Canadian Nuclear Safety Commission

Commission canadienne de sûreté nucléaire

Public meeting

Réunion publique

August 23rd, 2018

Le 23 août 2018

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

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

Commission Members present

Ms Rumina Velshi
Dr. Sandor Demeter
Mr. Timothy Berube
Ms Kathy Penney
Dr. Marcel Lacroix

Commissaires présents

Mme Rumina Velshi
Dr Sandor Demeter
M. Timothy Berube
Mme Kathy Penney
M. Marcel Lacroix

Assistant Secretary:

Ms Kelly McGee

Secrétaire adjointe:

Mme Kelly McGee

General Counsel:

Ms Lisa Thiele

Avocate générale :

Me Lisa Thiele

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Ottawa, Ontario / Ottawa (Ontario)

--- Upon commencing on Thursday, August 23, 2018
at 9:02 a.m. / La réunion débute le jeudi
23 août 2018 à 9 h 02

Opening Remarks

THE PRESIDENT: Good morning and welcome to the continuation of the meeting of the Canadian Nuclear Safety Commission.

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

Je vous souhaite la bienvenue and welcome to all those joining us by webcast.

I would like to introduce the Members of the Commission that are with us today.

On my right is Dr. Sandor Demeter; to my left are Dr. Marcel Lacroix, Ms Kathy Penney and Mr. Timothy Berube.

We have also Assistant Secretary Kelly McGee and Ms Lisa Thiele, Senior General Counsel to the Commission, with us on the podium today.

MME McGEE : Maintenant, j'aimerais aborder certains aspects touchant le déroulement de la réunion.

We have simultaneous interpretation.

Please keep the pace of your speech relatively slow so that the interpreters have a chance to keep up.

Des appareils pour l'interprétation sont disponibles à la réception. La version française est au poste 2 and the English version is on channel 1.

Please identify yourself before speaking so that the transcripts are as complete and clear as possible.

La transcription sera disponible sur le site Web de la Commission la semaine prochaine.

I would also like to note that this proceeding is being video webcast live and that archives of these proceedings will be available on the CNSC website for a three-month period after the close of the meeting.

Please silence your cell phones and other electronic devices.

The *Nuclear Safety and Control Act* authorizes the Commission to hold meetings for the conduct of its affairs.

The agenda was approved yesterday. Please refer to the agenda in CMD 18-M35.A for the complete list of items to be presented today.

CMD 18-M46

Written submission by CNSC staff

THE PRESIDENT: The first item today is the Event Initial Report regarding a personal contamination incident at McMaster University, as outlined in CMD 18-M46.

Representatives from McMaster University are in attendance and available for questions.

Mr. Moses, do you have anything you wish to add before we move to the questions?

MR. MOSES: Yes, thank you.

Madame Présidente, Members of the Commission, I am Colin Moses, Director General of Nuclear Substance Regulation.

With me here today are CNSC staff involved in the review of this event, including Denise Kozeluh, CNSC Inspector, joining us via videoconference from the CNSC South Ontario Regional Office.

Staff are here to provide an Event Initial Report on a recent potential action level exceedance that occurred under the McMaster University Consolidated Licence which authorizes the use of nuclear substances at the University.

The situation occurred on June 15th, 2018, and involved contamination of a nuclear energy worker

working in a hot cell -- which is a shielded room used to work with nuclear substances -- as a result of a residual contamination from previous work. The preliminary dose estimated to the worker is 1.3 to 6.5 mSv. However, this dose is pending validation through fecal analysis and CNSC staff have just recently received the final dose estimate from McMaster, which is currently under review by staff.

As discussed in the Event Initial Report provided to the Commission, McMaster University had issued a permit for work performed in the hot cell involving cutting irradiated pressure tubes removed from a Canadian reactor in preparation for analysis. This work was determined to be the source of contamination. Following the work the cell was decontaminated and declared clear of contamination. The worker entered the hot cell and began preparations for a planned experiment which involved passing control cables through an access port in the cell wall. While doing this, the worker noted dust on his hand and forearm and, recognizing the potential for contamination, contacted Health Physics, who proceeded to decontaminate the worker. The worker was subsequently sent for internal dosimetry.

CNSC staff have concluded that McMaster Health Physics staff responded appropriately in the aftermath of this incident.

As a result of this notification, CNSC staff conducted a focus inspection to gather additional information. The inspection identified potential deficiencies in the licensee's hazard assessment, contamination control measures, surveys and cleaning efforts, and a final root cause report is expected from the licensee by the end of this month. CNSC staff will use the information gathered during our inspection to inform a review of the root cause report. McMaster University has suspended any future pressure tube analysis work pending the implementation of corrective actions from the root cause report and CNSC staff remain available for any questions the Commission may have.

THE PRESIDENT: Thank you.

I will turn the floor over to McMaster University. Mr. Heysel, do you wish to make any comments before I open the floor to questions?

MR. ZIC: Good morning, President Velshi and Members of the Commission. For the record, my name is Josip Zic, I am the Senior Health Physicist for McMaster University. With me, as you mentioned, is Chris Heysel, who is the Director of Nuclear Operations and Facilities.

Just to add to what has been said already, we received last night the most recent dose estimate for this event. Currently that dose estimate indicates that

the dose is less than 0.1 mSv, or 10 millirem, which is good news. Having said that, we are not changing our approach to the event, we still consider that it could have been higher and all of the actions that we have in place that have been mentioned will continue, specifically the investigation team that has been put together to determine the causes of the event and to put in place corrective actions that will prevent it from happening again.

The corrective actions are focused on a number of things, but ultimately looking at the decision-making process that allowed us to say that that cell was free of contamination when it was not and that led to this event.

Having said that, the work has been suspended, it has been removed from our licence and we will not be performing this work again until internally we feel that we have the right actions in place to ensure it doesn't happen again and at that point we can internally go through our approval process and, if that is completed, approach the CNSC again in regards to allowing this work to continue at our facility.

THE PRESIDENT: Thank you.

We will now open the floor to Commission Members for questions.

Ms Penney...?

MEMBER PENNEY: Thanks for that.

A question about what the normal process would be for decontamination, just so I can picture it in my mind, and your comment around the decision-making around that decontamination.

MR. ZIC: So again, Josip Zic, for the record.

The decision-making process is ultimately we perform decontamination typically using wipes to decontaminate the cell and all the surfaces. Having said that, decontamination was not performed above about 8 feet, so the top of the cell, so some lighting fixtures and some things that were closer to the ceiling.

Having said that, from that point ultimately from the decontamination that was done, we do a 51-point smear analysis that takes a look at different points throughout the cell. It is a relatively small space, as you can probably see from the picture, and based on that, if it comes back as clean, it was declared clean.

Having said that, obviously with our investigation report that is specifically what we are looking at to say, you know, what do we need to change, because programmatically we thought that was okay and obviously it was not.

MEMBER PENNEY: This might sound like a

silly question, but is it just you need a ladder in there so you can reach the high points?

MR. ZIC: I would say it's -- sorry. Again, Josip Zic again, for the record. I would say it's more than just reaching the high points. There's a lot of, you know, different pipework, light fixtures, cages around light fixtures and so on, so there is more work. To do a full decontamination there is more work involved there. Currently we are putting together a work plan to do a full decontamination of the cell and we will be completing that work when the work plan is approved internally.

THE PRESIDENT: Mr. Berube...?

MEMBER BERUBE: I just want to confirm that you think this is a process issue that you have and it's not a human factor problem as a direct result of this.

MR. ZIC: Josip Zic, for the record again.

Ultimately, yes, we believe it is a process issue. Our program and process around clearing the cell allowed us to say that a 51-point smear was good enough to say that that cell was clean and allow people to do work in there with no protective equipment. So when we look at that, you know, had we had a different process in place this event would not have happened. So we are really focusing on that process to ensure the decision-making around that is very clear in the future and prevents this

from happening again.

THE PRESIDENT: Dr. Demeter...?

MEMBER DEMETER: Thank you very much.

For McMaster, this is one hot cell of a large complex. Is there potential that you have larger issues in this room or is this kind of activity that led to this contamination, residual contamination in other areas of your facility?

MR. ZIC: Josip Zic, for the record.

So ultimately when we look at -- this hot cell is located within the reactor. Within the reactor we don't deal with a source term like this, we don't do any work like this, so I would say that within the reactor facility, no.

Having said that, we are -- our program applies to all work that's done at McMaster, not just the reactor. We do, as many of you may know, have what's called a CANS facility where we will -- a series of hot cells where we can do hot work that is being commissioned, in the process of being commissioned, and so any lessons learned from this event are going to be applied to that as well. The program applies to all the work that's done, but we don't believe that this is a bigger issue, we really believe it's isolated to this specific work done in a hot cell.

MEMBER DEMETER: And this is related to specific work, as you said, which has the potential for alpha contamination in the air. Do you have any means of doing alpha sampling and monitoring?

MR. ZIC: Josip Zic, for the record again.

Ultimately, absolutely. With this event we knew that alpha was an issue as part of the hazard assessment. We had full controls in place, so alpha monitoring for airborne outside the cell, alpha frisking outside the cell. So we had all the tools that we needed to identify the contamination and when the event happened, again, you know, we recognized that this could be an issue and we used those tools to identify that we could have potentially exceeded an action level. So we had the tools that we needed to measure and identify alpha.

MEMBER DEMETER: And it talked about contamination on the hand and arms, and based on the -- and you can correct me if I'm wrong, but based on the intervention it seemed that they weren't wearing gloves because they washed it off their skin. Was there any fixed skin dose on this person?

MR. ZIC: Josip Zic, for the record.

Ultimately there was no skin dose, mainly because of the response of the individual. The individual performing the work, when they saw dust on their arm they

immediately realized that that was not normal, they backed out, they called Health Physics for support. The actual time from the point that they noticed the contamination after pulling their arm out to having the contamination removed was about five minutes. So because of the short duration, even though there was some contamination there, there was no skin dose assigned because it was cleaned up very quickly.

MEMBER DEMETER: And is there anyone else who went in this room that may have been contaminated between the time he finished the work and the time this person got exposed?

MR. ZIC: Josip Zic, for the record, again.

So there were individuals that went into the room as part of the follow-up, like my staff performing surveys of the room, but no one was contaminated following the event. We have looked at all the work that was done prior and we did find two contamination events that did occur as a result, associated with this work. Both of those events were involving contamination on clothes or feet and none of them led to any sort of internal updates.

We also had all the staff from the company that was in doing the work in the hot cell, they have all performed whole body counts following the work and they

were all clear, nothing identified.

THE PRESIDENT: Dr. Lacroix...?

MEMBER LACROIX: It says in the EIR that the worker noted the presence of dust on his arms. It's a blessing in disguise in the sense that had there been no dust he would have been contaminated anyway without knowing it. On the other hand, isn't a hot cell supposed to be a clean environment? So I'm confused here.

MR. ZIC: Yes. Josip Zic, for the record.

You are absolutely correct. Health Physics cleared that hot cell as clean and the individual did not -- because it was clean did not have to wear any protective equipment to be working in there. And so had they not noticed the dust and they were still contaminated, what would have happened was that it would have taken longer for us to identify the contamination. But having said that, as soon as they exited they would have monitored, that contamination would have been found and, depending on the length of time, it might have led to a skin dose assessment, but it wouldn't have really changed the response or our ability to identify the contamination, just increased the length of time.

MEMBER LACROIX: Okay. Thank you.

THE PRESIDENT: What is the worst case scenario in here? I mean, I don't know what the levels of

contamination were that the person would have been exposed to and, as you said, the dose estimate subsequently turned out to be quite low, but in the worst case what could it have been?

MR. ZIC: So in the worst case, it all depends on the source term. So at the time when the event happened we didn't have a really good understanding of what the source term was, so we didn't have smears that told us this is the contamination that was actually there. What we had was what was sent to us, which is the pressure tube source term. So it took us some time to get that smear analysis done, about two months to get that smear analysis done.

Having said that, when we did our initial assessment just based on the pressure tube, the worst case scenario was about 6.5 mSv. So it was relatively significant.

Having said that, the smear analysis fecal results have come back and they have shown that it is much less than the worst case scenario, but without any other information we had to go most conservative from the beginning.

THE PRESIDENT: Thank you.

And a question for staff. McMaster University said that this kind of work with pressure tubes

has actually been removed from their licence. Is that what that means, it has been removed from their licence or is the requirement that until you have actually implemented all required corrective actions you can't perform the work? Is there a distinction?

MR. MOSES: Colin Moses, for the record.

Yes. This is a Designated Officer licence, so it is issued by a Designated Officer in the Nuclear Substances and Radiation Devices Licensing Division and that licence includes specific reference procedures.

I will let Mr. Neil Babcock speak to the specifics of your question.

MR. BABCOCK: Neil Babcock, for the record.

We add a permit. The permit that McMaster issues to allow this work to happen in the hot cell, we add it to the licence to allow them to operate that procedure for the term of these campaigns. That work has now -- or sorry. That permit has now been removed from the licence, so they are not authorized to carry out that work under the Consolidated Studies Licence.

THE PRESIDENT: Thank you.

Any other questions?

Okay. Thank you very much.

--- Pause

THE PRESIDENT: Okay. The next item on the agenda today is an information item to provide us with the 2016-2017 Regulatory Oversight Report for Research Reactors and Class IB Accelerators, as outlined in CMDs 18-M32 and 18-M32.A.

The public was invited to comment in writing. No interventions were filed by the public.

Representatives from the licensees are joining us by teleconference or are here in person. They will be provided with an opportunity to comment after CNSC staff's presentation and will be available for questions.

I will go through the list of participants to see who is on the teleconference line.

From the Royal Military College, Dr. Samuleev and Dr. Lewis. Can you hear us?

DR. SAMULEEV: Yes, we can.

DR. LEWIS: Yes, we can.

THE PRESIDENT: Thank you.

From the University of Alberta, Dr. Duke and Dr. Moore?

DR. DUKE: Yes, we are present.

THE PRESIDENT: Thank you.

From the Saskatchewan Research Council, Mr. Chorney?

MR. CHORNEY: Hello. Yes, I can hear you.

THE PRESIDENT: Thank you.

De l'École Polytechnique de Montréal, Professeur Marleau, est-ce que vous êtes avec nous?

Je crois que Dr. Chilian est également en ligne. Dr. Chilian...?

DR. CHILIAN: Yes. I hear you well. I'm here.

THE PRESIDENT: Thank you.

From TRIUMF, Dr. Bagger? Dr. Bagger, are you with us? Okay. We can see if TRIUMF is going to join us.

From Canadian Light Source Inc., Dr. Cutler, are you there?

DR. CUTLER: I'm here.

THE PRESIDENT: Thank you.

And we have Mr. Heysel and Mr. Zic from the McMaster University in attendance.

Thank you. I will now turn the floor over to the CNSC staff for their presentation.

