Canadian Nuclear Safety Commission

Commission canadienne de sûreté nucléaire

Public hearing

Audience publique

Canadian Light Source Inc.

Centre canadien de rayonnement synchrotron incorporé

March 23rd, 2022

Le 23 mars 2022

Public Hearing Room
14th floor
280 Slater Street
Ottawa, Ontario

Salle des audiences publiques
14e étage
280, rue Slater
Ottawa (Ontario)

via videoconference

par vidéoconférence

Commission Members present

Commissaires présents

Ms. Rumina Velshi
Dr. Sandor Demeter
Ms. Indra Maharaj

Mme Rumina Velshi
Dr Sandor Demeter
Mme Indra Maharaj

Registrar:

Greffier:

Mr. Denis Saumure

Me Denis Saumure

Senior General Counsel:

Avocate-générale principale :

Ms. Lisa Thiele

Me Lisa Thiele

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via videoconference / par vidéoconférence

--- Upon commencing on Wednesday, March 23, 2022
at 10:00 a.m. / L'audience débute le
mercredi 23 mars 2022 à 10 h 00

Opening Remarks

THE PRESIDENT: Good morning and welcome to the public hearing of the Canadian Nuclear Safety Commission on the application by Canadian Light Source Incorporated for the renewal of its Particle Accelerator Operating Licence for its Class IB Synchrotron Facility.

Mon nom est Rumina Velshi. Je suis la présidente de la Commission canadienne de sûreté nucléaire.

I would like to begin by recognizing that participants in this hearing are located in many different parts of the country. I am speaking to you from Toronto, in the traditional territory of many nations, including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples, and now home to many diverse First Nations, Inuit and Métis peoples.

I would also like to acknowledge that the CLSI's facility, which we will be talking about this morning, is located in Treaty 6 territory and the homeland of the Métis.

I will pause for a few seconds in silence so that each of us can acknowledge the Treaty and/or traditional territory for our respective locations. Please take this time to provide your gratitude and acknowledgment for the land.

--- Pause

LA PRÉSIDENTE : Je vous souhaite la bienvenue, and welcome to all those joining us via Zoom or webcast.

Under my authority to do so in section 22 of the *Nuclear Safety and Control Act*, I established a three-member Panel of the Commission to conduct this licence renewal hearing.

I will preside over the hearing, and I have with me on the Panel Dr. Sandor Demeter and Ms. Indra Maharaj, who are, like me, present remotely for this virtual hearing.

Ms. Lisa Thiele, Senior General Counsel to the Commission, and Denis Saumure, Commission Registrar, are also joining us.

Today's safety moment is about moving from resilience to recovery after two years of COVID-19.

Last week marked two years since the COVID-19 pandemic changed the way we worked, interacted with each other and carried out our day-to-day activities.

For the past two years we navigated various means to protect ourselves and those around us from the health impacts of the virus, while continuing to determine long-term solutions to managing it.

We are now seeing many of these protections being lifted, public places such as museums, gyms, movie theatres opening once again for recreational activities. With the warm weather on its way, travel will yet again be a welcomed activity. As we are embracing these changes and reintroducing some of the activities we enjoyed doing back into our lives, we should continue to be mindful of the impact that the COVID-19 virus has had on our well-being and continue to follow safe health practices throughout our daily activities.

Enjoy the nice weather, spending more time with family and friends, carrying out recreational activities that we've all been waiting for, but remember to stay safe and vigilant. Be respectful that there are still vulnerable people around us and not everyone shares the same risk tolerance.

I will now turn the floor to Mr. Saumure for a few opening remarks.

Denis, over to you.

MR. SAUMURE: Thank you, President Velshi.

Bonjour, Mesdames et Messieurs. Bienvenue

à l'audience publique de la Commission canadienne de sûreté nucléaire.

During today's business, we have simultaneous interpretation. Please keep the pace of your speech relatively slow so that the interpreters have a chance to keep up.

L'audience est enregistrée et transcrite textuellement. Les transcriptions se font dans l'une ou l'autre des langues officielles, compte tenu de la langue utilisée par le participant à l'audience publique. Les transcriptions seront disponibles sur le site Web de la Commission dans environ une semaine.

To make the transcripts as meaningful as possible, we would ask everyone to identify themselves before speaking.

I would also like to note that this proceeding is being video webcast live and that the proceeding is also archived on our website for a three-month period after the closure of the hearing.

As a courtesy to others, please mute yourself if you are not presenting or answering a question.

As usual, the President will be coordinating the questions to avoid having two people talking at the same time. During the question period if you wish to provide an answer or add a comment, please use

the "Raise Hand" function.

President Velshi.

THE PRESIDENT: Thank you.

CMD 22-H9.A

Adoption of Agenda

THE PRESIDENT: With this information, I would now like to call for the adoption of the agenda by the Commission Members, as outlined in Commission Member Document 22-H9.A.

Do I have concurrence?

For the record, the agenda is adopted.

Denis, back to you.

MR. SAUMURE: The Notice of Public Hearing and Participant Funding on this matter was published on August 3, 2021. A revised notice was posted on October 18, 2021, to announce a change in the hearing date.

Participant funding was available to intervenors to prepare for and participate in this public hearing. The Commission received no funding applications.

The public was invited to participate in writing and by making oral presentations. February 7, 2022 was the deadline set for filing by intervenors. The Commission received one request to intervene.

We will first hear the presentations by CLSI and CNSC staff, followed by the presentation by the intervenor, after which we will open the floor to Commission Members for the rounds of questions.

President Velshi.

THE PRESIDENT: Let's begin with the presentation from Canadian Light Source Incorporated.

I will turn the floor to Mr. Matiko for this presentation. Please proceed.

CMD 22-H4.1/22-H4.1A

Oral presentation by Canadian Light Source Inc.

MR. MATIKO: Thank you, Madam President.

Good morning. Thank you for the opportunity to present to you today.

I will start by introducing myself and my colleagues from CLS.

I'm Bill Matiko, the Acting CEO of the Canadian Light Source Inc., which I will refer to as CLS throughout the rest of the presentation.

With me today are Gianluigi Botton, CLS Science Director; Mark Boland, Machine Director; Tim West, General Manager; and Grant Cubbon, Health and Safety Manager.

I'm also pleased to welcome as observers from CLS Pierre Lapointe, Chair of our Board of Directors, and Janet King, Vice-Chair of our Board of Directors.

Today's presentation will provide an overview of the CLS, its background, history and growth over the last 20 years, a short explanation of what a synchrotron is and its scientific and societal impact, as well as the key information and updates about our health and safety programs.

CLS is a national research facility of the University of Saskatchewan. It's located on the University Campus in Saskatoon and is the only synchrotron in Canada and one of the largest science projects in our country's history, boasting approximately 1,000 scientists from around the world every year to conduct experiments in a wide range of fields and publishing around 500 scientific papers every year.

The facility has been in operation since 2005, with the last six of our 22 beamlines completed in the past three years. CLS employs approximately 250 full-time staff, including scientists, engineers and technicians, and administrative, business and financial staff. Of interest, our floor area is approximately two and a half football fields in size.

To date, over 4,500 scientists, including

3,000 students from 42 countries and 171 Canadian institutions, have used the CLS, enabling over 900 international research collaborations and more than 6,000 academic publications, as well as the commercialization of innovative research activities at CLS.

This timeline shows key moments in the history of the CLS up to today. From the initial funding from the Canada Foundation for Innovation in 1999 that greenlit the CLS project, through producing its first X-rays in 2004 and hosting the first user in 2005, and through the CNSC licence renewal in 2012 and the construction of many new experimental facilities between 2006 and today, the last 20 years have seen continuous growth and expansion.

This slide shows the five key components that make our light source work.

The CLS produces very bright light used for scientific experiments, which starts with an electron gun which injects electrons into a linear accelerator which increases the speed of the electrons to 99.9 percent of the speed of light. They are then passed on to a booster ring which continues to accelerate the electrons, and from there they are transferred into the storage ring where they circulate continuously. Inside the storage ring are magnets which bend the electron beam to produce very bright

beams of photons, or light. This light is then directed down experimental facilities called beamlines to stations in which scientists use the light to examine matter from proteins to soil samples, plants or other materials.

Here you can see the path of the electrons from the electron gun all the way to each of the 22 beamlines, or experimental stations, where the researchers conduct their experiments.

This slide provides an overview of 2021 in numbers. In 2021 we hosted 812 users, a significant portion of which were graduate students primarily from Canada but also from 13 other countries. Users came from 39 Canadian universities, published 458 scientific papers in material science, health, the environment and agriculture fields, and were part of 64 international collaborations, which are projects in which there were scientists from non-Canadian institutions.

This slide shows the breadth of users from across Canada, demonstrating what a crucial scientific resource CLS represents to Canada, from the University of Victoria on Vancouver Island through to Dalhousie University in Halifax. It's worth pointing out that if this slide showed all of the Canadian user institutions over the last 10 years, it would be virtually unreadable, with all of the logos from these institutions.

To provide a global context, there are more than 50 light sources in the world, either operational or under construction. Seen here are all comparable light source facilities around the world. You will note the orange ones like CLS are members of lightsources.org, an international collaboration between communicators from light sources around the world. As you can see in the map, the U.S., Japan and Europe have the biggest concentrations of facilities.

