSCA for the transfer of a licence.

## 5.0 CONCLUSION

133. The Commission has considered TAI's applications to renew its Class IB particle accelerator operating licence for a 10-year period and to transfer the licence, if renewed, to TRIUMF Inc. The Commission has also considered the submissions of TAI, CNSC staff, and intervenors. Based on its consideration of the evidence on the record for this hearing, the Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, renews the Class IB particle accelerator operating licence issued to TRIUMF Accelerators Inc. for a period of 10 years, and authorizes the transfer of the licence from TRIUMF Accelerators Inc. to TRIUMF Inc. In doing so, the Commission also accepts the revised financial guarantee and delegates its authority as outlined in sections 4.4.2 and 4.5.3 of this Record of Decision, respectively. The renewed licence, PA1OL-01.00/2023 names TRIUMF Inc. as licensee and is valid from July 1, 2022 until June 30, 2032.

Velshi,  
Rumina



June 16, 2022

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Rumina Velshi  
President,  
Canadian Nuclear Safety Commission

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Date

**Appendix A – Intervenors**

Intervenors – Oral Presentations	Document Number
North American Young Generation in Nuclear, represented by M. Mairinger	CMD 22-H6.3
BWXT Medical Ltd., represented by M. Coombs	CMD 22-H6.5
Intervenors –Written Submission	Document Number
Sylvia Fedoruk Canadian Centre for Nuclear Innovation Inc.	CMD 22-H6.2
University of British Columbia	CMD 22-H6.4
McMaster University	CMD 22-H6.6
Canadian Nuclear Association	CMD 22-H6.7
BC Cancer Research Institute	CMD 22-H6.8