Ms Tadros, the floor is yours.

CMD 18-M32/CMD 18-M32.A

Oral presentation by CNSC staff

MS TADROS: Thank you.

Good morning, President Velshi, Members of the Commission.

For the record, I am Haidy Tadros, the Director General of the Directorate of Nuclear Cycle and Facilities Regulation.

With me today to present this ROR are my colleagues Dr. Caroline Ducros, Director of the Nuclear Facilities Division, and to her left, Mr. Mark Broeders, Director of the Accelerators and Class II Facilities Division, who will present the second part of this presentation.

The next few slides provide a brief introduction and background information for this Regulatory Oversight Report.

--- Pause

MS TADROS: I just want to make sure you have the slides as well. Perfect. Thank you.

This slide outlines the Regulatory Oversight Report format as well as the format for staff's presentation this morning.

The first part of this ROR describes the regulatory performance of research reactors comprising the McMaster nuclear reactor and the four SLOWPOKE-2 reactors located at the Royal Military College of Canada, at University of Alberta, at Saskatchewan Research Council and

at École Polytechnique de Montréal.

The second part of this presentation discusses the regulatory performance of the Class IB accelerators in Canada, comprising TRIUMF and Canadian Light Source.

CNSC staff presented a Regulatory Oversight Report for the first time for these facilities in 2016, which covered the performance over the 2015 calendar year. There was no ROR prepared for these facilities in 2017 and therefore this report covers calendar years 2016 and 2017. This ROR includes highlights of regulatory compliance efforts by CNSC staff, followed by a performance summary covering all 14 safety and control areas, or SCAs.

The radiation protection, environmental protection, and conventional health and safety SCAs will be discussed in greater detail as they provide key performance indicators as to the functioning of all programs required for safety.

We will also discuss other matters of regulatory interest such as public information programs, financial guarantees and any updates to the CNSC regulatory framework relevant to these nuclear facilities.

This report is also an opportunity to inform the Commission and the public of key developments with these facilities, including anticipated work and

projects for the future.

On April 3rd, 2018, a Notice of Participation at Commission Meeting and Participant Funding was issued and posted on the CNSC web site. This ROR was available for public consultation for 30 days, from June 22nd to July 23rd, 2018.

No interventions on this ROR were received.

Regulatory Oversight Reports are one of the pillars used by the CNSC to report to the Commission and members of the public on licensees' regulatory performance. RORs are presented in public proceedings, and it is an opportunity for the public to participate.

This presentation and the ROR are available to the public through the CNSC web site.

The CNSC regulates the nuclear sector in Canada, including the research reactors and the Class IB accelerators, ensuring the protection of the health, safety and security of Canadians and the environment, ensuring the implementation of Canada's international commitments on the peaceful use of nuclear energy, and disseminating objective scientific, technical and regulatory information to the public.

CNSC's regulatory oversight of licensed facilities and activities reduces the risk to people and

the environment.

The CNSC achieves this mandate through the authority under the *Nuclear Safety and Control Act*, the Regulations, the licences issued by the Commission and the CNSC's regulatory documents. CNSC staff use a risk-informed approach in determining the amount of compliance verification activities at each facility, meaning that the effort is commensurate with the risk associated with the facility.

For example, the risk associated with a SLOWPOKE reactor operating at low power, typically 0.02 megawatt with an inherent safe design, is much less than a risk of operating a 600 megawatt nuclear power plant. Compliance verification activities are planned, documented and implemented with this approach in mind.

Compliance verification activities include on-site inspection, document reviews, an evaluation of licensee programs and safety performance reports. CNSC staff rate the performance of the licensees against all 14 safety and control areas, and staff also verify the licensee's compliance in other areas of regulatory interest such as financial guarantees and public information programs.

All regulatory requirements are defined in the regulatory framework and licensing basis for each

licence.

For the record, we need to point out two *errata* in CMD M -- excuse me, I'll repeat that -- CMD 18-M32.

The first one is on page 14, last line on the second paragraph. The licence identified as NRPOL18.01 2023 was issued for the period ending June 30, 2023, instead of the reported June 23, 2013.

The second error is on page 55 on financial guarantees for the Class IB accelerators. Section 3.9 made reference to contributions to an NRRR fund, Nuclear Reactor Restricted Reserve fund, which is not the case for Class IB facilities.

Licensees contribute to the value -- to the full value of the decommissioning costs through a letter of credit as a financial instrument for the financial guarantee.

We apologize for any confusion this may have caused.

So with that, I will pass the presentation on to Dr. Ducros, who will go through Part 1 on research reactors.

DR. DUCROS: Thank you, Ms Tadros.

President Velshi, Members of the Commission, my name is Caroline Ducros and I'm the Director

of the Nuclear Processing Facilities Division. The division is responsible for the licensing and compliance of research reactors in Canada.

The next few slides provide an overview of the five research reactors in Canada. These include the McMaster Nuclear Reactor located in Hamilton, Ontario, and the four SLOWPOKE-2 reactors located the Royal Military College of Canada in Kingston, Ontario, University of Alberta in Edmonton, Alberta, Saskatchewan Research Council in Saskatoon, Saskatchewan, and at École Polytechnique de Montréal in Montreal, Quebec.

These research reactors operate at low power.

The McMaster Nuclear Reactor, or MNR, is licensed for five megawatts, but typically operates at three megawatts. MNR has the added safety of an airtight containment building.

The SLOWPOKEs are designed to operate at 0.02 megawatts, or 20 kilowatts. All five reactors operator at near ambient temperature and pressure. They are moderated and cooled with light water.

The SLOWPOKEs are self-limiting in power, meaning that the reactor will not exceed their designer power even if they were left unattended.

The research reactors have a low

environmental footprint, that is, there are no radiological liquid releases to the environment, and the airborne releases are small, as we will see in the environmental protection section of this presentation.

The public dose associated with these reactors is in the order of about 1 microsievert, which is less than 0.1 percent of the regulatory limit of one millisievert for the member of the public. To put this in context, the average exposure to background radiation in Canada is approximately 1.8 millisieverts.

I will now provide some details on each research reactor, starting with the McMaster Nuclear Reactor.

MNR is located on the campus of McMaster University in Hamilton, Ontario. It has been in operation since 1959. It currently operates on a licensed issued by the CNSC in 2014 for a period of 10 years.

It is a pool type reactor fuelled with low enriched uranium. The fuel core sits near the bottom of a pool approximately 10 metres below the surface.

MNR is an important producer of medical isotopes worldwide, particularly iodine-125 used in cancer treatment. MNR is also used for neutron radiography, in particular for aircraft turbine blades.

The reactor is used for a broad range of

research activities, including the development of radio pharmaceuticals.

In this picture, we see an example of two aircraft engine turbine blades. In the upper left we see evidence of material from the moulding process left in the cooling channels of the blade. The material becomes visible under neutron radiography with a special tracer element. This work is done on a daily basis at the McMaster Nuclear Reactor.

The Royal Military College of Canada, or RMCC, operates a SLOWPOKE-2 reactor on the RMCC campus in Kingston, Ontario. The licence was issued by the CNSC in 2013 for a period of 10 years.

The reactor was commissioned in 1985. It is used for neutron activation analysis, neutron radiography research and education.

In this picture, we can see the Royal Military College in Kingston, Ontario. The SLOWPOKE reactor is located in the Sawyer Science and Engineering building identified by the red circle.

RMCC announced that they're undertaking the project to refuel the reactor after 32 years of operation at the same fuel core. The Canadian Nuclear Laboratories will provide certified staff to perform this refuelling operation.

There will be an increased oversight on behalf of CNSC staff for the duration of this project.

RMCC will apply for an export permit and a licence to transport the used core in a licensed transport package to a waste management facility in the U.S. The project is scheduled to start in 2019 for completion in 2021.

In this picture, we see an actual size model of a SLOWPOKE core. The core is about 30 centimetres in diameter.

The fuel core is contained inside a vessel submerged in a pool of water which shields radiation and dissipates the heat. The beryllium plates on top of the core, known as shims, are used as neutron reflects and serve to adjust the reactivity of the core.

The University of Alberta in Edmonton, Alberta operated a SLOWPOKE-2 reactor between 1977 and 2017. The reactor was used for neutron activation analysis, isotope production, education and research programs. The core was fuelled with high enriched uranium, or HEU.

In December 2016, the University of Alberta made a decision to cease the operation of the reactor. University of Alberta applied for a licence amendment to authorize the decommissioning of the facility.

CNSC staff reviewed the detailed decommissioning plan and a licence amendment was granted in a decision of the Commission on September 22nd, 2017.

In 2017, the reactor was defuelled and the HEU core was repatriated to the United States in accordance with the April 2010 agreement between Canada and the United States to return HEU inventories to their countries of origin -- country of origin.

All components of the reactor were removed and checked for contamination. The pool was drained, and the facility was surveyed for contamination. Radiological conditions were consistent with normal background levels.

CNSC conducted an inspection of the University of Alberta facility in October 2017 and verified completion of the decommissioning activities, including the radiological surveys.

University of Alberta submitted an end state report and requested a licence to abandon the facility. Upon review of the end state report, CNSC staff recommended to the Commission that the operating licence be revoked and that a licence to abandon be issued.

On May 25, 2018, the Commission revoked the operating licence and issued a licence to abandon. The facility can be repurposed for any non-nuclear activities without any restrictions.

Saskatchewan Research Council, or SRC, has been in operation since 1981. It operates a SLOWPOKE-2 facility under a licence issued by the CNSC in 2013 for a period of 10 years.

The facility is located within SRC's Environmental Analytical Laboratories in Saskatoon. The SRC SLOWPOKE-2 reactor is fuelled with high enriched uranium and is the last facility still using HEU in Canada.

The reactor has been used for research and neutron activation analysis, which is used to detect trace elements and material samples in mining and oil industries. The reactor has also been used for education in conjunction with the University of Saskatchewan.

In December 2017, SRC announced their intention to cease the operation of the reactor and decommission the facility. SRC plans to repatriate the HEU core to the United States under the same agreement between Canada and the U.S. as University of Alberta did to repatriate their reactor core.

Decommissioning of the SRC facility will require increased oversight and licensing effort from CNSC staff. The operating licence will require an amendment to authorize decommissioning.

Other licensing and compliance activities

will include the issuance of a transport licence and export permit, review of the end state report and issuance of a licence to abandon. CNSC staff expect that the entire project can be completed by the end of 2020.

L'École Polytechnique de Montréal (ÉPM) exploite un réacteur SLOWPOKE-2 en vertu d'un permis émis en 2016 par la Commission canadienne de sûreté nucléaire (CCSN) pour une durée de sept ans. Cette installation est située sur le campus de l'Université de Montréal à Montréal, Québec. Le réacteur, qui est en exploitation depuis 1976, est utilisé pour la recherche, l'enseignement et l'analyse neutronique. Le cœur directeur est composé d'uranium faiblement enrichi.

L'École Polytechnique exploite aussi un assemblage sous-critique situé dans une salle adjacente au réacteur SLOWPOKE-2. Cet assemblage est composé de tiges d'uranium naturel et de sources de neutron qui sont insérées manuellement dans un ensemble de blocs de graphite. Cette installation est utilisée pour fins d'enseignement et de recherche.

L'installation sous-critique faisait l'objet d'un permis distinct. Cependant, le permis a été consolidé avec celui du réacteur SLOWPOKE-2, ceci dans le but d'améliorer l'efficacité du processus de conformité réglementaire. La demande a été approuvée par la

Commission le 30 juin 2016 et le permis a été émis, regroupant ainsi l'installation SLOWPOKE-2 et l'assemblage sous-critique sous un même permis. L'assemblage sous-critique n'est que rarement utilisé, sa dernière exploitation remontant à 2012.

I will now discuss the regulatory performance of the research reactor facilities with regard to the 14 safety and control areas and other areas of public interest.

The CNSC assesses how licensees meet regulatory requirements in 14 safety control areas. This SCA framework is described in Appendix A of the CMD, and the rating methodology is described in Appendix B as well as in the annex of this presentation.

This table provides the performance ratings for the five research reactors for all SCAs during calendar years 2016 and 2017. The ratings are all satisfactory, with the exception of security, which was assessed as fully satisfactory at the McMaster Nuclear Reactor.

McMaster University maintains a high standard of security that goes beyond the requirements for a research reactor operating on low enriched uranium.

Events with potential radiological, environmental or any safety and security implications are

carefully monitored at all nuclear facilities in Canada. Events can indicate potential weaknesses in licensees' programs and, therefore, it is important that these events be analyzed for root causes so that appropriate corrective actions can be implemented.

There were no events reported at any of the SLOWPOKE facilities during 2016 and 2017. There were no abnormal radiation exposures or releases to the environment, and the reactors operated within their operating limits and conditions for which they are licensed.

McMaster University reported two events for this period.

In July 2016, there was a fire at a McMaster University service building in the vicinity of the reactor building. The reactor was not affected by the fire.

The reactor was shut down as a precautionary measure and restarted the following week. Although there was no impact on MNR, the event was reported to the CNSC for its regulatory and public interest.

The second event took place in July 2017 when MNR was started up with the Fission Products Monitor, FPM, offline for approximately 10 minutes. There were no consequences associated with this event.

The role of the FPM is to detect any fission products in the cooling water, which would indicate a fuel defect, and the FMP would automatically shut down the reactor. It is one of the reactor safety systems.

Starting up the reactor with the FPM offline was a contravention of the MNR operating limits and conditions, which state that the FPM must be available and functional when MNR is operating and, therefore, the event was reportable under MNR's licence.

A root cause analysis was performed which identified contributing factors with the use of checklists, communications, training and assignment of responsibilities. Corrective actions were implemented which included revision to checklists, verification steps, revision to staff training and assignment of responsibilities.

In an inspection conducted in November 2017, CNSC staff verified that McMaster University had implemented these corrective actions satisfactorily.

CNSC staff prepare 10-year baseline inspection plans as well as facility-specific verification plans using a risk-informed approach. The risk-informed approach is described in CNSC's document, "Policy on the Use of a Risk-Informed Approach for Regulatory Oversight of Nuclear Activities and Facilities".

This takes into consideration the overall risk of the facility, the operational performance and the compliance history of the licensee as well as any changes in the regulatory framework.

CNSC staff conduct several other regulatory activities on a day-to-day basis, including reviews of annual reports and process documents, discussions around licensing matters, and periodic meetings.

This table provides an overview of CNSC's compliance and licensing efforts for the research reactors, including the number of inspections in 2016 and 2017. These efforts in terms of person-days can vary from year to year depending on a number of factors, including specific projects undertaken by the licensees, licensee performance, safety significant events and changes in the regulatory framework.

CNSC staff increased its licensing efforts for the University of Alberta in 2017 because of the licence amendment and decommissioning activities.

SRC and RMCC received fewer compliance and licensing efforts in 2017 due to consistent performance, a stable licensing basis and efficiencies gained by combining inspections.