Health is one of the four areas of science that CLS focuses on. Health research conducted at CLS is broad and of high importance for the health of Canadians. Areas of research include cardiovascular diseases, cancer, COVID-19, antimicrobial resistance, diabetes, osteoporosis, Cystic Fibrosis, microbiota, Parkinson's disease, pharmaceuticals and biomedical implants. Approximately 30 percent of CLS publications are in the area of health research.

Agriculture is one of the more unique areas of research as a synchrotron facility that CLS has as a strategic priority. Scientists around the world use the CLS to improve global food security by understanding crop growth, crop development, soil fertility, nutritious food production and novel food product development. The CLS is one of the leading synchrotrons in the world for this area

of research because of its unique suite of experimental stations to characterize plants, soil, food, animal feed and plant-based bioproducts. In 2019, CLS hosted the first biannual Pan-American Light Sources for Agriculture Conference. This is a joint initiative with CHESS, the Cornell High Energy Synchrotron Source, and LNLS, the Brazilian Synchrotron Light Laboratory.

Environmental issues are some of the most significant challenges facing Canada in the world. Twenty to 25 percent of the proposals that CLS received between 2019 and 2021 have been in this area. Scientists investigate carbon capture, microplastics, trace materials in aerosols, improving water treatment, and working with university and industrial partners applying advanced techniques to improving mining from resources discovery to mine site reclamation. Synchrotron mapping has helped better predict gold and uranium deposit locations and afforded new insight into the aging mechanisms of mine waste.

Advanced materials research is the fourth key area of focus for CLS. Advanced materials research represents the largest group of CLS users, with research activities covering energy conversion and storage for sustainable and renewable energy sources, advanced manufacturing for economic development, and quantum

materials for the development of future technologies. Approximately half of the publications enabled by CLS fall within this theme.

You will notice that many of the areas of study listed on these last four slides do overlap the four areas of research. Examples include research into the use of plant biomass such as turning wheat and canola straw into a fibre that removes the toxin arsenic from water, which is both agriculture- and environment-related; the battery in fuel cell research, which is both environment and advanced materials research-related.

This graph shows how CLS has grown over the years. The axis on the left represents the number of users and research shifts provided each year, while the axis on the right shows the number of beamlines and staff that we have. The number of CLS users has grown from 64 in 2005 to 1,200 in 2019, our last pandemic-free or somewhat normal year. With commensurate increases in staff from 103 to 271, the number of beamlines has grown from 3 to 22 and research shifts provided from 241 to 3,537, with peak user shifts in 2016 of 5,448.

This table shows the relative impact of CLS publications. A recent independent bibliometric review by the University of Québec examining the output of comparable facilities between 2006 and 2019 clearly shows

that the facility is competitive both nationally and internationally and that CLS enhances the publication index of Canadian research facilities. The world average, as you can see, is 1; the Canadian average is 1.3; the average citation index for CLS publications is 1.56, which is higher than the U.K., Australian, French and Swedish light source facilities.

CLS is quite multiculturally diverse, with staff having roots in over 25 countries. As an organization, we are committed to EDI, as reflected in our core values. Several improvement efforts are underway in important areas, including policy development, recruitment processes, and staff training. While several initiatives are underway, there are many more planned, as shown on the slide, including things such as EDI culture surveying and updating committee terms of reference to include EDI principles.

MS. PETIT: Indigenous engagement programs: kîwetinotahk mahkêsîs, paskwâwimostos, pâsiminân, and TREE projects.

MR. MATIKO: The voice you just heard is Bernie Petit, our Indigenous Programs Education Coordinator.

CLS has a very active Indigenous Outreach Education Program.

The TREE program that's listed at the bottom of the slide is a partnership with an Indigenous researcher from Mistik Askiwin Dendrochronology Laboratory, or MAD Lab, at the University of Saskatchewan. Students participate in a citizen science project where they gather trembling aspen tree core samples, soil samples and a detailed timeline of environmental events in the area. Data from these submissions is added to a citizen science database where anyone can access, compare and investigate further.

The MAD Lab itself is seeking to understand the climate history of various locations, date historical artifacts, and investigate how environmental contamination from humans has changed over time. In addition, MAD Lab is researching the potential to use trembling aspen in the remediation of contaminated sites.

Three other Indigenous land-based projects, the Bison, Arctic Fox and Berry, were created to weave or incorporate traditional Indigenous knowledge from every region of the country.

CLS has been working to incorporate the Truth and Reconciliation Call to Action in allowing each Indigenous Nation to include their own Nation's understanding of science, language and cultural connections within a synchrotron science project. This initiative is

intended to build awareness and work with our Indigenous communities to increase representation of Indigenous peoples within STEM careers.

CLS has had a positive impact by creating dedicated science resources and lesson plans for Indigenous engagement such as the Petit Beaded Medallion, which you see here, which connects traditional knowledge and cultural expression to teach standard units of measure and dimensional analysis.

A mature management system is critical to the effective, efficient, and safe operations of our facility. As an international research centre, CLS fosters a spirit of exploration, collaboration, and continuous improvement amongst science and external users. The management system serves as a framework for conducting world-leading research safety and reliably.

Management system improvements over the current licensing period include an organizational restructure in 2015 to better align staff functions with our objectives, the successful implementation of the Canadian Standards Association -- CSA -- management system standard N286-12, and the development of a comprehensive quality manual. The quality manual emphasizes the importance that the facility places on both safety and quality.

Strategic and operational planning has become embedded in our processes. The CLS management system serves as our foundation for safely operating and maintaining the facility while the values of safety, innovation, leadership, collaboration, EDI, and accountability encase the over-riding processes to achieve success.

Our operational planning is designed to align with our vision and mission, and with our long-term strategic key objectives. Our annual planning focuses not just on our annual planning but also on our multi-year initiatives, taking into account our financial resources, human resources, and risk, with safety being paramount in everything we do. This approach allows CLS to know, control, and improve the business as well as to know and grow our people and the community.

We have many years of collaboration with our peers TRIUMF and SnoLAB and more recently with Canadian Nuclear Laboratories. These collaborations represent our dedication to learn from each other, strengthen our organizations, and grow together. The most notable areas of cooperation are listed on the slide.

Qualified and well-trained staff are imperative for our success. A diverse workforce which includes staff recruited locally and from around the world

provides a unique environment where research can be conducted safely in a collaborative spirit.

During the current licensing period, CLS continued to improve its training program by implementing a systematic approach to training, including the addition of a training specialist to oversee and enhance the program. In 2019, we restructured the minimum staff complement role and introduced a new operator group of permanent employees to enhance the focus on safe and reliable operation.

Through careful planning and maintenance, CLS has successfully operated the facility safely and reliably while expanding and upgrading the number of experimental facilities as well as the building infrastructure that houses them. Recently, efforts have focused on a refinement of our maintenance strategy to help ensure reliability of operations as the facility matures. Implementation, maintenance, and testing of safety and other systems critical to operations remain strong, ensuring fitness for service of our facility.

CLS follows a cautious approach to the safe design and development of the facility centred on a work management system with a graded approach to safety. Carefully documented drawings and design manuals provide a foundation for the development of safe operating procedures. The strength of the design and implementation

process contributes positively to our low injury rate and the very low personal radiation exposure over the current licensing period.

The recent safe transition to the top-up mode of operations, which maintains a relatively constant higher average level of current in the storage ring compared to decay mode, exemplifies this approach. I'll talk about this a bit more on the next slide.

The radiation protection program includes strong design and effective work management components that have kept radiation exposure to staff, users, contractors, and visitors very low. This includes the significant change to the top-up mode of operations referred to on the previous slide, where the average circulating current in the storage ring is maintained at a maximum level by frequently injecting small amounts of electrons into the ring to top it up. Despite the increased number of electrons injected and circulating in the storage ring, there was virtually no change to radiation exposures to personnel.

Over the course of the current licensing period, personal radiation exposure to most staff have been indistinguishable from natural background levels, and the five-year cumulative maximum dose to any individual, as shown on the slide, was well below the annual limit to a

member of the public of 1 mSv.

Conventional safety is also very important to CLS. We believe that safety lives in conversation. Our focus is on having prompt reporting of safety issues and concerns followed by constructive dialogue and resolution.

In 2019, we strengthened our safety incident reporting process with the implementation of a refined digital platform that improves both transparency and accountability. We also completed a safety culture assessment in 2021 as a foundation step to developing a baseline for safety metrics to monitor safety culture over time. While our lost time injury rate remains low, as shown on the slide, we work toward our goal of an injury-free workplace.

Environmental protection and effective waste management are both important to CLS as well. A basic effluent monitoring program shows that the operation of the CLS facility poses a very low environmental concern. CLS has provided a draft screening-level environmental risk assessment to CNSC staff, and the final draft will be completed in 2022 to fully comply with regulatory requirements.

We also effectively manage small amounts of very low-level radioactive materials as well as assorted laboratory chemicals on site.

CLS completes regular testing of the fire detection and suppression systems as part of our fire protection program. A fire hazard assessment of the facility is currently underway to complete the transition to compliance with the new Regulatory Document CSA N393-13.