I will now discuss radiation protection at

the research reactors.

Different aspects are assessed when CNSC staff verify compliance of each licensee's radiation protection programs in accordance with the SCA framework. These aspects are application of the as low as reasonably achieve, or ALARA, principle, worker dose control, radiation protection program performance, radiological hazard control, estimated dose to the public.

All the research reactor facilities were rated satisfactory for their radiation protection programs in 2016 and 2017.

An important aspect of the radiation protection program is the worker dose control. This table shows the dose statistics for workers at the research reactors. The highest, average and maximum doses recorded in 2016 and 2017 are shown for each facility.

Some facilities do not need to designate their workers as nuclear energy workers, or NEWs, given the very low exposure rates that are encountered in these facilities. This is the case for ÉPM and SRC. RMCC has a combination of NEWs and non-NEWs. In either of the cases, the doses were well below the regulatory dose limit of 1 millisievert for non-NEWs and 50 millisieverts for NEWs.

McMaster Nuclear Reactor workers conduct a broad range of activities and radiological work, including

isotope production, fuel handling, neutron radiography, and maintenance. However, the average and the maximum effective dose to workers over the past five years demonstrate that they remain consistently well below the regulatory dose limit of 50 millisieverts per year and below the average effective dose limit of 100 millisieverts over five years.

MNR workers perform a broad range of radiological work, including Iodine-125 production, and therefore extremity exposure is carefully monitored. This figure shows the average and maximum equivalent extremity doses at MNR from 2013 to 2017. The doses were well below the regulatory limit of 500 millisieverts per year.

This graph shows the five-year trend for the average effective dose and maximum effective dose to workers at SLOWPOKE reactors. For each year, the highest number was plotted for any of the four SLOWPOKE reactors. These doses have shown to be consistently well below the annual regulatory dose limit of 50 millisieverts as well as below the average dose limit of 100 millisieverts over five years.

I will now discuss the environmental protection SCA, comprising two specific areas, which are effluent and emissions control and assessment and monitoring.

The SLOWPOKE-2 facilities release small amounts of radioactive noble gases, mainly Xenon-133 and Xenon-135, resulting from the weekly purges of reactor head space, and Argon-41, due to irradiation activities. The releases take place through filters and a dedicated facility stack after sampling and analysis of the head space cover gas. Once released to the stack, these quantities are below the threshold of detection.

MNR's environmental monitoring program includes three monitoring stations located around the facility. Samples are collected weekly. MNR also monitors the exhaust ventilation before the air is released outside.

There are no radioactive liquid releases at any of the research reactors.

All the research reactor facilities were rated as satisfactory for the environmental protection SCA.

MNR's effluent and emission monitoring program consists of monitoring exhaust ventilation for Iodine-125 and Argon-41, which are the only nuclear substances released to the environment in any measurable quantities. Argon-41 is produced mostly by the irradiation of air present in the sample irradiation system, where samples are moved in and out of the neutron flux of the core by pneumatic action.

Derived release limits, or DRLs, are

established based on the regulatory public dose limit of 1 millisievert per year. McMaster also maintains action levels corresponding to a little more than one percent of the DRL. Exceedance of an action level triggers a notification to the CNSC and an investigation which may result in corrective actions to avoid recurrence.

There are no exceedances of any environmental action level or regulatory limit at MNR in 2016 or 2017 or over the past five years.

This graph shows the five-year trend for Iodine-125 releases at MNR. Derived release limits are also established based on a dose of 1 millisievert as well as action levels. Releases have been consistently below 0.01 percent of the DRL.

The conventional health and safety SCA covers the implementation of a program to manage workplace safety hazards and to protect personnel and equipment. CNSC staff's assessment of this program comprises the following specific areas: performance, practices, and awareness.

A key performance indicator for the conventional health and safety SCA is the number of lost time injuries per year. There were no lost time injuries at any of the small nuclear reactor research reactor facilities in 2016 and 2017.

CNSC staff determined that the research reactor facilities implement conventional health and safety programs satisfactorily and that their programs are effective in protecting the health and safety of persons working in these facilities.

I will now provide an update on other matters of regulatory interest pertaining to the research reactors. These topics include public information and disclosure, financial guarantees, and regulatory developments over the review period.

The research reactor licensees are required to implement public information and disclosure programs as per RD GD 99.3 Public Information and Disclosure, which has now been superseded by REGDOC-3.2.1 of the same title. These programs are supported by disclosure protocols, which outline the type of information to be shared with the public such as incidents, major changes in operations, periodic environmental performance reports, and information of public interest.

The research reactor licensees actively provided information on the operations of their facilities on their websites and some also undertook activities such as open houses, outreach events, facilities tours, and community events.

CNSC staff concluded that public

information and disclosure programs were being implemented satisfactorily at all research reactor facilities.

The *Nuclear Safety and Control Act* requires licensees to provide a guarantee that sufficient financial resources are available to fund decommissioning activities, which include dismantling, decontamination, and closure of the facility, any post-decommissioning monitoring or institutional control measures that may be required, subsequent long-term management or disposal of all wastes including used fuel.

The research reactors and the Class IB accelerators do not have a pre-determined design life. The CNSC requires licensees to maintain preliminary decommissioning plans with cost estimates and revise these every five years. CNSC staff review these plans against regulatory requirements and ensure that the cost estimates are credible. These cost estimates form the basis of the financial guarantee which assures sufficient funding is available at any time during the lifetime of the facility. This means that if the facility were to decommission today, the funds would be available. Financial guarantees are presented to the Commission for acceptance and maintained as part of a licence condition for each research reactor licensee.

This table lists the five research reactor

facilities along with the current value of their respective Nuclear Reactor Restricted Reserve fund, or NRRR, which constitutes part or all of their financial guarantee. Licensees may contribute annual payments to the NRRR until the financial guarantee is funded to the full value of the decommissioning cost, and they may include other financial instruments as part of their financial guarantee agreement, such as a letter of credit.

University of Alberta's financial guarantee is not listed, given that they have already completed the decommissioning.

The cost of decommissioning of RMCC is assured through a formal written commitment from National Defence.

The financial guarantee for École Polytechnique is currently undergoing review and revision.

The *Nuclear Safety and Control Act* requires licensees to provide a guarantee that sufficient financial resources are available to fund decommissioning activities.

--- Off record discussion / Discussion officieuse

The CNSC continues to modernize the regulatory framework with a series of regulatory documents or REGDOCs. This table lists the REGDOCs that were produced since 2016 and that apply to the research

reactors. The *Licence Condition Handbooks* for each licensee are updated periodically to reflect these REGDOCs.

When a new REGDOC is published, the licensees are requested to provide implementation plans, if the requirements of the REGDOCs are not already satisfied by the licensee's current programs. It should be noted that the regulations must be met at all times.

This table lists the updates to the industry standards that apply to the research reactors. These standards also become part of the *Licence Condition Handbooks* once these are updated. CNSC staff verify that the licensees' programs continue to meet these standards as part of compliance verification activities.

This brings me to the conclusion for part 1 of the presentation.

During 2016-2017, CNSC staff continue to provide regulatory oversight of the research reactor facilities in Canada through inspections, review of licensee documents, and an effective implementation of CNSC's regulatory framework.

There are no radiological dose limit exceedances to the public or the workers; environmental releases did not exceed limits; and there are no lost time injuries. All research reactor facilities met all regulatory requirements in the 14 SCAs in 2016 and 2017.

Based on this assessment, CNSC staff conclude that research reactor licensees have made adequate provisions for the protection of the environment and the health and safety of persons, and that there are no adverse effects on the environment as a result of the operation of the research reactors.

I will now pass the presentation to Mr. Mark Broeders, who will cover part 2 on Class IB accelerators.

MR. BROEDERS: Thank you, Dr. Ducros.

President Velshi, Members of the Commission, my name is Mark Broeders, and I am the director of Accelerators and Class II Facilities Division, responsible for regulatory oversight of the Class IB accelerators.

I will be presenting the next part of this presentation on the performance of the Class IB particle accelerator facilities.

The Class IB accelerator facilities are presented with research reactors because they pose similar risk, have a low environmental footprint, and they maintain similar compliance programs.

Currently, there are two Class IB particle accelerator facilities in Canada. These are TRIUMF and Canadian Light Source, located in Vancouver and Saskatoon

respectively.

TRIUMF Accelerators Incorporated is located on the University of British Columbia campus in Vancouver and was commissioned in 1974. I would like to correct a typo on the slide. It incorrectly states 1959 as the commissioning date. It should read 1974. I apologize for that.

TRIUMF is Canada's national laboratory for nuclear and particle physics research and related sciences. TRIUMF operates one 520-megaelectronvolt cyclotron accelerator facility, four smaller cyclotron facilities, and three linear accelerator facilities under an operating licence issued by the Commission in 2012 for a 10-year period.

TRIUMF is also a major producer of radioisotopes used for medical diagnostic procedures. It is owned and operated as a joint venture by a consortium of 18 Canadian universities. There are approximately 560 persons working at TRIUMF.

Canadian Light Source Incorporated operates a synchrotron facility on the University of Saskatchewan campus in Saskatoon under a licence issued by the Commission in 2012, also for a 10-year period. The facility consists of three major accelerator systems, a 300 MeV linear accelerator, a booster ring that accelerates

electrons up to 2.9 gigaelectron volts, and a storage ring that keeps electrons circulating at this energy for several hours.

The facility has been in operation since 2005, and it produces synchrotron radiation that is used as a light source for experiments in diverse scientific fields of biology, materials research, atomic and molecular science, earth sciences, pharmaceuticals, biomedical research, and electronics.

I will now discuss the performance of the Class IB accelerators in regard to the 14 safety and control areas and other areas of public interest, focusing here again on the three SCAs of radiation protection, environmental protection, and conventional health and safety.

The performance ratings for each of the 14 safety and control areas were determined by CNSC staff based on the results and observations from inspections and desktop reviews. The CNSC evaluates how well licensees meet regulatory requirements and CNSC expectations for the performance of programs in the 14 SCAs.

This table provides the performance ratings for the Class IB accelerators during the 2016-2017 period. For this period, all individual SCAs were either satisfactory or fully satisfactory for the Class IB

particle accelerator facilities, with the exception of the management system SCA at CLSI and waste management at TRIUMF, which were both rated below expectations.

In 2016, following an inspection focused on management systems in which CLSI received a below expectation rating, CLSI initiated a review of programs to meet N286-12 standard and continued with the implementation of the changes in 2017. The management system SCA was rated as satisfactory in 2017 as a result of this work.

The rating for waste management SCA at TRIUMF was downgraded to below expectations following an inspection in 2016, which found deficiencies related to inventory and labelling of radioactive waste as well as the absence of secondary containment of some hazardous waste. CNSC staff performed a follow-up inspection in October 2017 to verify TRIUMF's corrective actions. Staff are satisfied with the corrective actions and brought back the rating to satisfactory.

In 2016, CNSC staff also conducted an inspection focused on radiation protection SCA and found minor deficiencies which brought down the rating from fully satisfactory to satisfactory.

Overall, these ratings indicate adequate management of safety and control measures at both facilities.

There were two events reported by TRIUMF for the reporting period. On June 10, 2017, the 350 microamp current licence limit for irradiating cadmium targets was exceeded for the TR30-2 isotope production cyclotron when it was run at 375 microamps for a period of about one half hour. There were no consequences as a result of this event; however, it was a contravention to TRIUMF's licence operating limits for this type of target.

A second event occurred on August 25th and September 1, 2017, when there were two unintentional releases of Carbon-11 from the Life Sciences Radiochemistry Annex, both in the range of 35 to 40 gigabecquerels. Both releases amounted to 0.1 percent of the full site releases for the year, and in a worst case would contribute to 0.3 micro sieverts to an individual of the most highly exposed group.

CNSC staff verified that corrective actions developed to prevent recurrence of both events have been implemented.

CLSI reported two events in 2016 and one event in 2017.

On July 14, 2016, a threat was made by an anonymous caller identifying himself as a member of ISIS. Police and CLSI staff responded, secured and searched the building. The incident was ultimately determined to be a

hoax.

On October 12, 2016, CLSI discovered that an electrical disconnect switch was not locked in the "off" position prior to working on a 600-volt power supply. Upon discovery, the area was promptly secured and the Lockout Tagout corrected. CLSI conducted an investigation which resulted in several recommendations to reduce the risk of recurrence. CNSC staff followed up with an inspection in January 2017. The response and implementation of recommendations by CLSI was subsequently considered acceptable.

There were no safety consequences as a result of these incidents.

On February 24, 2017, CLSI reported a wiring error in the Linac Access Control Interlock System, or ACIS system, discovered during annual validation and verification testing. Subsequent to the discovery of the error, CLSI performed a design review for the ACIS system, corrected all discovered errors, and repeated the validation and verification testing. There was no impact on safety due to the design redundancy in the ACIS system. CNSC staff verified the corrective action to correct recurrence had been implemented.

The Class IB accelerators are overall low-risk facilities with a primary hazard associated with

Class IB facilities being prompt radiation, that is, radiation produced coincident with the beam status. When the power is turned off, the most significant risk is eliminated. The environmental releases are very small. In the case of CSLI, there are no releases.

While all SCAs are assessed over the duration of the licence, the regulatory compliance efforts typically focus on radiation protection, environmental protection, and conventional health and safety.

The CNSC continuously monitors these facilities to provide assurance to Canadians of the continuing compliance and safety performance. This table presents the licensing and compliance effort from CNSC staff for Class IB particle accelerator facilities in 2016 and 2017. CNSC staff spent a total of 39 person days on licensing activities related to Class IB accelerators. A total of 450 person days were dedicated to compliance activities which included inspections of the facilities, licence activities and processes as well as desktop reviews of licensee reports. CNSC staff performed a total of eight compliance inspections at the Class IB particle accelerator facilities in 2016 and 2017. All the findings resulting from these inspections were provided to the licensee in detailed inspection reports. Staff conducted consistent and risk-informed regulatory oversight at the Class IB

accelerator facilities.

The radiation protection SCA covers the implementation of a radiation protection program in accordance with the radiation protection regulations. The program must ensure that contamination levels and radiation doses received by individuals are monitored, controlled, and maintained ALARA.

During 2016-17 period, CNSC staff determined that all Class IB accelerator facilities implemented effective measures to keep radiation exposures and doses to persons ALARA. This has consistently resulted in doses to persons being well below CNSC regulatory dose limits. The ratings for the radiation protection SCA for all Class IB accelerator facilities were satisfactory or better and remain unchanged from the previous five years.

The graph on this slide shows the average and maximum effective radiation doses to nuclear energy workers from 2013 through 2017 for TRIUMF. The red line represents the regulatory annual effective dose limit of 50 millisieverts for a nuclear energy worker. As shown, the average and maximum dose received by a nuclear energy worker at TRIUMF were continuously well below the regulatory limit.

Effective doses were monitored for non-nuclear energy workers. The maximum dose to non-NEWs

in 2016-17 was 0.15 millisieverts. There was no occurrence of action level exceedance at TRIUMF.

These data demonstrate the doses to workers at TRIUMF are safe and that TRIUMF's radiation protection program is effective.

The graph on this slide shows the average and maximum effective radiation doses to nuclear energy workers from 2013 to 2017 for CLSI. The red line represents the regulatory annual effective dose limit of 50 mSv for a nuclear energy worker. As shown, the average annual maximum dose received by a worker at CLSI were continuously well below the regulatory limit.

The maximum effective dose received by a nuclear energy worker in 2016-17 was 0.12 mSv. Effective doses were monitored for non-NEWs. The maximum dose to a non-NEW in 2016-'17 was 0.11 mSv. There was no action level exceedances at CLSI.

Again, this data demonstrates that doses to workers at CLSI are safe and CLSI's radiation protection program is effective.

This table shows the maximum effective doses to a member of the public. The main component for the variation of these values is the 520 MeV Cyclotron annual delivered beam charge. During the last five years the public dose to a member of the public was well below

the CNSC regulatory dose limit for a member of the public of 1 mSv a year.

There are no airborne or liquid effluent releases of radioactive material or hazardous substances from CLSI. And CLSI monitors environmental radiation levels outside of the main building which are found to be at ambient background radiation levels. Therefore, the estimated dose to the public is at natural radiation background levels.

CNSC staff conclude that the Class IB accelerator facilities effectively implement and maintain their RP programs to ensure the health and safety of persons present in their facilities.

The environmental protection SCA covers programs that identify, control and monitor all releases of radioactive and hazardous substances and the effects on the environment from facilities, or as a result of licensed activities.

Licensees are required to develop and implement policies, programs and procedures to comply with applicable federal and provincial regulatory requirements to control the release of nuclear and hazardous materials into the environment. Licensees are also expected to have suitably trained and qualified staff to effectively develop, implement and maintain their environmental

protection programs.

The rating for the environmental protection SCA was satisfactory for TRIUMF and fully satisfactory for CLSI. This is unchanged from the previous five years.

For 2016-17 CNSC staff continued to rate the environmental protection SCA at TRIUMF as satisfactory. CNSC staff performed an environmental protection inspection at TRIUMF in 2017 and confirmed that TRIUMF has an effective environmental protection program. TRIUMF monitors airborne radiological releases of beta plus emitters, Argon-41, noble gases and volatile and particulate emissions from the TRIUMF facility.

In 2017 TRIUMF submitted an updated DRL document, derived release limit document, for their airborne and liquid releases which was reviewed and approved by CNSC staff.

This graph shows a trend in airborne releases expressed in percentage of the DRL which is associated with the 1 mSv regulatory annual dose limit to a member of the public.

In 2016 the total releases of airborne effluents represented a combined total of 1.04 per cent of the DRL. The action levels are set at 5 per cent of the DRL and none were exceeded at any time over the review

period.

The annual airborne emissions remain well below the DRLs for the TRIUMF facility. The results demonstrate that the air emissions are being controlled effectively at this facility.

TRIUMF has no liquid releases to surface waters. There are approved radiological liquid effluent releases to the sanitary sewers which are monitored through various holding tanks and sumps from the facility. Liquid effluent releases for the recent five-year period are provided in the slide. One hundred percent of the derived release limit equals a 1 mSv annual dose limit to a member of the public. The data for 2017 are reported as the new revised DRL limits to align with CSA N-288.1-14.

The results demonstrate that the liquid effluent releases are being controlled effectively at the TRIUMF facility and no action levels were exceeded at any time during the review period.

CLSI does not release radiological contaminants to the environment. CLSI operates an accelerator that does not produce any emissions. An inspection was performed in July, 2017 and confirmed the fact that there are, in fact, no releases to the environment. As such, there are no data to present in this section for CLSI.

The Class IB accelerator facilities implemented their environmental programs satisfactorily and their programs are effective in protecting the health and safety of persons working in their facilities.

Licensees are required to report unsafe occurrences to the CNSC as directed by section 29 of the *General Nuclear Safety and Control Regulations*. These reports include serious illness or injury incurred or possibly incurred as a result of licence activity. No unsafe occurrences were reported by any of the Class IB accelerator facilities between 2016 and 2017.

The ratings for the conventional health and safety SCA were satisfactory for all Class IB accelerator facilities. Following the inspection in July, 2017, the rating for CLSI increased from satisfactory to fully satisfactory.

The table on this slide summarizes the number of reportable lost-time injuries reported by Class IB accelerator facilities during the 2016-17 period. An LTI is an injury or illness resulting in lost days beyond the date of injury as a direct result of an occupational injury or illness incident. There were four lost-time injuries reported in 2017: three at TRIUMF and one at CLSI. The lost-time injuries have remained low in 2016-17.

CNSC staff are satisfied that both Class

IB accelerator facilities continue to protect the health and safety of workers and the environment.

I'll now provide an update on other matters that are of regulatory interest pertaining to the Class IB accelerator facilities. These topics include public information disclosure, financial guarantees and regulatory developments over the review period.

Class IB facilities are required to provide open and transparent information to the public in accordance with REGDOC-3.2.1 Public Information and Disclosure. The Class IB accelerator facilities actively provided information on the operations of their accelerators and their programs were effective at communicating information about the health, safety and security of persons and the environment. They have engaged with stakeholders and the community through lectures, outreach events, facility tours, community events and social media.

Class IB accelerator facilities have successfully implemented public information and disclosure programs.

Class IB accelerator facilities -- licensees, rather, are required to develop preliminary decommissioning plans, including a financial guarantee to ensure sufficient financial resources are available to fund

decommissioning activities.

The table on this slide lists the Class IB accelerator facilities along with the current value of their respective financial guarantees. Licensees contribute to the full value of their decommissioning costs through letter of credit as financial instruments for their financial guarantee.

The table on this slide updates the Commission on the status of implementation by the Class IB accelerator facilities of regulatory documents published from 2016 through 2018. CNSC staff verified the implementation as part of their ongoing compliance verification activities.

This table lists the updates to the industry standards that were made in 2016-17 which apply to these facilities. CNSC staff continue to verify the implementation of the most recent updates through the periodic compliance verification activities.

This brings me to the conclusion of the regulatory performance of the Class IB accelerator facilities. All Class IB accelerator facilities were rated satisfactory or fully satisfactory for all 14 SCAs in 2017. There were no radiological dose limit exceedances to the public or to workers. While most SCAs were rated satisfactory or above, in 2016 the risk management system

SCA at CLSI and the risk management SCA at TRIUMF were rated below expectations. Both licensees have implemented, or are in the process of implementing corrective actions approved by CNSC staff.

During 2016-17 the CNSC staff continued to provide regulatory oversight of the Class IB accelerator facilities in Canada through inspections, review of licensee documents and an effective implementation of CNSC's regulatory framework.

CNSC staff conclude that the Class IB accelerator licensees continue to operate these facilities while protecting the health and safety of the public and the workers, the environment and security and in compliance with Canada's international obligations on the peaceful use of nuclear energy.

I'll now pass the presentation to Ms Haidy Tadros to speak to the overall conclusions on research reactors and Class IB accelerators.

MS TADROS: Thank you. For the record, this is Haidy Tadros.

Performance of research reactors and Class IB accelerators was rated satisfactory to fully satisfactory in all 14 SCAs in 2017.

CNSC staff spent a total of 961 person-days on regulatory compliance activities including

17 inspections for the research reactors and Class IB accelerators combined.

Through these compliance verification activities CNSC staff have found:

That the radiation protection programs at these facilities were adequate in controlling radiation exposures and keeping doses as low as reasonably achievable;

That there were no radiological dose limits that were exceeded for the public or the workers;

That the environmental protection programs were effective;

That radiological releases to the environment were kept at a small fraction of the regulatory limits; and

That conventional health and safety programs at all facilities continue to protect workers.

As outlined in the previous slide, CNSC staff continue to provide regulatory compliance oversight to all licensed facilities to ensure that the facilities continue to make adequate provision to protect the health, safety and security of workers, Canadians and the environment.

CNSC staff will also continue to ensure Canada's international obligations on the peaceful use of

nuclear energy are implemented and adhered to.

This concludes the presentation on the Regulatory Oversight Report for the research reactors and Class IB accelerators for 2016-'17.

We would like to note though in annex of this presentation we have provided several slides summarizing the rating methodology used in this ROR with some examples to demonstrate the implementation of the methodology. CNSC staff can speak to these if needed, and are also available to answer any questions the Commission may have.

Thank you.

THE PRESIDENT: Thank you. I'd now like to ask each of the licensees whether they would like to make a statement or wait for questions from the Commission Members.

So, following the order of presentation, let's start with Mr. Heysel and Mr. Zic from McMaster University. Do you wish to make any comments?

MR. HEYSEL: Chris Heysel, for the record. McMaster University has nothing to add at this point in time.

THE PRESIDENT: Thank you. From the Royal Military College of Canada, Dr. Samuleev and Dr. Lewis, any comments at this time?

DR. LEWIS: For the record, Dr. Lewis. We're just waiting for Treasury Board approval to go ahead with our refuelling. This is going to be scheduled either for November, or if we can't make the schedule, it will be in May most likely, 2019.

THE PRESIDENT: Thank you.

From the University of Alberta, Dr. Duke, do you wish to provide any comments?

DR. DUKE: No, we're fine. Thank you.

THE PRESIDENT: From Saskatchewan Research Council, Mr. Chorney?

MR. CHORNEY: No, SRC has no comments at this time.

LA PRÉSIDENTE : Pour l'École Polytechnique de Montréal, Monsieur Marleau et Dr. Chilian, avez-vous des commentaires avant la période de questions?

L'École Polytechnique de Montréal?

I guess we've lost them.

For TRIUMF, Dr. Bagger, do you wish to make any comments?

DR. BAGGER: Yes, please.

THE PRESIDENT: Go ahead.

DR. BAGGER: Thank you. So, for the record, President Velshi, Commissioners, I'm Jonathan Bagger, I am the Director of TRIUMF and I'm joined here by

Dr. Anne Trudel, our Chief Safety Officer, and we are prepared to answer questions during the question period.

I'd just like to start by saying a few words though of introduction, in particular, to reassure you and the Commissioners that safety is indeed our highest priority here at TRIUMF and it permeates everything we do, that means both safety of our workers and safety of the surrounding community.

I'd like to highlight three areas in which we've been improving our safety performance over the last two years; first, by tapping into industry best practices and external resources. We believe that, of course, it's important to keep ourselves in line with best practices outside of TRIUMF. So, we have hired external contractors with expertise in industrial safety to launch a 5S Program to work on cleaning and clarifying our site, both to make it safer and to make our work more efficient.

And also, we've worked to revamp our management inspections with a focus on visual indicators so that workers can see quickly whether they're complying with safety requirements.

We've hired an external contractor with quality control expertise to assist with our efforts in revising our procedures and, in general, in improving our document management so people can quickly find the

resources they need to do their job safely and effectively.

We have hired an external consultant who's carrying out a safety culture assessment which is following the CNSC and IAEA regulatory guidance.

And fourthly, we've expanded our board of management, the sub-committee that overlooks safety and security with three external people, two from Canada and one from the United States, subject matter experts in safety to make sure that we have an external point of view represented in our governance.

We're also looking outwards to the community to learn. We hosted the International Technical Safety Forum here a year ago which brought together specialists from 14 similar laboratories across nine countries to share lessons learned and best practices.

We have participated in the Standard Committee, the CSA Standard Committee for Class IB facilities, in particular, in developing N-288 and N-286.

And finally, we participated in the U.S. Department of Energy Accelerator Safety monthly teleconference calls so that we benefit from the lessons learned across their extensive complex of similar sized laboratories.

During the past two years here at TRIUMF we've devoted a significant amount of effort to aligning

our environmental protection program with the CSA standard and, as you heard, revising our derived release limits, both during our environmental monitoring for airborne effluents and putting in place an environmental risk assessment.

We're making continued improvements to our management systems to align with N-286, so when that requirement comes down we will be fully in compliance.

And we are, of course, continuing our extensive outreach activities with the surrounding community and, in particular, updating our public information program to align it with the CNSC REGDOCS.

And so, thank you very much for the opportunity to speak with you today and, again, we look forward to answering questions when the time comes.

Thank you.

THE PRESIDENT: Thank you. Thank you for sharing that.

From Canadian Light Source, Dr. Cutler, do you wish to provide a statement?

DR. CUTLER: We have no statement at this time, but happy to answer any questions.

THE PRESIDENT: Thank you. Then we'll turn the floor over to the Commission Members for their questions.

So, let's start with Dr. Lacroix.

MEMBER LACROIX: Thank you, President Velshi.

I have a burning question here. The SLOWPOKE at the University of Alberta ceased operation in 2017 and the SLOWPOKE at SRC will also cease operation in the next months, if it's not already done.

So, there must be good reason for ceasing operation. Are these related to cost, the obsolescence of the technology, strategy plans or lack of interest?

So, I would like to hear from first Alberta and then Saskatchewan.

Thank you.

DR. DUKE: This is John Duke, the University of Alberta.

There are a number of factors that went into the decision for the University of Alberta to decommission its SLOWPOKE. One of the major ones was the requirement to return our HEU fuel to the United States of America. Their program to repatriate HEU fuel had at that time a deadline of May, 2019, after which there would have been an issue of how to dispose of this fuel given that Canada does not have an HEU depository for (off mic)

Secondly, the building in which the SLOWPOKE was housed is being totally redeveloped. In

response for its usage, the use of nuclear activation analysis is still in demand. I continue to get emails asking for service both on-campus and off-campus, but the decision, as I say, had to be made given these other factors, most importantly the disposal of the HEU fuel.

MEMBER LACROIX: And Saskatchewan? Saskatchewan, are you there?

MR. CHORNEY: Sorry about that.

Yeah, Dave Chorney, for the record.

The SRC's reasons for decommissioning are largely the same as the University of Alberta's. The main driving factor behind it was the deadline for repatriating the HEU to the United States.

And the other reason is that the SLOWPOKE was housed in the same building as the entire SRC Environmental Analytical Labs and the Environmental Labs moved to a new facility in April of this year, leaving only the SLOWPOKE in the old building. The uncertainty of the future of that building was also a significant factor in decommissioning now and taking SRC's presence completely out of that facility.

MEMBER LACROIX: Thank you, gentlemen.

THE PRESIDENT: Ms Penney?

MEMBER PENNEY: A question for CLSI. So, I'm looking at the actual submission which is probably not

helpful to you, but it's about an October 12th, 2016 event, lock-out/tag-out event and conventional health and safety would say that's a high potential event because there could have been severe consequences.