Emergency response protocols are tested annually, including an annual fire alarm drill conducted with oversight from the University of Saskatchewan fire protection group.

Small amounts of low-activity radioactive material and other hazardous materials are used regularly in user experiments. All experimental proposals are carefully reviewed and approved for safety and compliance before being allowed to proceed. Staff handling the shipments of research samples are trained in the packaging and transport of radioactive and other hazardous materials.

CLS does not possess safeguard material, and our security program ensures security matters are properly managed.

Communication with stakeholders and members of the public is important for the success of the facility. Regular reports and news releases combined with outreach programs show our leadership role in the research community.

Prior to the pandemic, public tours were

used effectively to show CLS's role as a safe and reliable member of the research community. Once pandemic restrictions ease, CLS intends to resume public tours of the facility.

CLS maintains transparency in our operational activities by updating stakeholders promptly when required. A review of the preliminary decommissioning plan and decommissioning cost estimates was completed twice during the current licensing period. Historically, CLS has secured the amount required for decommissioning costs through the use of a University of Saskatchewan-managed bank line of credit. CLS plans to transition to a self-funded cash investment managed by the University of Saskatchewan by annually contributing to the investment fund and reducing the line of credit amount over time.

This change has been reviewed by CNSC staff and found to be acceptable, and we are requesting the approval of the proposed funding instrument change as part of this licence application.

In closing, we have attempted to provide you with an overview of what CLS is and does and the value it brings to the Canadian research community and public. We hope we've demonstrated that we have a strong record of operating safely with compliance issues corrected on a timely basis and a management system to support our safe

and reliable growth.

Lastly, we want to point out that all management system notices of non-compliance are now fully closed.

This concludes our presentation. On behalf of my CLS colleagues, I thank you for hearing our application, and we would be happy to answer questions you may have.

THE PRESIDENT: Thank you very much for the presentation, Mr. Matiko.

I would now like us to move to the presentation from CNSC staff. And Ms. Owen-Whitred, you may proceed, please.

CMD 22-H4/22-H4.A

Oral presentation by CNSC staff

MS. OWEN-WHITRED: Thank you.

Good morning, Madam President and Members of the Commission. For the record, my name is Karen Owen-Whitred, and I am the director general of the Directorate of Nuclear Substances Regulation.

With me today are my colleagues Mr. Mark Broeders, director of the Accelerators and Class II Facilities Division, and Ms. Leah Shuparski-Miller, senior

project officer in the same division. Also present today are CNSC specialists who have been involved in the technical assessment and compliance oversight of Canadian Light Source Incorporated, or CLSI. They are all available to answer any questions the Commission may have.

We are here to present CNSC staff's assessment of CLSI's application to renew the Class IB licence to operate the Canadian Light Source.

At this time, I would like to acknowledge that the CLSI facility is located in Treaty 6 territory in the homeland of the Métis.

Our presentation, identified as CMD 22-H4.A, provides highlights from CNSC staff's written submission found in CMD 22-H4.

During this presentation, CNSC staff will present key information related to selected safety and control areas and the financial guarantee. We will also briefly discuss the proposed changes to the licence. Finally, we will outline staff recommendations regarding the licence renewal request and proposed financial guarantee.

Before beginning the presentation, I would like to note the following errata identified in CMD 22-H4.

The risk ranking for the management system SCA was incorrectly listed as high. The risk ranking of

the management system safety and control area for CLSI is medium.

CNSC staff periodically review the relative risk ranking of SCAs for similar licensed activities to establish a baseline inspection frequency, which helps prioritize compliance efforts. The CMD did not reflect the most recent update.

Second, in section 4.6 of the CNSC staff CMD, delegation of authority was requested for four licence conditions. In fact, the request for delegation should only be for two licence conditions. These conditions are resolution of conflict or inconsistency and dose action levels. No delegation of authority is requested for the planning for decommissioning or financial guarantee licence conditions.

Finally, the executive summary section of the CMD included an incorrect expiration date for the proposed licence. The expiry date of the proposed licence is May 31st, 2032.

The errata described do not impact the conclusions and recommendations made in the CMD.

CLSI has applied to the CNSC to renew the particle accelerator operating licence for a period of 10 years. CLSI has also proposed a financial guarantee for acceptance.

CNSC staff have assessed the licence application and produced CMD 22-H4, which summarizes CNSC staff's assessment of CLSI's performance over the current licensing period. CNSC staff recommend that the Commission conclude that CLSI is qualified to carry on the activities authorized by the licence and will make adequate provision for the protection of the environment, health, and safety of persons and maintenance of national security and measures required to implement international obligations to which Canada has agreed. Therefore, CNSC staff recommends that the Commission renew the operating licence for a period of 10 years until May 31st, 2032, accept the proposed financial guarantee, and delegate authority as set out in CMD 22-H4.

I will now turn the presentation over to Mr. Broeders.

MR. BROEDERS: Thank you, Ms. Owen-Whitred.

Good morning, President Velshi, Members of the Commission. For the record, I am Mark Broeders. I'm the director of the Accelerators and Class II Facilities Division.

The CLSI accelerator, located on the University of Saskatchewan campus, is a synchrotron that accelerates electrons up to 2.9 gigaelectron volts.

Magnetic devices then force the circulating electrons to change direction, which in turn create intense light of varying wavelengths. This light is brought to different beamlines and used for scientific experiments.

Synchrotron light can be used to take images of objects or to evaluate the structure and composition of materials. Experiments are performed in diverse fields such as agriculture, material sciences, or life sciences.

In 2021, CLSI hosted 812 users from 14 countries and published a total of 458 science publications. CLSI also holds a licence to operate a medical isotope project accelerator. Accelerator produces molybdenum-99M and copper-67, which are then processed outside the facility. The medical isotope project accelerator is operated under a Class II facility licence which is separate from the licence renewal under consideration today.

CLSI's current operating licence authorized them to operate the Canadian Light Source and possess, transfer, use, and store the nuclear substances arising from the operation. It also authorizes the licensee to possess, process, transfer, use, import, and store other nuclear substances at the facility, mainly related to the medical isotope project accelerator.

The current operating licence was issued in 2012. One licence amendment during the current licensing term was granted in 2015 to add the authorized activity process to the licence. This was required to permit processing of unsealed nuclear substances produced in the medical isotope project accelerator and from experiments performed on the synchrotron beamline. CNSC staff's assessment and recommendations were outlined in CMD 15-H106.

Two licensing basis changes were subsequently granted by the Commission.

The first in 2017 was for a change in operating mode to enable electron top-up operation. In this mode, electrons can be added to the storage ring as experiments on the beamlines are taking place. CNSC staff assessment and recommendations were outlined in CMD 17-H112.

The second licensing basis change in 2021 was for a change in area occupancy to accommodate a planned electron source lab. CNSC staff assessment and recommendation for this change were included in CMD 21-H109.

CLSI has applied for a 10-year licence to continue operation at the Canadian Light Source with no changes to the authorized activities. CLSI has also

applied for a Commission acceptance of a financial guarantee composed of a letter of credit and cash account totalling $11.9 million Canadian in 2022.

I will now pass the presentation to Ms. Shuparski-Miller.

MS. SHUPARSKI-MILLER: Thank you, Mr. Broeders.

For the record, I am Leah Shuparski-Miller.

I will now discuss CNSC staff's review of CLSI's licence application.

CLSI submitted its licence renewal application on January 29th, 2021, requesting a 10-year licence term with no new licensed activities proposed in the application. CNSC staff assessed whether the information submitted in support of the application satisfied CNSC regulatory requirements including the *Nuclear Safety and Control Act*, or *NSCA*, and associated regulations for the 13 applicable safety and control areas. Staff concluded that the application complied with regulatory requirements.

Midway through the licence period, CNSC staff assessed the level of interest from Indigenous nations and communities in the vicinity of CLSI. No interest or concerns were noted. After the licence

application was received, the CNSC offered funding to enable participation in the regulatory review and Commission hearing process. No applications for funding were received.

CNSC staff did not receive any requests or questions from Indigenous nations or communities regarding the licence renewal application or the CNSC's regulatory process. Given the minimal interest, CNSC staff did not conduct specific engagement or outreach activities with Indigenous nations or communities with traditional or treaty territories that cover the CLSI site.

CNSC staff are available to answer questions or engage with any interested Indigenous nation or community regarding the CLSI facility upon request.

I will now summarize CNSC staff's assessment of three key safety and control areas. Regulatory oversight is performed in accordance with a standard set of safety and control areas, or SCAs. SCAs are technical topics used across all CNSC regulated facilities and activities to assess, evaluate, review, verify, and report on licensee regulatory requirements and performance.

The safety and control areas assessed are listed in the table shown. The safeguards SCA is not listed as it does not apply to CLSI. During this

presentation I will discuss the assessment of the management system, radiation protection, and conventional health and safety SCAs. The management system and radiation protection SCAs were selected because of their importance. The conventional health and safety SCA was selected because the performance history of this area has been shown to be of interest to the Commission in past proceedings.

CLSI is required to implement and maintain a management system in compliance with the CSA standard N286-12, Management System Requirements for Nuclear Facilities. The standard was introduced in 2016 to Class 1B particle accelerators. CLSI's transition plan targeted full implementation by 2018. During the transition and early implementation period CLSI worked steadily to improve the implementation of the management system. CLSI has made significant progress in ensuring their management system framework and implementation are in accordance with N286-12.