The description in the document that I'm looking at, which is CMD 18-M32, says that the worker had properly completed the lock-out/tag-out process, but then it wasn't locked in the off position, so it couldn't have been correct.

So, my question for CLSI is, you know, have I read that wrong? And then the follow-up question would be for staff in terms of, are you satisfied with the follow-up to this high potential lock-out/tag-out event?

So, CLSI?

MR. STREET: Yes. Darin Street, Radiation Protection and Control Lead at Canadian Light Source.

The event as described is how I understand it, as it was written. I'm not privy to the investigation that was -- the detailed investigation that was done on it.

What we have done for mitigations we feel has been sufficient. We've rewritten our lock-out and tag-out procedure. We've also provided updated and upgraded training on the subject matter which included a -- not only a PowerPoint and exam, but also a practical portion of it where the worker demonstrates their knowledge

by actually physically doing the work and they're evaluated on that.

We're also continuing our process of hazard assessment and identification training which should be getting underway in the next month here and eventually rolled out to the entire facility.

MEMBER PENNEY: Staff?

MR. BROEDERS: Mark Broeders, for the record.

So, indeed, CLSI did submit a fairly detailed root cause analysis of the event and corrective action, part of which involved, of course, training, as already mentioned, but also reviewing the role of the supervisor, that's an important role in this kind of exercise.

We were satisfied with the response that they provided.

I'll ask Dr. Plante to provide some additional details as to the detail of the corrective action plan.

DR. PLANTE: Jacinthe Plante, for the record. Je suis agente de projet principale pour la Division des accélérateurs et des installations de catégorie II. I am also in charge for Canadian Light Source, I'm the Project Officer for Canadian Light Source.

So Canadian Light Source had a near-miss incident and it's in fact a very important incident. They revised the lockout tagout procedures. In addition, they added a new verification step that was an independent verification step. So we were pleased and accepted their review and their response.

THE PRESIDENT: Mr. Berube.

MEMBER BERUBE: I have a number of questions, and all of them for CNSC staff.

First of all, looking at the research reactors, the SLOWPOKES in general. You commented that there's no predetermined lifespan for the SLOWPOKE reactors at this time. However, what is a practical design limit on this in terms of what can we get out of them?

DR. LEWIS: This is Dr. Lewis, for the record. Roughly, they're for about 30 years, we've had about 32 years, depending on usage of the reactor.

MEMBER BERUBE: So do you concur with that? We're talking about three decades to decommissioning, is that a realistic target that we're looking at?

MR. TANGUAY: Pierre Tanguay, for the record. I'm the Project Officer assigned to the research reactor facilities in Canada.

From our perspective, yes, these design

estimates are described in the preliminary decommissioning plans. So there are several assumptions that are made when these PDPs are devised.

So 32 years seems a reasonable estimate. But we're finding out as our experience develops, especially with the decommissioning of U of A and Dalhousie in the past that, yeah, really we can't really establish a specific design life.

MEMBER BERUBE: Given the fact that we're shutting down at least two of the research reactors at this point, are there any new applications in process for new research reactors in Canada?

MR. TANGUAY: Pierre Tanguay, for the record. That would be really for the licensees to determine.

MS TADROS: Haidy Tadros, for the record. We have not received any applications requesting new research reactors be put in Canada at this time.

MEMBER BERUBE: Another question pertaining to the Montreal-based SLOWPOKE. A couple of things that I'm concerned about here is 2016 there were no inspections on this site. What's the reason for that?

MS TADROS: Haidy Tadros, for the record. So I'll start and perhaps I'll ask Mr. Pierre Tanguay to provide the details.

So École Polytechnique de Montréal basically what we look at, and as outlined in CNSC staff's presentation, is using a risk-informed approach for establishing a baseline compliance activities across all like facilities.

On top of that, we put specific plans that are focused on the facility, and those specific plans will look at either events or any projects or activities that might be going on at a particular year that we would want to increase our regulatory oversight on.

So for the period that you've highlighted, typically a baseline for these research reactors is anywhere between one inspection over a period of five years. That was past practice.

What we've done in the Directorate of Nuclear Cycle and Facilities Regulation is, going forward, to ensure that we are looking across the whole fuel cycle and not just at a very specific facility type, is we have developed a 10-year outlook based on the risk of all nuclear cycling facilities in the fuel cycle program.

So, going forward, the numbers have been adjusted based on the risk that these facilities are attributed. For research reactors, the numbers that we currently have from a baseline perspective for, again, low-risk facilities is one every three years as opposed to

the one every five years that was currently practiced. This, again, is a baseline inspection plan that has been documented based on risk across the whole fuel cycle.

On top of that, as mentioned, we will put facility-specific requirements and plans in place for compliance oversight. So that would all depend on what is going on at the facility at the time. That could increase whether it be inspections or desktop reviews that are used as well as compliance verification activities.

MEMBER BERUBE: On the same reactor facility I'm looking at the financial guarantee on that particular --

THE PRESIDENT: Can you wait for the next round?

MEMBER BERUBE: Sorry, okay.

THE PRESIDENT: I just want to give the other Members a chance to get their questions in. Dr. Demeter.

MEMBER DEMETER: Thank you. Given that we've spent a lot of time on legacy waste issues in the last couple days, I'm quite interested in waste issues with these.

So for the non-HEU reactors, which I believe is McMaster, Royal Military College, and École Polytechnique, and for the accelerators, what are the

long-term waste management strategies for the cores of the reactors, the non-HEU cores, and for accelerated products from the accelerators?

So maybe the sites can give me a sense of what you're going to do with your non-HEU reactor radioactive waste and what the two accelerators are going to -- how they manage their activated material waste now and in the future.

We'll start maybe with McMaster.

MR. HEYSEL: Chris Heysel, McMaster University. We currently dispose of our LEU fuel with -- at the U.S., and we have a shipment planned within the next year.

Going forward, we are working with other waste facilities in Canada and abroad to address our fuel waste.

Our active waste is currently disposed of at Chalk River facilities as well as in the States, depending on the characterization of the waste.

MEMBER DEMETER: Kingston.

DR. SAMULEEV: It's Pavel Samuleev, for the record. With RMC SLOWPOKE we don't have any environmental releases I have been told with our activated samples. So we normally let them sit and decay to below background limit, and then they get disposed as a normal

hazardous waste.

For our used core, most likely it will disposed into the Chalk River storage.

DR. LEWIS: This is Dr. Lewis, for the record. The fuel, because it's LEU, as part of the contract we're negotiating with the Canadian Nuclear Laboratories, there's a licensed storage facility up there (indiscernible) for those fuel for the core to be in that facility, it goes to the hot cells, it's broken up into two packages and then it's stored there until there's a permanent waste disposal facility announced by the government for permanent disposal.

MEMBER DEMETER: Just for clarification, my understanding is that waste from these facilities were not necessarily included in the permanent waste facility agency's mandate, unlike spent fuel?

Maybe staff can clarify that?

MS TADROS: Haidy Tadros, for the record. You're actually very timely because the presentation after this one is our joint convention presentation that highlights sort of the waste profile across Canada.

So, as rightly noted, the high-level waste for many fuel will be -- or is anticipated to go at the NWMO's Adaptive Phased Management Project. In the interim, it us up to each of the licensees that we currently have to

find a storage solution for the waste that they currently have.

So perhaps I'll ask Mr. Pierre Tanguay and then after that Ms Karine Glenn to provide some details with regards to the waste management programs at each of these facilities from a regulatory perspective.

MR. TANGUAY: Pierre Tanguay, for the record. Yes, depending on -- it's a case-by-case scenario. In some cases the fuel has been repatriated to the U.S. regardless whether it's HEU or LEU. In other cases, as we might see in the future, it could be a different waste management facility.

But, you know, the radioactive waste is disposed of in a safe manner with a licensed waste facility in every case.

MEMBER DEMETER: So I guess what I'm hearing is that each of these facilities, in a pre-hoc fashion, has demonstrated to you their plans for ultimate decommissioning and management of their waste on an ongoing basis, and at the end of the day that you're satisfied with?

MS TADROS: Haidy Tadros, for the record. That is correct. So we have a safety and control area for waste management that looks at specific areas that are required to be in place for an effective waste management

program at each of these facilities and includes all of the requirements that are in place for waste characterization, waste minimization, effective implementation of their waste management programs and, finally, decommissioning plans as Mr. Tanguay outlined.

So I don't believe we've answered your question with regards to the current waste, where it's slated to go. So perhaps Ms Karine Glenn can give you a perspective of what's been included in our joint convention report.

MS GLENN: Karine Glenn, I'm the Director of Wastes and Decommissioning. Just to clarify, with respect to the APM, I think and that's where a little bit you were asking about with respect to the fuel. So the NWMO's APM initiative is for reactor fuel, it's not specific to CANDU reactors, for instance. So, as we heard yesterday, for instance, the Whiteshell reactor fuel and the NPD fuel, all those are also slated to go as part of the repository that NWMO is working towards.

So that design will take into account reactor fuel of all kinds of reactor designs.

THE PRESIDENT: I have some questions around conventional health and safety and particularly as it relates to TRIUMF.

So, Dr. Bagger, thank you very much that

in your opening remarks you addressed some of the initiatives you've taken and that are underway to strengthening your management of conventional health and safety.

So my questions and comments are directed more to staff.

As I turn to slide 63 in your presentation where you start off that lost-time injuries remained low, at 4, three of which were at TRIUMF, I don't know what you base low as. All the industries we have seen here, that would be exceptionally high and unacceptable. So, again, I'm not sure what you compare to, but you can comment on that.

Then, similarly, on page 68 of the written report where you provide description of the four lost-time injuries, particularly when it comes to the column on the actions taken, I found that to be not very helpful. It didn't give any indication of what the causes were, how severe those accidents were.

In fact, I'll read them out to you. The first comment is, "The incident was not related to licensed activity." Then basically says that, you know what, there could be no corrective actions taken. Same with the second one.

So, again, I'll turn it to staff. I think

maybe you can provide why you thought this was not unacceptable. Clearly, TRIUMF thinks there is great room for improvement, given all the actions they have taken. Then in future I think, at least in the written submission, we just need to strength when we talk about what has been done about it.

So any comments?

MR. BROEDERS: Mark Broeders, for the record. I'll address the second comment first. So point taken, indeed we can do better and clarify how or why we deem that acceptable.

I want to first comment that the last time we presented in 2016 I think you raised similar concerns about the levels of lost-time injuries, particularly at TRIUMF.

Following that meeting we did go do some research and we compared TRIUMF, given the number of workers, 560, and like industries based on WorkSafeBC's statistics, and found it was comparable to like industry and like numbers of workers.

I can't comment on how it compares to other dissimilar industries, but for some industries in that province it appears to be similar.

Of course, we would like it to be lower, zero. However, so when the lost-time injuries are reported

to us we look at it through I guess three lenses. One is to see is this a reoccurring lost-time injury? For the most part, no. They appear to be dissimilar events. Nevertheless, we are concerned or we want to make sure that there aren't reoccurring or a reoccurring trend of the same type of injury. For example, someone falling down the same staircase again and again would speak to a lack of action on the part of the licensee to address that.

We also look to see are any of those lost-time injuries potentially evidence of a systemic problem that may directly affect some of the licensed activities. For the most part, no. The lockout tagout, that's potentially -- sorry, the geological installation, for example, that could be directly related of course to licensed activity. But that's the other aspect that we look for.

Finally, we want to make sure that they're complying with the program. So each licensee, a Class IB licensee, is required to have a conventional health and safety program, and it's referenced in their LCH. So we take that seriously and make sure that they're complying with their program and take the necessary corrective action.

Where appropriate, involving the corresponding provincial or federal conventional health and

safety regulator in discussion with WorkSafeBC in the case of B.C. and the federal regulatory in the case of CLS.

I think Yani Picard is available by teleconference, I might ask him to comment further on his investigation with respect to the LTI data at TRIUMF.

MR. PICARD: Hello, my name is Yani Picard, I'm the Senor Project Officer in the Accelerator and Class II Facility Division and I'm the Project Officer for TRIUMF.

Yes, with TRIUMF, we keep informed of the lost-time injuries and all the incidents that they're having. When it's related to conventional health and safety, our role is to ensure also that they inform WorkSafeBC on anything that is happening relating to conventional health and safety, and there are follow-ups. So far, everything is done properly and so that's why we don't have any concern.

Like Mark was mentioning, we compare with the industry for WorkSafeBC for the same sector, well industrial sector. Actually, TRIUMF is slightly lower than the average in the sector. But we also compare with accelerator facilities in the United States, and the same situation, the lost-time injuries are lower than similar facilities in the United States.

THE PRESIDENT: So before I turn this to

Dr. Bagger for him to comment, given that I raised similar issues last year, I think it would have been helpful to then put these comparators here so that we get some reassurance that they're not out of line.

But, Dr. Bagger, what do you think of your performance in this area?

DR. BAGGER: I think there is always room for improvement, and that in fact is why there's a driving -- a strong number of activities that we are undertaking at TRIUMF. They have not been in response to any particular incident, but we would like to drive your numbers down to be best in class and we are constantly seeking ways of improving.

I certainly agree with our CNSC inspectors that we are approximately at industry average, but there's no reason we can't be better and so that's what we are striving to reach.

THE PRESIDENT: Thank you. Dr. Lacroix.

MEMBRE LACROIX : Oui, merci. École Polytechnique, êtes-vous en ligne?

Oh, that's just too bad.

Okay, well, I'll redirect my question to staff. The SLOWPOKE reactor at École Polytechnique in Montreal has been in operation for 40 years. They have refuelled the reactor a couple of years ago with low

enriched uranium. Was there a thorough inspection of the vessel at the time?

MS TADROS: Haidy Tadros, for the record. We will need to take that question back to the Project Officer who, unfortunately, is currently not available to accurately answer that question. But we will make note of it and get back to the Commission.

MEMBER LACROIX: Okay. I appreciate that. Also I'd like to know is this vessel inspected on a regular basis?

MS TADROS: Haidy Tadros, for the record. The vessel would be part of the inspection plan going forward and if there are any concerns or any issues with the vessel that either were highlighted through the annual compliance reports or others, we would ensure that there would be an inspection or a desktop review once the annual compliance report is submitted to CNSC staff for review.

MR. JAMMAL: Ramzi Jammal, for the record. We will not authorize any facility, it doesn’t matter if it’s a SLOWPOKE or an NPP, to restart without proper commissioning.

So, as you know, the SLOWPOKE is really low temperature, low pressure and, as a matter of fact, the interval part is literally a hole in the ground that has a proper adequacy in place in order to maintain the

integrity, and we would not allow it to operate if it does not meet its original or enhancement that was done at the time it was designed.

So, to answer your question, inspections were done, commissioning process did take place after the refuel of the core, and all the tests were authorized before normal operation did take place. So the answer is, yes, we did both a desktop review and an inspection.

MEMBER LACROIX: Thank you.

THE PRESIDENT: Ms Penney.

MEMBER PENNEY: Thanks. Looking at CMD 18-M32, again CNSC staff's submission and it's about TRIUMF and about TRIUMF's waste management SCA was downgraded to below expectations in 2016, has subsequently been retested by CNSC staff.

So I just wanted to ask TRIUMF to address what was put in place, what corrective actions, to ensure that this below-expectation rating doesn't reoccur and then, staff, are you satisfied?

DR. TRUDEL: This is Anne Trudel, for the record. I'm TRIUMF's Chief Safety Officer. With regard to the findings with that inspection, the corrective actions focus on improving our inventory of our waste in terms of the level of detail that we had for the waste, and so that's been put in place.

As well, we had to also address signage on our waste storage location, and we have looked to update that signage as well.

MEMBER PENNEY: There's also a reference to an absence of secondary containment.

DR. TRUDEL: Yes. That was an issue with our waste oil from our vacuum pumps, and the handling of that oil is in a trailer.

So the primary containment, if you like, is we have rugged plastic containers that the oil is contained in and then that's within the trailer. The recommendation was that we add spill trays in order to provide that additional secondary containment, and we have put that in place.

MEMBER PENNEY: Staff.

MR. BROEDERS: Mark Broeders, for the record. So I concur with what Dr. Trudel mentioned in terms of their corrective actions, that they were effective, we think they're effective.

Maybe they can also comment, I believe that they implemented a program to be proactive in waste management. As you know, TRIUMF hosts many visiting researchers, so it's a proactive approach saying, okay, what are we going to do with this waste when your experiment is complete? I think that may help mitigate

this reoccurring in the future.

Dr. Trudel, maybe you can comment on that?

DR. TRUDEL: Anne Trudel, for the record. Yes, we have also looked to upgrade our waste management program as part of our continual improvement, both in terms of addressing all of our different waste streams.

Perhaps I can ask our Head of Radiation Protection, Dr. Joe Mildenberger, who is here with us, to provide a little bit more information in terms of those different waste streams.

DR. MILDENBERGER: Yes. So we have several different waste streams.

Our most prominent one we refer to as compactable waste, which is for the most part slightly contaminated personal protective equipment from maintenance operations mainly. This stream is examined for radiation levels in a dedicated facility and we apply clearance levels approved by the CNSC and dispose of this waste stream with our regular waste to a local landfill.

We have another waste stream consisting of oil from vacuum pumps, again that has low levels of radioactivity in it. It is disposed of also in a regular hazardous waste stream as non-radioactive waste under unconditional clearance levels from the *Nuclear Substances and Radiation Devices Regulations*, Schedule 2.

We have a third waste stream consisting of low-level activated metals. These are primarily support structures from decommissioned beam lines and other experimental facilities. At present we are just getting geared up to dispose of hopefully a large fraction of this, again under clearance levels approved by the CNSC a few years ago, but we have an additional constraint for this stream that basically is a non-regulatory constraint but that metal recyclers typically have their own survey metres and they reject basically anything that they can find detectable radiation in above background levels. So I point out again that these levels are well below regulatory clearance levels, that we are entitled to dispose of it, but recyclers around here typically send their metals to the U.S., across the border, and they have trouble crossing the border again if there is any detectable radiation in any of their metals. So we have to work within this additional constraint for this stream.

We have another, a fourth stream that we again are working towards an active disposal program under unconditional clearance levels and that's in low-level activated concrete. The efforts in that area need to be enhanced, in our understanding of the bulk activation properties of the concrete, based on surface measurements, surface surveying measurements. So we need to build up a

database of knowledge from simulations, from sampling that will allow us to confidently predict bulk concentrations based on surface measurements of either contact dose rates or simply counts per minute from a survey metre.

THE PRESIDENT: Okay. Thank you.

Dr. Berube...?

MEMBER BERUBE: Going back to LCs, letter of credits as they pertain to these facilities, I'm just looking at the SLOWPOKE in Montréal here and comparatively speaking to all other facilities that we have this is a very low financial guarantee. I see that it's under review. Where are we at with this review process and what are we looking at as a proposed amount of money set aside to actually decommission this facility?

MS GLENN: Karine Glenn, for the record. I am the Director of the Wastes and Decommissioning Division.

So perhaps I will provide a little bit of context around assumptions that go behind the cost estimates that are associated with the financial guarantee.

So we have a guide that is out there and typically the recommended approach is decommission tomorrow and by a third party, so assuming that the licensee has gone bankrupt and is no longer available to perform the decommissioning themselves. In the case of more enduring

entities, if you like, parapublic institutions such as universities or hospitals, there is an opportunity on a case-by-case basis to use a different set of assumptions.

In the case of École Polytechnique, they have put forward a proposal to perform the decommissioning themselves. Because they are an enduring entity, the university has been around for many years and has a big, if you like, body behind the smaller facility, which is the licence, this proposal was considered by staff in their review as being something that could be done if the university was able to demonstrate that they had in place a training program to ensure that at all times they have the staff who would be able and available to perform the decommissioning. So they did do so.

So that is partly why you see a discrepancy perhaps in the amounts, but, as we mentioned, we are currently working through a revision to the financial guarantee that École Polytechnique has and it's mostly related to the terms of how they are managing some of the fund, the NRRR, and to how the legal setup of that fund is put together and the ability of the CNSC to access that. So we want to make sure that that is really framed and put in place in a way that the CNSC, if there is a need, can access that money at any time.

But the major discrepancy between the

amounts that you are seeing is due to this different approach that they have put forward, which we have ensured that the framework has been put around that. And the training program, also I should add, that has been put forward has been reviewed in order to ensure that it is adequate.

MEMBER BERUBE: If I may -- sorry. I would caution you on that approach.

DR. CHILIAN: Cornelia Chilian...

MS GLENN: Go ahead.

DR. CHILIAN: Cornelia Chilian, for the record.

I am outside Canada, I lost the connection but I'm following the meeting through the webcast.

So just to take your words and to answer the former question related to Polytechnique. So related to the financial guarantee, it's under review in the letter of credit. Now it's like $800,000, but in December 2014 it was proposed by Polytechnique to be increased to $1.5 million. And presently the money that we have accumulating in the fund, the decommissioning fund, are $50,000 more, so it's $548,000.

How Polytechnique is proceeding, each year they are adding $50,000 to the decommissioning fund and it was the plan to decommission the reactor in 2032, but with

the last operating reactor we managed the operation differently so we are planning actually to decommission in 2040.

So related to the state of the reactor container, because we had a question related to the container, the container is in excellent condition. Each time that the reactivity is adjusted, we have an inspection and in 2014-2015 CNSC staff came to our facility, so they inspected the container twice. The only part of the structure, of the reactor that is giving signs of aging is the pool, because the pool is lined with an epoxy liner, so we are witnessing small cracks in the liner of the pool. However, we are thinking that we can operate safely until 2040.

So thank you.

MS GLENN: If I may -- Karine Glenn, for the record -- add a couple of missing pieces to the financial guarantee.

There is also a letter from the university taking full responsibility for the entire cost of the decommissioning. So if the cost were to exceed the amount that is currently provided through the letter of credit and the fund, the university has provided a letter of commitment saying that they would provide the rest of the funding.

And the final piece of the puzzle is that once staff are satisfied with what École Polytechnique has put forward in terms of instruments and amounts, this financial guarantee will also come to the Commission for final acceptance.

MEMBER BERUBE: The only reason why I cautioned you on that is because I know a number of universities are running deficits at this point in time and it seems to be a trend going forward, so we have to be very, very careful in this area and I choose to be conservative versus not in this particular case.

The other thing, I want to ask about letters of credit in general across all sectors. Are these irrevocable letters of credit that we are dealing with or -- they are. Okay.

MS GLENN: Karine Glenn, for the record.

So when we do review the instruments, we also do get a legal review from our lawyers here at the CNSC and they also verify that the terms from the accessibility of the letters of credit are acceptable and one of them is being irrevocable. So the terms -- typically the letters of credit are issued for a term. We do require them to be -- typically they are automatically renewable.

We are, through REGDOC-3 -- and I will get

the number wrong -- is it 3.2.1 or 3.1.2, which is a reporting requirement that has just been -- 3.1.2. We have put forward a requirement for licensees to report annually on the validity of their financial guarantee instrument. In addition, there is always a term that if for some reason the letter of credit is being revoked or cancelled by the institution, they must notify the CNSC in advance of that happening.

THE PRESIDENT: Okay. Thank you.

Dr. Demeter...?

MEMBER DEMETER: Thank you.

This is a question for TRIUMF. So you have a very robust, complicated arrangement with 18 universities, 560 workers. I want to get a sense -- can you give me a snapshot of your Radiation Safety Committee? Do you have one main committee with a number of subcommittees and what is the composition, who sits on your Radiation Safety Committee, to get a sense that is representative of the multitude of activities that you conduct, research and otherwise?

DR. TRUDEL: This is Anne Trudel, TRIUMF Chief Safety Officer, for the record.

We have a Radiation Safety Committee where we review doses quarterly with all of our management. To put in context our number of staff that we have versus work

that is done that involves dose, most of our staff -- out of that 560 we have about 200 nuclear energy workers, and the planning of the work, and in particular work that involves dose, receives its own review with the group leader and the proponent as well as input from our Radiation Protection Group.

I am not sure if that addresses all of your question or whether you need further information.

MEMBER DEMETER: I guess what I wanted to get a sense of is the titles or the type of people you have on your committee. Are they -- how do you decide who sits on your Radiation Safety Committee, beyond just sort of dose review, just general setting policies and procedures? Do you pick them as the chief scientist for each area, do you -- what is sort of the composition of your main Radiation Safety Committee is really what I want to know, based on their --

DR. TRUDEL: Apologies. Anne Trudel, for the record.

Our nuclear energy workers come from our own staff and our own personnel. Our 18 universities involve research scientists that mount experiments and carry out experiments here at TRIUMF. The dose associated with a large part of our activities that involve dose is -- I'm sorry. Those workers are from our own staff and the

planning for that work is done, as I said, with those group leaders and our members of our Radiation Protection Group. So it's not a case of researchers from our 18 member universities that are the nuclear energy workers. A few of them would be nuclear energy workers, but in fact it is from our research scientists who would be the spokesperson for the experiments that are mounted here.

Each of the experiments of course receives an individual safety review and we have Safety Review Committees in place for the different scientific program areas and each experiment receives that safety review where we address if there are any specific dose concerns with the radioactive ion beam that is going to be used for that experiment.

MEMBER DEMETER: I guess I wasn't making myself clear. So every organization has an operational Radiation Safety Program that does sort of the groundwork and they usually sit on a committee, a Radiation Safety Committee that sets policies and procedures on a go-forward basis to sort of pull it all together. The question I was really asking is how do you decide who sits on your main Radiation Safety Committee to drive the governance and policies and procedures of your overall program? Who sits on that committee?

DR. TRUDEL: So that committee is our

Safety and Quality Management Review Committee and it's a committee that is chaired by our Director, Dr. Jonathan Bagger, and all of our Associate Lab Directors sit on that committee as well as managers having operational responsibilities.

And as well we have Divisional Safety Officers who are involved with the safety reviews for the different activities in those divisions that also sit on that committee, as well as our head of our Radiation Protection Group and myself as the Chief Safety Officer.

MEMBER DEMETER: Okay. Thank you.

THE PRESIDENT: Thank you.

A quick question of clarification for staff on the research reactors on Slide 22 on reported events.

There is a statement there that:

> "The SLOWPOKES operated within their Operating Limits and Conditions".

And then the following slide talks about the incident at McMaster where the Fission Products Monitor was offline and that was in contravention of the Operating Limits and Conditions. So isn't that inconsistent?

MR. TANGUAY: Pierre Tanguay, for the record.

Yes, the slide that said there were no

incidents was specific to the SLOWPOKE facilities, which does not include the McMaster nuclear reactor.

THE PRESIDENT: Thank you.

So last round of questions then and maybe you can have two if you can sneak them in. So we will start with you, Dr. Lacroix.

MEMBRE LACROIX : École Polytechnique, vous êtes en ligne?

École Polytechnique, deuxième fois.

École Polytechnique, au revoir.

--- Rires / Laughter

THE PRESIDENT: Okay.

Ms Penney...?

MEMBER PENNEY: A quick question about environmental protection. I note that there was an ERA done on the SLOWPOKES -- generic ERA on the SLOWPOKES and TRIUMF also undertook a screening level ERA.

The question is for staff. You know, no discharges, really low discharges, no emissions, we are really satisfied with environmental performance.

MS TADROS: Haidy Tadros, for the record.

So I will ask our Environmental Risk Analysis Specialist to take that question.

MR. McALLISTER: Andrew McAllister, Director of the Environmental Risk Assessment Division.

That is correct, Commissioner Penney. We do that check of that on an annual basis based on the environmental -- if there's environmental monitoring reports, just to confirm the findings of the risk assessment.

THE PRESIDENT: Mr. Berube...?

MEMBER BERUBE: Just a final thing to do with the differences here in inspection processes.

I am to understand that the SLOWPOKES are actually a higher risk facility than the actual accelerator projects; is that correct in general?

DR. DUCROS: Caroline Ducros, for the record.

No, the SLOWPOKES and all the research reactors have been assessed at the low end of risk in the baseline compliance program. We are in planning now moving forward. Up until now we were following a different process, but our risk basis for all of these facilities has consistently been low risk.

MEMBER BERUBE: Given that, I'm looking at 2017 numbers and the inspection rate on the accelerators are twice that of the SLOWPOKES. Is there a reason for this? Is it just scheduling or is there some other concern that you have?

MR. BROEDERS: Mark Broeders, for the

record.

I wouldn't characterize it as scheduling, it's more logistics. So as we mentioned before, TRIUMF and CLS are quite large facilities, complex facilities involving hundreds of employees. So the way the baseline plan is developed is on an SCA-by-SCA basis. We determine the risk ranking using the Risk Index Approach, which is one of the CSA recommended approaches, and then as a result of that, that sort of makes the basis for our compliance plan. Where those SCAs require specialist involvement, then we will bring the specialist along with us, but there is a limit to how much we can accomplish in a one-week visit, so it does require more frequent visits perhaps to bring different specialists along to address all the SCAs necessary.

THE PRESIDENT: Dr. Demeter...?

MEMBER DEMETER: Last question. This is part 2 of the last question I asked, so I will ask this to staff.

So what I have seen in organizations is that the licensee presents to you how they are going to manage their Radiation Safety Program, and that includes the structure of the Radiation Safety Committees or Committee. And we have seen sometimes that they are a little bit distant from the ground where their members may

not have that much knowledge of the day-to-day operations. How do you assess and take into account the governance structure for the Radiation Safety Program to make sure it's grounded in their practice versus having individuals who may not have that much content, expertise or knowledge of the operations?