CLSI is required to implement and maintain a radiation protection program and to notify the CNSC within 24 hours of having learned of an action level exceedance. The licensee's radiation protection program meets the requirements of the radiation protection regulations. Whole body doses at the facility are very

low. There were no action level exceedances during the licensing period.

This slide shows the effective doses for nuclear energy workers at CLSI for the current licensing period. The maximum effective dose received by a nuclear energy worker was approximately 100 times below the annual dose limit for every year of the licensing period. The highest annual dose for a nuclear energy worker at CLSI was 0.31 mSv.

These very low doses mean that the graph shown which plots average and maximum annual effective dose, scaled to the effective dose limit of 50 mSv, appears empty. CNSC staff conclude that CLSI's performance in the radiation protection SCA is satisfactory.

Next is CNSC staff's assessment of the conventional health and safety SCA. CLSI's occupational health and safety program is well established and effective. CLSI has programs in place to identify and control hazards, including a safety training program, work permits for specialized work, and regular workplace inspections.

A lost time injury is an injury that takes place at work resulting in lost days beyond the date of the injury, as a direct result of an occupational injury or illness event. CLSI reported four lost time injuries

between 2012 and 2021. The four injuries in question are a worker falling from an office chair, a worker hitting their head on an overhead door, a laceration while stripping insulation off a wire, and a chemical burn incurred while cutting concrete shielding blocks. In all cases, the licensee took steps to investigate the incident and put in place mitigation measures to prevent recurrence where appropriate.

CLSI's conventional health and safety program meets regulatory requirements.

I will now pass the floor to Mr. Broeders, who will present CNSC staff's assessment of the preliminary decommissioning, financial guarantee, and public information program.

MR. BROEDERS: Thank you, Ms. Shuparski-Miller.

In accordance with the licence CLSI is required to have in place an acceptable preliminary decommissioning plan, or PDP. The PDP describes the estimated cost if CLSI were to decommission the Canadian Light Source facility today. CNSC staff have assessed CLSI's PDP. The plan meets the requirements of G-219, the CNSC's regulatory guide on decommissioning planning for license activities and CSA group standard N294-09 the decommissioning facilities containing nuclear substances.

Staff had determined that the PDP adequately captures the decommissioning strategies, activities, and cost estimates which are used as a basis for establishing the financial guarantee. PDPs and the associated financial guarantees are reviewed by the CNSC staff on a 5-year basis. The next PDP for CLSI is expected in 2026 and will be assessed against REGDOC 2.11.2 Decommissioning.

CLSI is required to have in place an acceptable financial guarantee that is sufficient to cover the cost of decommissioning according to the most up to date PDP. The licensee has proposed a financial guarantee for 2022 through 2026 composed of a letter of credit and a cash account, both controlled by the University of Saskatchewan.

The proposed financial guarantee includes a funding plan that increases the amount of the financial guarantee available in the cash account each year, to match or exceed the financial guarantee required amount. The net effect is an increase of 3 percent for each year in the five-year period. The form of the proposed instruments will not change over the five-year period.

CNSC staff have assessed the proposed financial guarantee and confirmed that is acceptable and meets the expectations based on CNSC’s regulatory guide

G-206, financial guarantees for the decommissioning licensed activities. The proposed financial guarantee instruments, a letter of credit and a cash account, are acceptable. CNSC staff confirm that the proposed financial guarantee is adequate for the future decommissioning of CLSI.

CLSI has proactively provided CNSC staff with proof of the current -- or the proposed financial guarantee. The current combined total of the financial guarantee instruments is $12.6 million, which meets the required amount for 2022. As with other licenses, CLSI will report annually to the CNSC on the status of the financial guarantee. Should CNSC staff find that the amount of the financial guarantee is less than the required amount, CLSI will be required to return to the Commission for a decision.

CLSI's public information and disclosure program employs multiple modes of communication including newsletters, website content, facility tours, social media, public meetings, and community relations activities to reach target audiences. The licensee is also required to publicly report events such as fires, serious worker accidents, and significant interruptions in facility operation. These events are reported within 48 hours via social media, the licensee's website, and a news release.

CNSC staff have evaluated the licensee's performance in accordance with REGDOC 3.2.1, public information and disclosure, and conclude that the licence's PIDP program meets regulatory requirements.

In preparation for this hearing, the CNSC advertised and communicated the licensee -- the licence application and Commission hearing process to the public through social media and info subscriber emails. As previously mentioned, participant funding was offered to enable participation in the regulatory review and Commission hearing process. No applications for funding were received, no questions from the public regarding the licence renewal application, the CLSI facility, or the CNSC regulatory process for this licence application were received. The CNSC registry received one intervention related to the licence renewal. CNSC staff are available to answer questions and engage with the public regarding the CLSI facility upon request.

I will now present information on the proposed licence. There are no significant changes in the proposed operating licence, and no changes proposed to the licence activities. The licensee has requested the removal of licence condition 4.3 regarding the use of a particular beamline for human research. CLSI has indicated that they no longer intend to perform bio medical research on humans,

therefore the licence condition is no longer required.

CLSI is currently required to provide a full written report to the CNSC on any action level exceedance within 30 working days. Staff propose that this timeline be reduced to 21 days to align reporting timelines with other particle accelerator licences. The action levels themselves remain unchanged. CNSC staff recommend retaining all other licence conditions. Licence conditions will be updated to reflect the current standardized language used in other CNSC licenses.

When assessing the proposed licence term, CNSC staff consider a number of factors including the regulatory compliance history of the licensee and whether similar facilities have the same license term. A 10-year license term is consistent with the current license term, and with other particle accelerator's in Canada. CNSC's standardized license and *Licence Condition Handbook* framework provide for effective regulatory oversight. CNSC staff report CLSI's performance to the Commission through the regulatory oversight reports.

I will now pass the presentation back to Ms. Owen-Whitred.

MS. OWEN-WHITRED: Thank you. To conclude, I will now outline CNSC staff's recommendations for the requests from Canadian Light Source Incorporated to

renew the operating license and accept the proposed financial guarantee. CNSC staff recommend that the Commission conclude that CLSI is qualified to carry out the activities authorized by the licence, and that CLSI 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.

In addition, CNSC staff recommend that the Commission renew the proposed operating licence for a period of 10 years and accept the proposed financial guarantee. Staff also recommend that the Commission direct CLSI to provide the original instrument within 90 days of the issuance of a decision on this matter, and delegate authority as described in Section 4.6 of CMD22-H4 and the errata discussed earlier in the presentation.

Thank you for your attention. We are available to respond to any questions you may have.

THE PRESIDENT: Thank you very much for the presentation, Ms. Owen-Whitred, Mr. Broeders, and Ms. Shuparski-Miller.

We will now move to the presentation by the intervenor, and Denis, I'll turn it over to you, please.

MR. SAUMURE: Thank you. As per usual practice, we have allocated 10 minutes for your presentation, and I would appreciate your assistance in helping us to maintain that schedule. Your more detailed written submission has already been read by the Panel Members and will be duly considered. There will be time for questions from the Commission after your presentation and there's no time limit ascribed for the question period.

I will ask that once your presentation any associated question period are over that you leave the zoom session. You will be able to continue following the hearing via the live webcast on the CNSC website.

President Velshi?

THE PRESIDENT: Thank you, Denis. I'll turn the floor to Mr. Matthew Mairinger for the presentation from the North American Young Generation in Nuclear. Please proceed.

CMD 22-H4.2

Oral Presentation by the

North American Young Generation in Nuclear

MR. MAIRINGER: Mathew Mairinger, for the record.

I would like to start by thanking the

Canadian Nuclear Safety Commission for providing an opportunity to speak on the application from Canadian Light Source Incorporated for a 10-year renewal of its particle accelerator operating facility for its Class 1B synchrotron facility. I have over nine years of experience working for Ontario Power Generation at both the Pickering and Darlington nuclear sites. I have worked in Project Controls, Minor Modifications, Reactor Safety, Performance Engineering, Stakeholder Relations, and now I work in Nuclear Sustainability Services as a Business Analyst.

I earned my Nuclear Engineering degree and Graduate Diploma in Nuclear Technology from Ontario Tech University, and I am a Project Management Professional and a Professional Engineer.

I am here representing North America Young Generation in Nuclear, NAYGN, as a Canadian Operating Officer. NAYGN is an association of young professionals and students passionate about the nuclear industry and is focused on professional development, public relations, networking, and community outreach. There are currently over 120 chapters across North America, and 16 active chapters in Canada.

I just want to highlight the importance of this facility. CLS employs over 250 people, and since the start of user operations in 2005, CLS has enabled over

4,000 scientists from 171 Canadian academic institutions and from 41 countries, to publish over 6,000 scientific papers highlighting discoveries in a wide variety of fields.

A synchrotron produces different kinds of light in order to study the structural and chemical properties of material at the molecular level. Some of the uses for this are to probe matter, to analyze many physical, chemical, geological, and biological processes. Just a few examples of what this had led to include new medications, advances in next-generation technology, more effective product development such as motor oils and medical implants, and also to find innovative ways to combat climate change, which we are very passionate about at NAYGN.