MR. BROEDERS: Mark Broeders, for the record. So I will speak in the context of TRIUMF.

So in our view the purpose of the Radiation Safety Committee, as you said, is a governance structure, so they provide an oversight function, an advisory function, so we want to make sure that the people who are involved in the Radiation Safety Committee can provide meaningful input into the Radiation Safety Officer and other people involved in managing the Radiation Safety Program. So to that end we are satisfied that TRIUMF has the correct personnel involved. As Dr. Trudel mentioned or explained, it is somewhat complex because you have a number of different universities involved and scientists involved, so they engage the appropriate people at the appropriate time to make sure that they are included in the safety oversight of the facility. Does that answer your question?

MEMBER DEMETER: I just wanted to know if you had a formal mechanism for reviewing the composition and structure, their governance structure for radiation

safety, and that you have like a way of saying that that's satisfactory.

MS TADROS: Haidy Tadros, for the record.

So maybe from a more generic perspective and systematic across all radiation protection programs we can ask our radiation protection specialists, who tend to review and look at requirements of an effective Radiation Protection Program, to speak to that question.

MS PURVIS: Good morning. Caroline Purvis, Director of the Radiation Protection Division, for the record.

So to answer your question, Dr. Demeter, I would say that currently there is no specific guidance that gives a governance model as it were for Radiation Safety Committees.

As discussed with the Commission previously, we are in the process of documenting radiation protection and guidance in future REGDOC-2.7.1. Part of that looks at the programmatic elements and that would be including management oversight, which is one of the pillars of a Radiation Safety Program. In that of course there are many ways that governance can happen in a licensee, it depends on the complexity and the risk of the licensed activities. What we are looking for is, as you say, that the right people are sitting around the table making good

judgments about safety and providing recommendations. So I think forward-looking we are going to see more of CNSC expectations in that regard.

What I can say for our specialists that receive programs for review, we will do a desktop review and then we will have to look in inspections to determine to what extent that structure that they put in place is effective.

MEMBER DEMETER: Thank you. I think it's important to have, because with large institutions with multi-sites, sometimes they have a Radiation Safety Program that's a bit removed from the operations and it is important that they understand their accountabilities and responsibilities. Thank you.

THE PRESIDENT: Thank you.

So my last question. I will start off with again a point for clarification. On Slide 39 on Regulatory Document Developments, you provide a status which says either "implemented" or "implementation plans" and I guess when you say implementation plans, that means implementation is underway. I think what would be helpful is if there was a date provided, implement -- you know, compliance expected by this date. Any thoughts?

MS TADROS: Haidy Tadros, for the record.

So that is noted. What we mean to say by

implementation plans is, as the Commission is familiar, when the Commission approves publication of a regulatory document for implementation across the applicable licensees and licensed facility types, we then send specific letters to the licensees requesting their implementation plans for what and when these requirements will be put in place specific to the document that is in question. So per your note, President Velshi, we will make corrections or updates to the table to indicate the dates, if we have them, as to when the licensees have signalled that this REGDOC would be in full implementation, taking into account that CNSC staff review those plans to make sure that they are relevant and accurate to the REGDOC being implemented.

THE PRESIDENT: Thank you.

And my last question, or actually more seeking input from you, given that we didn't receive any interventions and, you know, it has been two years since you came in front of the Commission with these RORs, lower risk facilities, and given what you have heard from the licensees, and maybe the licensees would like to comment on this themselves, what kind of public concerns, interest exists out there and what is the appropriate frequency of appearing before the Commission to give an update?

You don't have to answer now if you haven't thought about it, but if you have I would love to

hear what you have to say.

MS TADROS: Haidy Tadros, for the record.

So that is a very important subject that we have at Commission proceedings and meetings, having had the opportunity to review with regards to public interest, and maybe I will start by saying I would be amiss or we would be amiss to indicate that because there was no intervention there is no interest. So I think that needs to be stated.

The other thing that as staff, as you have heard, we tend to use very informed, very risk-informed approaches in everything we do, so there is always a balance to find the right sort of balance between our commitment to inform the Commission, to inform the public, to look at the risk of the facility and generate the interest of the public. And when I say generate the interest of the public, that really depends on a period of time. So waste right now is very high public interest and there doesn't seem to be enough that we can do to put the information out there.

With regards to research reactors, we are looking at not only the content but also the frequency of our Regulatory Oversight Reports across the board.

Having said that, I suspect there is no doubt in anyone's mind that NPPs will be reported on

annually, uranium mines and mills will be reported on annually, so that is almost a given. We are going through the exercise nonetheless.

For the typical low-risk research reactors, accelerated reactors, we would need to look at that and we would need to adjust our considerations based on not only what we hear today but also when we go out and do meet the regulator sessions, our outreach sessions, when we go out and meet the public in different fora, one, provide an awareness that these facilities exist and hear back to see what kind, if anything, they would like to see more of with regards to the RORs.

So I will not commit to a regular frequency at this point but just commit to there will be always a constant awareness of where the public's interests are and we will take that into consideration as we develop our approaches for these types of facilities and other facilities that might not be in front of the Commission on a regular basis.

THE PRESIDENT: Thank you.

Ms Cattrysse, did you want to add anything?

MS CATTRYSSE: Hello. Clare Cattrysse, Director of the Policy Aboriginal International Relations Division.

For the Regulatory Oversight Reports in general we started actually offering -- so it is fairly new -- participant funding to participate at the hearings and I think when we did the first pushouts for Regulatory Oversight Reports in general we had a lot of people asking what they were. So there is a bit of a learning curve, too, with the different groups. So I think more and more as different groups and public and Indigenous groups learn more about the program we may see a little bit more interest.

In this case, for this, I am depending on what the Regulatory Oversight Report is. The level of interest, we actually do targeted, like we will specifically do a mailout for the Participant Funding Program to a specific group if they have expressed interest in a facility or have some interest in a facility. In this particular case we did offer the 25,000 for this ROR and opened it up. We just did a general pushout through our information program. We didn't target every First Nation and interest group that might be around the facilities because it covers most of Canada, but we did do a pushout. There was some interest. We did have actually one group who did put in an application, but then when they learned more about what the facilities were they retracted their request for intervention. I hope that helps a little bit.

THE PRESIDENT: Thank you. Thank you very much.

We will now take a break and we will be back at 11:45. Thank you.

--- Upon recessing at 11:32 a.m. /
Suspension à 11 h 32
--- Upon resuming at 11:48 a.m. /
Reprise à 11 h 48

THE PRESIDENT: The next item on the agenda is an information item to provide us with an Overview of the 6th Review Meeting of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. This is outlined in CMD 18-M42.

Joining us in attendance or by teleconference are representatives from Ontario Power Generation, the Nuclear Waste Management Organization, Atomic Energy of Canada Limited, the Canadian Nuclear Laboratories, Hydro-Québec and Natural Resources Canada. They will be available for questions after the CNSC staff presentation.

So let's start by confirming the participants joining us by teleconference.

From OPG, Mr. Van Ooteghem, are you on the line? OPG...?

Okay. From NWMO, Ms Ion, can you hear us?

MS ION: Yes, we can, Ms Velshi. And Mr. Paul Gierszewski is also here with us.

THE PRESIDENT: Thank you.

And from Hydro-Québec, Monsieur Plante, est-ce que vous êtes là?

MR. PLANTE: Yes, we are here.

THE PRESIDENT: Good. Okay.

I will turn the floor over to the CNSC staff. Mr. Jammal, the floor is yours.

CMD 18-M42

Oral presentation by CNSC staff

M. JAMMAL : Merci, Madame la Présidente. Bonjour, Membres de la Commission. Mon nom est Ramzi Jammal. I am the Executive Vice President and Chief Regulatory Operations Officer at the CNSC. I am wearing two hats today and my hat as the head of the Canadian Delegation for the 6th Review Meeting.

And of course, as you mentioned, Madam President, the Canadian delegation consists of many contributors and our government, fellow government

departments and the licensees. So without repeating the call you made with respect to the attendance, I will skip that section.

However, I would like to note that Canada is one of the very few contracting parties that engage the industry and other regulatory partners in preparing the report and being part of the delegation to answer the questions.

So the purpose of this presentation is to provide you with an overview of the 6th Review Meeting of the Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

We will make this presentation brief and not the detailed presentation we gave at the Joint Convention. I will be making reference to the Joint Convention instead of the full title.

On Slide number 2 is an overview of the presentation itself. It's self-explanatory as a slide. I will be discussing the highlights of the Joint Convention itself, some background, and then the appendices that you have in your presentation describe in detail each appendix we will make reference to.

Appendix A will provide an overview of the articles of the Joint Convention and Appendix B has the full Canada presentation for the 6th Review Meeting.

The reason we are going to talk to you about the articles of the Joint Convention is because the Convention itself is a legally binding instrument and even though it is legally binding it's an incentive. So in other words, if there are no non-compliance or no conformity, the contracting party will not be referred to the -- for example, to the Security Council or anything of that sort. So it is an incentive with respect to the compliance.

What is the objective of the Joint Convention? It is to maintain a high level of safety in spent fuel management and safety in radioactive waste management. The intent is to ensure and assure the public that there are contracting parties who are assuring that the public and the environment will be protected from harmful effects of ionizing radiation during all stages of spent fuel and reductive waste management. The intent is to mitigate and prevent accidents associated to radiological consequences should they occur during, again, any stage of the spent fuel or radioactive waste management cycle.

The frequency of the review meetings is once every three years and this commitment is legally binding in accordance with the articles of the Convention.

The discussions in the Convention are

confidential discussions, it is not open for the public. The reason being is the contracting parties wish that discussion to remain confidential because there will be a frank discussion and an open discussion challenging the contracting parties in order to improve safety at the global level.

Why is the Convention of importance to Canada? Being a contracting party provides significant benefits for Canada. It allows us to perform a peer review and a self-assessment against the guidance and requirements of the Convention and then the frequency is on a three-year basis. It also provides us with an international peer review process in an open forum within the rules of the Joint Convention. It allows regulators, government officials and industry to have a discussion on the best practices or best available technologies and best applied practices to include regulatory OPEX and industry OPEX.

It is very important to ensure that the national arrangements for spent fuel and radioactive waste management conform to international agreements. The Joint Convention again is a legally binding requirement and Canada was one of the first countries to ratify the Convention.

As we move forward, the report and the Convention itself, and the report and our National Report

provides a good reference through the development of the National Report on what is happening in each and every contracting party and in specific for Canada. And we take pride as Canada as CNSC that we publish on our website, which is publicly accessible, our National Report the questions we receive and the answers we provide to the other contracting parties, and it is not very common.

So our participation at Joint Review, it takes a lot of resources. As you can see, my colleagues right across me and behind me are just a small representation of the contribution to the National Report.

So Canada, as I mentioned, was the first contracting party to ratify the Joint Convention and it came into force on June 18th, 2001.

Since the coming into force of the Convention, Canada has participated in all of the review meetings. If we missed one review meeting, if we did not submit a National Report, we will be in contravention of the articles. So to date we are in full compliance. The 6th Review meeting was held on May 21st to June 2nd, 2018. It was a two-week long period.

As I mentioned before, I will briefly discuss the obligations of the Joint Convention.

So the articles of the Joint Convention obligate every contracting party to submit a National

Report and the National Report has guidelines that we must follow as contracting parties. We always break ground in our National Report for the Joint Convention and even for the Convention on Nuclear Safety. We include in our report the IRRS missions or follow-up missions and the closure of -- or suggestions, recommendations arising from the services provided by the IAEA.

We actively participate in the international peer review process. We provide responses to questions and we are obligated to provide responses in a quality manner. It's not just yes and no, we have to provide facts associated with our responses.

Our attendance every three years has been regular and our purpose to be present is to present the National Report. And the National Report is being presented not just by myself, by every contributing element of the Canadian delegation. NRCan, AECL, OPG and the industry itself make the presentation.

So each contracting party will be fit into a country group and the country group will have an in-depth discussion of the report of the contracting party.

Next slide.

So a significant amount of resources has gone into the report and I will elaborate on each step of the preparation of the report as we go forward in the

slides.

So we start with the submission of the National Report. We draft the report from the CNSC perspective; contributors review the report; we have multiple meetings in order to come up with the final version; and it takes us approximately nine months or so to have the report finalized. So the report highlights the inventory, talks about our regulatory process, talks about Canadian policies, and it talks about the structure and the way forward of waste management in Canada.

So the organizations that contributed to Canada's 6th National Report are of course the CNSC, Atomic Energy of Canada Limited, Bruce Power, Cameco, Hydro-Québec, Nordion, Natural Resources Canada, Nuclear Waste Management Organization, NB Power or New Brunswick Power, and Ontario Power Generation, which is OPG.

As part of our participation in the Joint Convention we reviewed 25 National Reports. Canada reviews National Reports of other contracting parties that are of interest to Canada. And when I speak of interest to Canada, it could be technical, it could be policy in order for us to learn from a peer review process. For example, many contracting parties are ahead of us in the deep geological repositories, such as Finland with respect to low-level and intermediate-level waste, so we do ask them

questions with respect to how they are managing and what is the -- for us to extract, the best practice and regulatory OPEX or operational OPEX.

We are fitted -- in order to manage the Convention, the Convention is structured into country groups and each country group has a proper distribution, both geographical and based on the national program. So if there is a large program then they try to distribute the contracting parties to include large operations of nuclear programs and small operators to provide diversity in the discussion and the capacity of contracting parties to learn from each other.

So in our country group was Georgia, Ghana, Lithuania, Morocco, the Netherlands, the Republic of Korea and Uruguay. And I'm not going to read what's on the slide, but Canada reviewed reports of other contracting parties.

In total, Canada posed 97 written questions to other contracting parties. And in our country group discussion, there were contracting parties who were interested in Canada's report. Even though they are not members of the country group, they were -- they did participate and they asked questions.

And I will provide the names of them shortly.

Our participation of the peer review process was that 17 contracting parties posed 86 questions to Canada. The questions came from China, Euratom, Finland, France, Germany, to name a few, Russian Federation, Sweden, UK and U.S.A.

And as I mentioned, all of the questions and answers provided and our presentations are posted on the CNSC public web site.

We are proud of our review of the national reports of other contracting parties because we commit to open discussion and at times very challenging because we want to lead by example. The intention of the convention is not to pat each contracting party on the back, but to challenge the contracting parties where we see or foresee deficiency in the application of nuclear safety at the global level.

On this slide I'd like to share with you some of the topics that there were questions or the topics of the questions that were posed to Canada by the 17 contracting parties.

A lot of interest in our long-term management of spent fuel cycle. Questions were asked of us on the interim storage of spent fuel and design life of structures/containers.

The waste minimization technique. Waste

classification and clearance of radioactive material. CNSC public hearing process. The community involvement and indigenous engagement. And the decommissioning end states of the facilities. And import/export of sealed sources and orphaned disused sealed sources.