Furthermore, the broad research opportunities at the research facility in the University of Saskatchewan provide amazing opportunities for the next generation of science and innovational leaders, a feature which aligns quite closely with the NAYGN mission.

Reading through the written submission from CLS, I see that the organization has taken the CNSC feedback and recommendations into consideration and have implemented improvements based on the findings and audits. This transparency and commitment to improvement gives me

confidence in the licence renewal for this facility, especially given the societal benefits from this facility.

I am impressed with the interaction CLS has had with the local community. Some examples provided include having 4,000 to 5,000 tour guests annually and Ag in the City, a Science Odyssey and Science Rendezvous after-hour tours, Global Biotech Week, International Day of Light talks, Innovation 150 hour, and the Expo, educational light and colour displays, the 10th anniversary public open house. There's a couple more examples here.

In closing, I encourage the CNSC to grant CLSI a 10-year renewal of its particle accelerator operating licence for its Class 1B synchrotron facility.

Thank you for your time.

THE PRESIDENT: Thank you, Mr. Mairinger for your intervention and your presentation. I'll open the floor for questions from Panel Members and we'll start with Ms. Maharaj.

MEMBER MAHARAJ: Thank you, Madam Velshi. Thank you as well for the presentations today, it's been very informative for me.

I would like to start with a question regarding the management system SCA. What I've observed through the reading is that there has been something of a history of noncompliance up to a certain point in time, and

I would like if possible, for a CLSI to explain their movement from that direct cause analysis to the root cause analysis and whether or not that root cause analysis is responsible for the foundation now of the management system that you are using?

MR. MATIKO: It's an answer that involves, I think, a couple of things. The movement to root cause analysis, I think, is really driven by our quality group. So when we put in place a formal quality group who developed our quality manual and that's part of the process that we have for improvement. So that's I think what started the root cause analysis, that's partially responsible, I think, for how we started to respond to the management system notices and the corrective action that we took.

I think the other part of it is the team that's been put in place, the leadership team at CLS in the last few years. Bringing in some outside people like myself, who have some background in management with other organisations, both small and large, bringing in the General Manager position with Tim West who has a very strong background in management and process improvement.

So it's a combination of several things, including working with our managers and educating them on management systems and those sorts of things.

MEMBER MAHARAJ: Okay. And was that switch the 2015 reorganizational change? Are those two things concurrent?

MR. MATIKO: The 2015 reorganizational change was the start of it, and then I arrived in 2019, the quality group had already been there. Perhaps one of the other people from our side knows exactly when quality was implemented. Quality was part of that process, and then a lot of the changes to the staff complement really started to happen in 2019 and 2020. So that --

MEMBER MAHARAJ: Are you handing that over to somebody who's been around a little longer?

MR. MATIKO: I'm just seeing if -- I'm looking to see if there is -- maybe Grant could comment because the executive team that's here, we're all relatively new to CLSI. So I'm looking to Grant possibly to put his hand up on that if he can add anything.

MR. CUBBON: Sure, I can chime in a little on that. Yeah, I think as Bill pointed out, in 2015 a restructure of the organization was made that, as someone who's been there awhile, you can tell by my few grey hairs, that it had a pretty big impact in terms of creating levels within the organization from director, to manager, to supervisor level, down to the workers.

And I think that was the beginning of

creating some accountability within, and steps within the organization for getting things done in more systematic ways and understanding people's roles a little better. I think the arrival of Bill, and the arrival of Tim put more focus on that and allowed us to, I guess, put energy into creating the right combination of events. We had a quality manual, we had a quality group started, we added two or three people to it now, which historically we've only had one since 2011.

So I think as Bill mentioned, it's been a gradual kind of change over time trying to assess how we can create a management process starting from the directors -- management system that is starting from the executive group on down through the organization. And from my point of view, it's been quite effective. I think the changes that I've seen in the way the projects are approached, the way safety is managed, the way all these parts integrate now has grown immensely and there's a real spirit to continuously improve.

MEMBER MAHARAJ: Thank you. So then I'll just wrap up with this last question on this point for myself --

THE PRESIDENT: So I'm sorry, Ms. Maharaj, I just saw a hand up. Mr. Botton, did you want to add something?

MR. BOTTON: Yes, this is Gianluigi Botton, also from CLS. I just wanted to add that making some of the issues visible through medium -- electronic media, for example JIRA and conformances, our internal web systems. Any potential issues, or any issues that are raised, any problems are made visible, and we are able to track these problems more effectively. So that's also part of the change. So I wanted to add that. Thank you.

THE PRESIDENT: Thank you. Ms. Maharaj?

MEMBER MAHARAJ: Thank you.

So I just wanted to bring this together with the comment that was made in the presentation that the 2015 was when the organizational structure changed, and the N286-12 standards were beginning to be implemented. But by 2019 when most of the current executive commenced, there was a system, but it had been implemented. And I was wondering if CLS and potentially staff could speak to why there's a four-year delay between an organizational restructure to bring coherence and standards to management systems, but four years later it's still not implemented?

MR. MATIKO: Grant, do you want to provide some comments?

MR. CUBBON: Sure. I'd say probably the biggest thing was, it was a pretty big cultural shift in how CLS approached -- approached doing business, really, in

working.

CLS, I think, historically had been a bit siloed, I would say, in terms of the different divisions and groups and how they operated. It wasn't that they didn't communicate and talk, but there was a bit of a -- perhaps a disconnect. And by changing the org structure, it forced communication both up and down and then also laterally across the organization.

Concurrent with this were some real changes to trying to create a project-oriented culture, which, for instance, one of the biggest changes I noticed personally was we have -- twice a year we have an outage where we plan a tremendous amount of work ranging from some important maintenance to some upgrades to the machine and various types of things like that. And when I first started at CLS, these were, I would say, not as strongly planned, and now they're planned many months, even years in advance.

And there's a group that meets now every week to go over progress on all of this stuff, so -- all the plans for an outage.

So these types of things all combined took a long time to implement. People had to -- staff had to buy into the cultural change of how we organized and managed all this.

So I'd say, you know, ideally it would have come a lot faster. It took us some time. And I think the addition of Bill and Tim in particular but, you know, both Gianluigi and Mark Boland played roles in this as well in getting the -- getting all the groups and divisions to buy into the idea that we had structure, we had processes and we needed to follow them.

MEMBER MAHARAJ: Thank you.

THE PRESIDENT: Thank you.

And before I turn to Dr. Demeter, just a reminder, folks, if you can please identify yourself before you answer to help with the transcription, that would be greatly appreciated. Thank you.

Dr. Demeter.

MEMBER DEMETER: Thank you for all the presentations.

First I want to start that I don't have any specific questions for the last presenter from North American Young Generation Nuclear, so thank you for your presentation.

I'll maybe revisit the management SCA later, noting that three out of nine years recorded are below expectation, which is, on the surface of it, concerning, but I want to get to the question about the financial guarantee and probe some questions.

So the facility is owned by the University of Saskatchewan and I saw that the cash account is with the University of Saskatchewan and lines of credit based on the discussions, if I'm not mistaken, is with the University of Saskatchewan. And we're at a hearing today to talk about renewal of this licence and I don't see them at the table.

So that gives me some pause for concern that the people who are involved with security of the financial instruments for the guarantee didn't have a presentation, they're not listed as potential individuals to answer questions. So maybe I'll ask CLS why the University of Saskatchewan is not at the table at this hearing.

MR. MATIKO: Bill Matiko.

Probably an oversight on our part, not recognizing the need for that.

Grant, anything from your perspective?

MR. CUBBON: Grant Cubbon, for the record.

Yeah. I'm not -- from the financial guarantee point of view, the university is the owner of this facility and they are liable for this part of it, the decommissioning component, and yeah. Essentially, we've always had them on board. They look after the line of credit and now we're making a transition, but all of this is managed through a carefully controlled University of

Saskatchewan investment program, and that's what they look after.

And that's -- that's the primary role. Beyond that, the university doesn't have a large -- a large role in how CLSI operates.

MEMBER DEMETER: I would argue they have a large liability, but --

MR. CUBBON: Fair enough.

MEMBER DEMETER: They might not have an operational role.

I just want to query about the cash account, this 1,050,000 just to help me -- and I might not be using the correct terminology, and this is to CNSC. Is this a protected, secured closed account so that it's sitting somewhere and it can't be changed without CNSC knowing about it?

Like how secure is this cash account? How liquid is it?

MS. OWEN-WHITRED: Sorry, Dr. Demeter. Was that question directed to CNSC Staff?

MEMBER DEMETER: Yeah. Just from your end -- from your end, how -- what sense of security do you have that this account is frozen in the sense that it can't be used for anything else, it's not liquid, this million dollars sitting in a cash account?

MS. OWEN-WHITRED: Thank you. Karen Owen-Whitred, for the record.

I'm going to turn that to our expert in this area.

Shona, over to you, please.

MS. THOMPSON: Shona Thompson, for the record, Senior Project Officer in the Wastes and Decommissioning Division.

When CNSC Staff were conducting our review of the financial guarantee proposed by CLSI, when they proposed to introduce this cash account as a part of their financial guarantee, we requested that CLSI ask the University of Saskatchewan to send us a letter that outlines the conditions of the cash account and when the money from the cash account could be accessed and who could access the cash account, which is the CNSC, and that it can only be accessed for decommissioning reasons.

So that letter was sent to the CNSC and was reviewed as a part of our review of the cost estimate and financial guarantee, and CNSC Staff found that letter, along with the cash account, to be acceptable to staff and in line with G206, which was the document that was used at the time for our assessment.

Thank you.

MEMBER DEMETER: Thank you.

That -- for this round, that answers my question. I'll leave my next question to the next round.

THE PRESIDENT: Thank you.

I do have a question for Mr. Mairinger.

Of the 250 employees at CLSI, how many of them are members of NAYGN?

MR. MAIRINGER: Matthew Mairinger, for the record.

I didn't do an investigation to see how many members of CLSI are actually members of NAYGN, but we do have chapters at McMaster, University of Waterloo, Western, University of Alberta, so even if they aren't directly members of this organization, they're still benefiting from the opportunities that they provide.

Thank you.

THE PRESIDENT: Right. And I was asking that because as we saw in the presentation from CSLI, they're extremely active in promoting STEM and reaching out to youth, and I just wondered if your organization was actively involved with CLSI in doing that there.

MR. MAIRINGER: And for the record, I have reached out and we will be having discussions about greater interactions, maybe starting up a chapter, so I'll be working with them after this.

Thank you.

THE PRESIDENT: Okay. Thank you very much.

Did anyone have questions for Mr. Mairinger? Because if not, we can move to our general round of questions. We could move to that.

Okay. Well, then, why don't we start with Dr. Demeter, then, with our general round?

MEMBER DEMETER: Okay. There's a statement from the CLI written that said the CLS -- sorry, the CLS was constructed in 2005 but relies on critical instrumentation installed in 1960s and '70s as part of the earlier Saskatchewan accelerator laboratory. The 2018 failure of these components resulted in a six-month closure of the CLS. To date, despite best efforts, there's been no funding support secured to reduce the significance of a repeat incident.

I'd like some reassurance from CLS to translate this into what it means for -- does it have any impact on operational risk, radiation safety or conventional health and safety risks? If you're not able to get money to replace this critical infrastructure, are there concerns beyond this that would impact operations, radiation or conventional safety?

MR. MATIKO: Bill Matiko, for the record.

I can start with the first part in terms

of the electron gun-related failure in 2018.

We are in the process of procuring a new linear accelerator. That's the entire linear accelerator from the power supply to the electron gun through to the accelerator.

We have funding in place for that, so that specific risk is being mitigated and will be mitigated over the next few years.

Regarding radiation safety, perhaps if Grant could address that, any issues related to that.

MR. CUBBON: Certainly. Grant Cubbon, for the record.

Yeah. The risk regarding the operation of our linear accelerator is very low. The initial facility was designed and operated at a much higher frequency of beam injection, so with CLS we operate at one hertz, which means one pulse of electrons leaves the electron gun, gets ramped up in energy as Bill showed in the slide there until it gets to the storage ring, where it's captured and stored.

So the electron gun, this was the failure. It was an aging component. It's -- we were able to get it replaced at the time, but going forward now we're going to replace the whole thing.

It'll make it much more reliable and much

more efficient in operation.

But from a radiation perspective -- radiation safety perspective, we have very good controls and the risk from that -- a failure of that device is very, very low.

THE PRESIDENT: You okay with that, Dr. Demeter?

MEMBER DEMETER: I am, yeah. It's one component. I just wanted to get a sense of these broader issues, yeah.

Thank you.

THE PRESIDENT: Ms. Owen-Whitred?

MS. OWEN-WHITRED: Thank you.

Karen Owen-Whitred, for the record.

I just wanted to complement the response that we've already heard with the perspective from the CNSC -- from CNSC Staff, which is that we had no and we have no concerns with respect to radiation protection or occupational health and safety with respect to this particular equipment of failure that you were mentioning, Dr. Demeter.

THE PRESIDENT: Thank you.

Ms. Maharaj.

MEMBER MAHARAJ: Thank you, Madam Velshi.

Just to follow up, though, with staff on

the conventional health and safety SCA, I noted on page 27 of the CMD-4 that the occupational injuries in 2020 are significantly higher than they were in 2018 and 2019.

From the staff perspective, are you concerned about this or has there been a satisfactory explanation given by the licensee?

So I was at page 27, if that helps you, Ms. Owen-Whitred.

MS. OWEN-WHITRED: Thank you.

Karen Owen-Whitred, for the record. I'm going to turn that to Ms. Leah Shuparski-Miller to provide some more details.

I will just introduce the response by confirming that CNSC Staff are satisfied overall with the performance of the licensee in this -- with respect to this safety and control area, but the details of the question that you've just raised, I'd like to turn that to Ms. Shuparski-Miller.

MS. SHUPARSKI-MILLER: Leah Suparski-Miller, for the record.

So as discussed, CLSI had four lost-time injuries over the entire licensing period, and I think what you're seeing is that there were two additional injuries requiring medical attention in 2020. Is that --

MEMBER MAHARAJ: Yes, that's right.

MS. SHUPARSKI-MILLER: Is that what you were discussing?

So in that case, those injuries, because they didn't require -- they didn't lose any time beyond the day of the injury, they were relatively minor and CNSC Staff have no concerns about how the licensee addressed that concern.

Their injury reporting program and follow-up is sound, and CNSC Staff do review the Occupational Health and Safety Committee minutes to be able to see the whole follow-up that occurs with all injuries and hazards that are flagged at CLSI.

MEMBER MAHARAJ: Thank you.

THE PRESIDENT: So let me ask a few more questions on the occupational health and safety or the conventional health and safety side.

And if we can go to slide 17 of CLSI presentation, CMD22-H4.1A, as I looked at this slide -- and maybe if you can open it for us.

You know, this is a very modern facility. I have visited it. But I look at this workstation and I just scratch my head. Like this is -- this looks like it's fraught with all kinds of hazards and how does one even get in there?

Help me understand. Like it's just such a

complex ball of spaghetti. Like I don't know how best to describe that, but you know, as a previous health and safety professional, I'd be kind of concerned on how do you even figure out what the hazards are.

Any comment on that?

Maybe I'll ask CNSC Staff first.

MS. OWEN-WHITRED: Karen Owen-Whitred, for the record.

I'll turn again to Ms. Shuparski-Miller to give a reaction to that particular question.

MS. SHUPARSKI-MILLER: Leah Shuparski-Miller, for the record.

So during all of CNSC Staff's visits to the site, occupational health and safety is sort of top of mind, and so even if we're not particularly there to focus on that SCA, any hazards that are noted such as, you know, slip-and-trip hazards or other -- other concerns are immediately noted and dealt with in the inspection report. So that's always -- that's always part of our assessments.

In terms of how the licensee knows what hazard is which, they overall have occupational health and safety manual that describes in general how hazards are assessed and mitigated.

For CNSC, our main document is the safety analysis, but I'm going to let the licensee talk more about

how those -- how that framework happens day to day at their facility.

THE PRESIDENT: Yeah. No, I'm not -- no. My question was, what's your reaction when you see something like this?

This is a workplace and I know it's an aerial view, so maybe the perspective is -- but it's -- as I said, like would -- is your initial reaction that this looks like a safe setup just from conventional hazards around here?

MS. OWEN-WHITRED: Karen Owen-Whitred, for the record.

I can't speak to the nature of the specific image, and that might be more relevant for the licensee to provide some context for the image. That might be helpful.

THE PRESIDENT: But if one of our inspectors were to see this, what would their reaction be, is my question first to staff, or is it hard to conclude just from seeing a setup like that? Yeah.

MS. OWEN-WHITRED: I think that's more to the point that without knowing the context -- I mean, I understand what you're saying regarding the number of, you know, cables that we're seeing in the image, certainly.

I'll just check in with Mr. Broeders to

see if he can provide a perspective from staff on that.

THE PRESIDENT: While we wait for staff, maybe CLSI want to comment.

MR. CUBBON: Sure. I can take that on, Bill, if you'd like. It's Grant Cubbon here, for the record, from CLSI.

So this particular picture is a view of an actual beam line from one of our synchrotron experimental areas. This particular one is actually a very low-energy photon beam line that there's no radiation hazard, so we allow that to be outside of the -- of the shielded areas.

It's in an enclosed room, but what you can't see very well is there's a space on the floor where that worker is standing. It's an area where they go in very infrequently to perhaps connect or make some adjustments, but then once it's -- once the beam is turned back on, there wouldn't be personnel in there.

The bulk of the cable you see is communication type of cable. I think by nature, synchrotrons can be a bit -- a bit quirky this way in that this is stuff I've seen in other facilities as well in that you end up with a lot of cable runs. And it does take some effort to manage these carefully and properly.

I'd say as much as this picture looks like a bit of a collection of wires going who knows where, there

is considerable organization to all of this and the -- between the occupancy and the fact that the hazard for connections of all these because they're communication cables, predominantly, is quite low.

This is a setup we've -- you know, we allow to continue. We do work with our staff to manage extension cords and all that type of -- those types of things and make sure that connections are sound, but they do require setting up a variety of connections and have to make changes periodically.

THE PRESIDENT: Okay. Well, maybe I'll switch gears, then.

You mentioned that you did a safety culture assessment in 2021, kind of a baseline one. Share with us what were some of the key findings from that assessment and when are you planning on doing your next one.

MR. CUBBON: Grant Cubbon, for the record again.

The assessment was an interesting process for it. It was a very big undertaking. We ended up with about a 150-page report, so there was a number of findings.

I think the higher-level ones were just communicating with staff and working towards improving accountability were probably the key ones we got out of it.

So we had a number of things started to try and improve that. I think the timing of the -- of the survey was right in the midst of our COVID and, actually, the actual survey itself occurred during an outbreak that we had. It had all been scheduled, so we feel that had some impact on it as well, but in the end it's been very interesting.

So we've -- what we've done, I think, as Bill and Gianluigi had alluded to, was really improve the transparency of our safety reporting systems. And I'm finding -- from my perspective, I'm finding that helps a lot.

Now everyone can see what's going on, they understand. Things are getting responded to and they don't -- I might get a knock on my door from someone asking, you know, "What's going on with this", and we work together with the management group very closely to make sure things keep moving forward.

And we've kept sort of roughly around a 95 percent closure rate of all safety items at any given time, so it's a bit complex. Most stuff are small problems, fixed, addressed and moved on fairly quickly. Some stuff takes a little longer to address, so we always have a portion that are open, but I think the transparency and the communication of these events has helped a lot.

And I'd say that's probably the biggest lesson, at least for me, anyway, was just to improve the communication, keep the culture -- help improve the culture that way and having better buy-in for all the processes that we have in place.

THE PRESIDENT: Thank you.

And when are you planning on doing your next one, or are you?

MR. CUBBON: Well, we're not sure. We do an engagement survey every three years has been our recent practice. This was added on to that.

We're likely going to combine those two and incorporate some of the questions, but as -- our licence doesn't require us to do an assessment. It requires us to do monitoring, so our intent was to do the assessment and give us a baseline for some metrics, but I'd say we're still struggling a little to find some meaningful metrics. But I'm hoping in the next few months, certainly by the end of this year, we'll have something in place we can begin to use for our tracking purposes a baseline and help us make changes and understand the impact.

THE PRESIDENT: Thank you.

Mr. Botton?

MR. BOTTON: Gianluigi Botton, Science Director at CLSC, for the record.

So I wanted to add to what Mr. Cubbon mentioned about the culture.

So for example, when we plan projects, we do have now a formal process of involving HSC as part of the review of the plans so that when we plan a workstation, for example, they would look at this. If we plan even a grant application, they would be involved in the review of the safety implications.

So that's part of now what is implemented, and we also have -- in the Science Division, when we month monthly meetings, we do invite occasionally HSC, the Health and Safety Environment Group, coming and we do have always a safety moment at the beginning of the meeting.

So these are things that are changing the culture and examples of how we're doing -- we're changing this.

Thank you.

THE PRESIDENT: Thank you.

Mr. West?

MR. WEST: Hello, thank you. Tim West, General Manager at CLS, for the record.

And just to go back to the reoccurrence of the assessment, what we were looking at and wanting to do is actually combining our engagement and safety into our pulse surveys and being able to collect more data over time

to be able to see themes and trends that any sort of interventions or improvements that we are making we can identify those improvements and so less time in between, more data and be able to use that for good improvement decision-making.

THE PRESIDENT: Excellent, thank you.

Mr. Boland.

MR. BOLAND: Mark Boland, Machine Director for the CLS. A couple more points to make in this context.

One, is, that in the staff survey on safety where we ask the question, do your staff feel safe and do they feel that CLS is addressing safety, I don't know the exact number but it is in the very high nineties. So, people do feel safe coming to work. That's one point.

The second brief point that's being touched on by my colleagues is the electronic system for the reporting and one key aspect of that is that whoever reports it, the system automatically assigns it to their supervisor, which is then viewed by the manager, which is then viewed by the director. And in association with that, there's been training for supervisors and managers on their responsibility under *Canada Labour Code* as to what it means to assign work and how they should respond to these safety incidences.

So, those are two additional points that

I'd like to make on top of what has already been said.

THE PRESIDENT: Thank you.

Dr. Demeter?

MEMBER DEMETER: Okay. A question for CNSC staff, radiation protection, on page 26 of their written report under "External Dose," --this is just for clarification for me. It says,

> "Skin doses are essentially identical to whole body doses and are not reported separately." (As read)

I just want to make sure I make the right assumption that -- my assumption is that the hazards are all full body exposures, and there's no significant risk of partial body exposures. Or, are there areas in the facility where it would be important to measure skin doses if there's going to be a partial body exposure?

MS. OWEN-WHITRED: Karen Owen-Whitred, for the record.

I'd like to ask as Mr. Diego Estan, our specialist in radiation protection, to address that question.

MR. ESTAN: Diego Estan, for the record, Radiation Protection Division.

Yes, that is correct. Essentially, they're exposed to more or less uniform fields of gamma radiation,

so that's what results in the skin doses being essentially identical to the whole-body doses.

They may have instances in the lab where they might require to monitor extremities, but I would let CLS comment on that, if there's anything else to add.

MR. CUBBON: Sure, it's Grant Cubbon, for the record, from CLS.

Thanks Diego.

Yes, that's quite correct. We have engineered our radiation protection very strongly there. We keep people out of the areas that are dangerous and don't let them when the beam is on, and the shielding keeps the radiation on occupied areas extremely low such that there's no real distinguishing -- no real way to distinguish between like the whole body dose and skin dose.

We do have some -- related to their medical isotope project, there are situations where we do provide ring dosimeters, but as was mentioned earlier that's a separate licence in itself. We do monitor some workers for skin dose, for instance, if they have to work on a component that's been strongly irradiated which is not uncommon - I admit that happens occasionally - and so we do have some reporting of that with respect to our Class 2 licence, but with respect to the Class 1B licence, there's no real extra mini-dose risk.

MEMBER DEMETER: Okay, thank you very much.

THE PRESIDENT: Thank you. Ms. Maharaj?

MEMBER MAHARAJ: Thank you, Madam Velshi.

I had a quick question with respect to the lifecycle of this particular facility. I notice that we were talking about decommissioning costs and financial guarantees that run up to 2025, 2026. What is the end-of-life expectation for this particular facility? Perhaps to CSLI?

MR. MATIKO: Bill Matiko, for the record.

Right now, the best estimate we have been using has been 2029. The reality is that that it's somewhat dependent on the funding, so we're right now in the process of -- we've applied for - our major funder is CFI and the main type of funding we get is referred to as MSI Funding. That, along with some other funding things that are happing right now, there's a distinct likelihood that the life of the facility could be extended into the early, mid-2030s, depending on the funding situation that happens over the coming year or couple of years.

MEMBER MAHARAJ: Okay, so just as a follow-up to that, with respect to the financial guarantee, I'm just looking at the split between the line of credit and the cash account, and I think we're -- you know, we're

focussing on that cash account because it's being held by the University of Saskatchewan.

Just to follow up on a question of my colleague Dr. Demeter, are those funds segregated in any way, or are they simply mushed in with the rest of the U of S funds with a letter indicating everybody's going to behave themselves around these monies?

MR. MATIKO: Bill Matiko, for the record.

First thing, let me preface it, CLSI does not currently have our own banking functions, so all of our banking function is through the university.

The second thing, the funds are sitting -- they are segregated funds, so they are segregated specifically for CLSI and they are sitting in the managed fund -- overall, is a fund for these types of things. Some might refer to it as a sinking fund for specific projects. So, it's a fund that is in very low-risk safe investments if you will, so you also get a low return. So, as an example, it's things like GICs, government bonds, etcetera.

MEMBER MAHARAJ: Sure.

MR. MATIKO: It is also quite liquid. I wouldn't say liquid within a day or two, but within a matter of days or a week or so, so it is low risk, liquid and segregated.

MEMBER MAHARAJ: Okay, and restricted,

then to CSLI exclusively?

MR. MATIKO: Yes, and it's restricted -- it's restricted for decommissioning, yes.

MEMBER MAHARAJ: Okay. And then I notice your proposal is to increase the financial guarantee to reflect inflationary increases to decommissioning costs. Is that escalation going to continue up to the end of life-cycle, or is that a capped proposal up to 2026?

MR. MATIKO: Bill Matiko, for the record.

So, it's something we will do on an annual basis. It's actually an accounting requirement and so we look at what are the actual estimated costs, we build inflation in and we take interest rates into account. And so that's something that we will do right up until the day of, or I guess maybe within a few months of decommissioning. So, it's done on an annual basis.

Our intent is, our Board has approved for a five-year period to move a million dollars of cash into this investment decommissioning fund instrument, if you will. So, our intent is to do that, and our goal would be to have sufficient cash funds by 2029. So, our plan is, at the end of the five-year period to just revisit what's the dollar amount of cash that would need to be set aside each year into this fun. And it's approximately a million dollars, but it just gives us -- we committed to one

million dollars a year for a five-year period, and we will readjust at the end of that five-year period.

MEMBER MAHARAJ: Thank you.

THE PRESIDENT: Ms. Owen-Whitred?

MS. OWEN-WHITRED: Thank you. Karen Owen-Whitred, for the record.

I just wanted to turn to Shona Thompson who could provide some further context on the CNSC's requirements and expectations in this area with which the licensee needs to comply.

So, Ms. Thompson, over to you, please.

MS. THOMPSON: Shona Thompson, for the record, Senior Project Officer from the Wastes and Decommissioning Division.

CNSC Staff reviewed CLSI's proposed financial guarantee against CNSC Document G-206, and will be reviewing their next financial guarantee proposal which is five years from now, in 2026, against CSNC REGDOC 2.11.2, Decommissioning.

It is a requirement by the CNSC that financial guarantee instruments be held separate from other assets, so it is something that CNSC Staff look at when we conduct our reviews.

The reviews of financial guarantees are conducted by Staff in the Wastes and Decommissioning

Division as well as Finance and Legal Services. So, together, we conduct a review of the financial guarantee against the regulatory requirements that are in place. So, I just did want to mention that it is a requirement that those assets be kept separately. So, CNSC Staff did confirm that the cash is held in a separate account that only contains the money that has been set aside for decommissioning. And we do also, as mentioned, have that letter from the University of Saskatchewan stating the amount that's in the account, as well as the conditions behind withdrawing money from the account, which is that it's only by the CNSC for the purposes of decommissioning.

MEMBER MAHARAJ: Thank you very much.

THE PRESIDENT: Thank you, Ms. Thompson.

A question for CLSI on what your future plans are. And if I look at your current ten-year licence, you know there was a licence amendment to changes to the licensing basis that were needed. As you look ahead, and I know you mentioned 2029, perhaps, as kind of the end-of-life, at least as you see it now subject to a whole lot of other things, a lot of innovation happening, maybe new opportunities out there. Do you feel that this licence gives you the kind of flexibility you would need to undertake that, or do you envisage coming back with amendments to this proposed licence?

MR. MATIKO: Bill Matiko, for the record.

Maybe some of my colleagues, either Gianluigi or Mark or Grant may want to comment on that.

MR. BOTTON: Gianluigi Botton, CLS, for the record.

In terms of what we have in the pipeline for upgrades of the facility, I'm confident that we can operate within this licence. And if there are any amendments, it might be small, similar to what Electron Source Lab would have been. So, I don't have concerns about this particularly.

THE PRESIDENT: Thank you.

Okay. Back to Dr. Demeter.

MEMBER DEMETER: Thank you. Being a research facility it's very fluid, and when I looked at CNSC's Dosimetry for NEWs, Non-NEWs and users, I see that the users are actually the bulk of the people that come and go from your facility. So, if I came to your facility as a NEW user today, can you summarize what health and safety, both radiologic and conventional I would get, and how would you assess whether you're confident before stepping out onto a research platform, that I'm safe to go. That's to CLSI.

MR. MATIKO: Bill Matiko, for the record.

Grant, can you just go over the training we do, and certification, and what's required of a user when they come? And perhaps mention also on the renewals that we do do?

MR. CUBBON: Sure. It's Grant Cubbon, for the record.

So, a user arriving on site has a few requirements before they actually get to do some beam time. So, first, we have a facility access training requirement which basically they are required to take before they get into the facility, so that includes a general safety orientation course with an exam, a basic radiation safety course with an exam, and then a WHMIS training exam, so all three of those training requirements are tied into our card access, so until they are completed, the card is not activated.

Once they're on-site, there's also a free to beamline; we have something called beamline specific orientation, so that's an opportunity for the user to go to the beamline and meet the beamline staff and go through a training program that identifies the types of hazards that they could see at the beamline, and both in a general sense and then if there's anything specific related to the work they are doing. So, based on that, we qualify people of perform work with that, at the beamline.

There are also additional considerations for laboratories. Sometimes the users will prepare samples, and so we have laboratory safety training requirements and then any special requirements depending on the type of work they might be doing in the lab.

So, I'd say it's fairly comprehensive. It's a bit of work, it's not just walking in the door and getting the go to start on the beamline. There's a lot of components to it, and we -- we feel they are fairly rigorous and we have very little trouble with injuries and problems with respect to our users in terms of them operating or working on the experimental floor.

Thank you.

MEMBER DEMETER: I appreciate that, I'm satisfied, thank you.

THE PRESIDENT: I have a couple of quick questions. One, just to get confirmation -- this is for CSLI, to get confirmation from you that you have no concerns with Staff's recommendation that the timeline for submissions of extra-level exceedance is changed from thirty working days to twenty-one days. And, Staff, is it twenty-one days, or twenty-one working days that -- I know you've made that distinction in your -- in the slide. But first is to CSLI, just confirmation that this doesn't pose an issue for you?

MR. MATIKO: Bill Matiko, for the record.

We're comfortable with that; it does not pose an issue.

THE PRESIDENT: Perfect. Thank you.

And, Staff, is it twenty-one days, or twenty-one working days?

MS. OWEN-WHITRED: Karen Owen-Whitred, for the record.

It's twenty-one calendar days.

THE PRESIDENT: It is calendar days, okay.

And then another quick -- maybe this isn't a quick question. Also, for CSLI, can you -- you know, I think the Commission would really love to know, at a high level what's been the impact of the pandemic on your operations? Did it severely restrict your operations? You did mention an outbreak that you had had. Can you give us a quick synopsis of that?

MR. MATIKO: Bill Matiko, for the record.

I'll start and then the rest of the team can perhaps add. When the pandemic first hit, we did shut down the facility; we went into what we would call "Warm Standby Mode." It's a mode we go into over the Christmas season. And, so that did slow us down. We were at the start of an outage and then when we had restrict -- the COVID requirements from a PPE perspective, distancing,

things like that, as well as we restricted the number of staff that had access to our facility, it extended the time it would take to actually get repairs and maintenance work done.

We did ultimately have restrictions in terms of allowing users on site to our facility for a number of months. So, there were impacts to the use of the facility, the amount of beam hours that were available, those sorts of things.

We also had supply chain issues as well that were pandemic-related, and that included some of the equipment and repair components that we needed to get where manufacturers and other suppliers were impacted, including instances where we would normally have the supplier come and install the equipment, and because of COVID travel restrictions -- this is between Europe and Canada -- it caused us some challenges there, as well.

Mark, if you could add to that?

MR. BOLAND: Mark Boland, Machine Director for the CLS.

So, two points to make. The impact for our staff. Just the amount of daily coordination was severe, a huge amount of time, meetings twice daily to coordinate who could come in and who was needed, what priorities were. So, that was a huge impact and a stress

for staff.

The second point, for external, and I say this also as a professor at the University of Saskatchewan, it was a complete disaster for training students and staff, and so it was -- to this day, there's still a challenge getting HQP into the facility for hands-on training. So, there was several groups of students who -- across the country, who only received data, which is at least we were able to provide data. But you cannot substitute the hands-on work with equipment for training. So, that was a huge loss for our external users.

THE PRESIDENT: Thank you. Mr. Botton.

MR. BOTTON: Yes, I'd like to add also that the initial return to work showed the best of CSLI staff. We had to work together. We had to plan in every detail the return, a checklist, engaging all stakeholders, and looking at potential risks, doing rounds to look at all possible sources of risks. And that showed the best of CSLI staff.

We also had to plan daily the number of users -- the number of staff. We had limits initially going to -- from twenty-five to fifty, to seventy-five, to one hundred. That implied that we had to plan in advance who was going to come on site. The managers had to work together to put people on the daily list so they could come

in, because we have severe limitations of the number of users and staff.

And, finally, in terms of the users, we operated almost more than a year with mailing mode. That is, the users would send samples to CLS and our staff would carry out the work. That implied a lot of more work for our staff.

And over the year 2021, we started accepting users locally from Saskatchewan because of the travel restrictions. And then we increased the -- the range of users coming from Canada. I think that started in the summer of 2021 and -- finally -- the summer and early fall.

And, finally, in December 2021 we started having external users out of Canada coming to CLS, so relating back to the operations, the planning and the access to the facility.

THE PRESIDENT: Thank you. Thank you for sharing that. I think you've answered certainly all of the burning questions that the Panel has. And, so before concluding the hearing, I'll turn the floor to CLSI for any remarks you wish to make in closing.

Mr. Matiko, over to you.

MR. MATIKO: Bill Matiko, for the record.

We just want to thank the panel for

allowing us this opportunity to present to you and to the CNSC staff for the support that you are showing to our organization, and we really appreciate the questions you have and the interest that you have shown in our facility. So, thank you once again for considering our application.

THE PRESIDENT: Thank you.

Thank you everyone for your participation.

Denis, over to you for any closing remarks, please.

MR. SAUMURE: Thank you. This brings to a close the Public Hearing on Canadian Light Source's application.

With respect to this matter, the Commission will confer with regards to the information under its consideration and then determine if further information is needed or if the Commission is ready to proceed with a decision.

We will advise accordingly.

Thank you.

THE PRESIDENT: Thank you everyone. Stay well.

Bye-bye.

--- Whereupon the hearing concluded at 11:59 a.m. /

L'audience se termine à 11 h 59