Canada has a full cycle regulator and a full cycle oversight by other government departments. That's why there is an interest, you see, from the rock all the way to the -- from cradle to grave with respect to the nuclear fuel cycle.

Next slide, please.

So I would like to take an opportunity to introduce who's with us today. I have with me the Canadian Nuclear Safety Commission delegation. Karine Glenn, Haidy Tadros, Julie Mecke, Phil Webster. He is our nuclear counsellor in Vienna. He's permanently in Vienna.

Jocelyn Truong, Tiffany Lo. Mr. Kent is not present, but Anna Mazur represents our legal section unit. And this will be the second time in Canadian history -- this is the second convention where we engage with our legal section unit to be present, and they are extremely helpful in order to provide us with interpretation, and especially to provide the head of delegation proper advice on the articles of the convention.

We've got with us from Natural Resources

Canada Mr. Dave McCauley and Catherine Badke.

On the line is Ontario Power Generation. Even though Lise Morton is not present, but Lise was part of the delegation. Mr. Dave Van Ooteghem is on line. And part of the delegation was Shaheen Shaikh, and I don't think she is here.

On the NWMO, it was Mr. Ben Belfadhel Mahrez, Paul Gierszewski, and Mihaela Ion. She's online, and I believe Paul is online, too.

From AECL, on a avec nous Maude-Émilie Pagé, et puis Paul McClelland.

And the Canadian Nuclear Laboratories, Jérôme Besner. Et puis Hydro-Québec, Steve Plante.

It's important to note that the Canadian delegation was not just attendees. We've got officers who were elected to be part of the officers of the Joint Convention. And Canada should take pride of the competency of our colleagues who sat as officers on the Joint Convention.

So in total, nine CNSC staff and 12 members from the other organizations that I mentioned.

So what do we do for two weeks? For the first week, I usually attend and then Ms Tadros took on the head of the delegation for the second week.

The first week is -- that's when the

discussion takes place pertaining to the national reports.

So on the first week, myself and my colleagues delivered the Canada's presentation and we answered questions. We posed follow-up questions at the peer review sessions of the contracting parties. And then we helped facilitate as review officers who were elected to be part of the officers of the Convention, and we participated actively in the peer review process.

It's very important to note that the -- as the Convention takes place, it is not just one meeting. Think of it as a big conference where you have parallel sessions that are taking place.

So as part of the head of delegation, we strategically look at contracting parties or country group that is of interest to Canada, and then we disperse ourselves in order to obtain the information.

The key point to know as Commission members is if I am attending a country group in which Canada is not member of that country group, we cannot ask the questions till the contracting parties of that country group finishes their questions and the chairman will allow other contracting parties to ask questions.

So it goes on a priority basis, a member of a country group or a contracting party of a country group asks the questions first. If there is time, then

other contracting parties -- the floor will be open for other contracting parties.

So in our presentation, there was a huge interest from Switzerland, U.S. and for any more contracting party who were present, and they did ask quite a few questions.

The presentation itself is around one and a half hours. We took questions for almost one and a half hours. And then there was an outcome out of the 6th Review, and I will talk about the outcome of the 6th Review.

So we made the country presentations. We provided answers in questions.

The outcome of the country group is on the record, a report called Rapporteur's Report. And that becomes the official outcome of the country group, and that Rapporteur's Report is transformed over to the plenary session to reflect the discussion in the country group.

It's very important to note for the public and for the individuals who are not engaged in the country group discussions, if an item is closed or if an item is open, is done by consensus by all contracting parties. So it's not an opinion of one contracting party. It's not an opinion of one individual.

So all of the country group -- all of the

country group members, all of the contracting parties who are a member of the country group will have to reach consensus with respect to the outcome and the Rapporteur's Report.

So it's quite an extensive discussion, and if there is one disagreement, then the chairman will have to navigate through in order to provide a final version of the report.

So in our country report, the eight which included, as I mentioned, Lithuania, Uruguay, Republic of Korea, Kazakhstan, Ghana, Morocco, Niger, Netherlands and George. And U.S., Romania and Switzerland attended our country group due to their interest with what Canada is proposing and presenting.

As I mentioned, the rapporteur's summary report is the record arising from the country group. So we were asked -- I'm going to go a little bit to describe the questions we received.

There is an interest on the continuous enhancement of safety requirements as established by the CNSC and legislated financial guarantee requirements on operators.

The licensing process as it relates to the licensees' demonstration of the
safety case and opportunities for public involvement in the

decision-making process. That is a big one with respect to the public engagement and the transparency of the CNSC.

I would unequivocally state the whole contracting parties group is very interested on how we are able to manage the public interest in our regulatory process and how we engage them.

And the mechanisms for public participation in CNSC's annual reporting on regulatory oversight. I will come back to item number 3 on this slide with respect to the CNSC annual reporting and public engagement outside the licensing process.

There is significant interest in the CNSC licensing renewal process and, in specific, the compliance verification of existing licensees, and the establishment of the *Licence Condition Handbook* and the compliance verification.

Many contracting parties trying to copy what we've done in order to provide clarity.

Item number 5 on this slide is roles and responsibilities of the regulatory body which includes the technical support organizations and other technical experts supporting the regulatory body. We are unique in Canada that TSO, technical support organization, is integral to the CNSC.

And Mr. Peter Elder, who's the chief

science officer, is the head of the TSO and in Canada and at CNSC, our TSO is integral to our -- to the CNSC itself. So it's not an outside organization providing us with a service. It's integral to the CNSC.

Item number 6, there was an interest on how Canada has established the independence of the regulator and continues to do so.

Number 7 is the challenge that everybody's facing in specific on ensuring knowledge management for safety of radioactive waste and spent fuel management, especially when many of the facilities are moving towards decommissioning, decommissioning that might take place in decades from now or 10 years from now. The international interest, how do you maintain knowledge management with respect to the management of waste fuel and having the adequate knowledge for workers to carry on their activities safely.

As I mentioned before, the review meetings are a continuation of previous review meetings, so the 5th Review was a continuation of 4th Review, the 6th Review was continuation of the 5th Review.

In every review meeting, if there are challenges identified for contracting parties, those challenges will be legally put on Canada in order to address. At the 6th Review meeting, the challenges were

reviewed, evaluated by the contracting parties. And like I mentioned, the closure was obtained by consensus.

So we were able to obtain consensus to close the following challenges we had from the previous review.

Industry access to suitable skills and resources to support a change in focus from operations to decommissioning. The human resources capability to ensure that there is adequate regulatory oversight from our perspective as there is a shift from operations to decommissioning. And at the time, Canada was facing for the first time an implementation of Government-owned Contractor-operated (GoCo) management model for radioactive waste management facility and the completion of the procurement process.

So as contracting party, we provided the factual evidence associated with our request for closure. It was reviewed, it was debated, and the country group agreed that these challenges are closed.

As part of the 5th Review challenges, we have several who remains open. The contracting parties and the country group felt that there is more work is required in order to have a full closure of the challenges.

One of them is the finding an acceptable site in a willing host community for a spent fuel

repository. That will -- challenge will remain open.

Develop an integrated strategy for non-OPG low and intermediate level waste disposal. And continued accelerated decommissioning and remediation of AECL sites.

Those challenges will remain open until the 7th Review.

It's important to note that no new challenges were identified to us -- to Canada as a contracting party based on our national report or the discussion at the country group.

The outcome of the 6th Review meeting, Canada received one "Good Practice" identified in the review meeting. I would like to highlight the fact that a "Good Practice" is if you want to think of it as the gold medal or diamond medal, if there is such thing. They don't grant those very, very frequently.

So I would like to read on the record what is the definition for "Good Practice":

> "A Good Practice is defined as a new or revised practice, policy or program that makes a significant contribution to the safety of radioactive waste and spent fuel management. A Good Practice is one that has been tried and proven by at

least one contracting party but has not been widely implemented by other contracting parties and is applicable to other contracting parties with similar programs."

So that's the strict definition of "Good Practice".

So we got one Good Practice out of the six, and that was given to us in consensus.

So the interest was -- is the CNSC annual regulatory oversight report at Commission proceedings which provide opportunities for public involvement through interventions and the availability of the CNSC participant funding program independently from any licensing process.

So our RORs are been looked at as outside the licensing process as a good practice for other contracting parties to follow. And in addition to it is the participant funding program that gives an opportunity to interested parties to engage.

As I said, I wear multiple hats. One of them still is the President of the Convention on Nuclear Safety. While I was President of the Convention on Nuclear Safety, there was a huge debate between contracting parties of -- I mentioned the gold medal or diamond medal Good Practice, but contracting parties wanted to go back to the

government and say why we're here and what can we take back.

So as President of the Convention on Nuclear Safety, I created an "Area of Good Performance". So in other words, if a contracting party has made good improvements in their regulatory program or in their policy or in the governmental structure, they should be going back with an indication from the peer review process that something good has been improved between the review meetings.

So we got Areas of Good Performance on openness and transparency through Public Commission hearings and opportunities of public participations throughout the licensing period.

The CNSC Independent Environmental Monitoring Program received international kudos that we as a regulator independent of industry, we carry out our own Independent Environmental Monitoring Program.

And then the NWMO integrating indigenous knowledge with science in the site selection process for the deep geological repository for spent fuel. And that's key for many contracting parties to learn from.

So this new category now will stay with all of the Conventions, mainly pertaining to safety, and received good success so that the contracting parties are

encouraged to continue their improvements.

The other outcomes of the 6th Review. Any enhancement to the process itself because it's a Convention and a legally binding process has to be done in a formal environment. So Canada always contributes to enhance the process of the Convention itself, and it has to be done, again, by consensus via a mechanism called open-ended work group by which contracting parties come with proposals, the proposals are debated, either accepted by consensus or rejected.

I would be amiss not to tell you that geographical pressures are brought into the open-ended work group. Political interference are brought into the open-ended work group. And this is one of the very few places where diplomats show up in order to present the -- flex their government muscles or interfere or add substance. But I'll refrain from making comments on that.

So we made our proposals in order to enhance the Joint Convention.

The first proposal was to remove the requirement for the contracting parties to submit one paper copy of their national report to the Secretariat.

We do not need paper any more, so we are beyond that era so the consensus was obtained for such electronic submission because the paper copy nobody reads.

It's stored somewhere, and nobody knows where.

With respect to the second proposal, at the Convention of Nuclear Safety I was able to convince the contracting parties with a proposal to video conference the national report of the contracting party who does not have the financial capability to attend in person or not able to get a visa or they have challenges in participating in person.

So that proposal has been accepted. It is at its infancy. It is the IAEA, which is the Secretariat, will have to establish a mechanism in place and tool in order to allow contracting parties to make presentation by video conferencing.

And we'll stay tuned for how that's going to take place.

In addition to our attendance, we carry out many bilateral meetings on the margins of the Joint Convention one on one. The members of the Canadian delegation that they have a special interest from our industry colleagues, from our government colleagues will meet with the contracting parties in order to exchange information.

So we always talk about how we are always in a learning mode with respect to international best practices for waste management and decommissioning and

opportunities for future regulatory cooperation, and we always talk about the interest with respect to the election of the officer for the 8th Review on the Convention on Nuclear Safety Review Meeting.

And that is my personal interest. We make sure that the Convention, or CNS, that the political arena is ready with respect to the election of the officers for the 8th Review of the Convention on Nuclear Safety.

Those are not the only topics, but those were the major topics that we've put in place for the bilateral discussions.

Overall conclusion.

The Joint Convention is a valuable peer review process. The Convention is ratified by the Government of Canada. The Government of Canada assigned the CNSC to be the lead for this Convention, so we are obligated by law for us to engage and perform adequately under the Articles of the Convention.

That's the legal element.

With respect to the regulatory OPEX, technical information and learning from each other in a sharing good practices, operational experience and discuss of emerging issues is phenomenal.

Identifying challenges and having a follow-up process for closure of challenges is of

importance to all of us and to the contracting parties to ensure that there is adequate global nuclear safety regime.

So I'm proud to say that our delegation was a strong participant at 6th Review. We've met the obligations of the Joint Convention, and that is in the report of the President of the Convention.

We've contributed significantly to the review process. We've contributed significantly to the improvements of the Convention, and will continue to demonstrate leadership in nuclear safety, regulatory excellence, openness and transparency.

And staff, we are available to answer any questions you may have.

Oh, next steps. Too anxious to stop.

Prepare for the 7th Review Meeting in 2021. We will assemble the new team in the spring of 2019 to start drafting Canada’s report.

We engaged in work to propose enhancements to the Joint Convention. And I will keep an eye on the improvements we've requested that will be executed. And we'll manage Canada’s effort to address challenges identified at the
6th Review Meeting.

So we'll continue to be a leader in the safety of spent fuel management and radioactive waste

management.

So thank you for your attention. That's the end of our presentation.

THE PRESIDENT: Thank you, Mr. Jammal, for an excellent presentation, and kudos to the team for a very successful meeting.

So opening it up for questions from Commission Members, we start with Dr. Demeter.

MEMBER DEMETER: Thank you.

This is sort of perhaps a tangential question. In the large basket of spent fuel and nuclear waste, is there representation here from military entities to deal with how they manage their waste and the potential spent fuel?

MR. JAMMAL: It's Ramzi Jammal, for the record.

The conventions itself is not binding on military applications as a general response. In Canada the military, or DND, Department of National Defence, is exempt from our requirements. However, they have their own structure in place that they look at with respect to the radioactive waste management.

So as we -- one of our licensees is RMC. And RMC will follow the requirements of the CNSC, and they are a licensee of the CNSC. But the convention does not

apply to military application, only for civil facilities.

MEMBER DEMETER: Thank you. And excellent presentation, by the way. Congratulations.

THE PRESIDENT: Dr. Lacroix.

MEMBER LACROIX: Sure. Thank you very much for this presentation. I found this document extremely useful in the sense that it answered many of my questions that I have.

Overall, how is the Canadian nuclear industry? How is the health of the Canadian nuclear industry compared to what you see?

MR. JAMMAL: It's Ramzi Jammal, for the record.

I'll start with my answer, then I'll call onto our colleagues from the industry to answer.

Because we have a strong independent regulator and independent Commission, so the oversight demonstrates that the Canadian nuclear industry is very well regulated. And that's why we're getting a lot of questions with respect to our regulatory processes in place. So an informed regulator is a very good regulator, and they're the reflection of the industry.

Not to take away anything from our industry -- our industry is always looking for high achievements with best available technology and what they

propose. And our flexibility as a regulator not being prescriptive, performance-based, allows us that flexibility.

As a regulator, I take pride of the safety record of the industry. They are responsible for safety, but at the same time, they need the strong regulator, so that's why we keep on top of things.

But I will pass it on to the industry with respect to how they measure themselves against counterparts -- whoever wants to go first.

MS PAGÉ: I can start, maybe, Maude-Émilie Pagé, for the record. I'm with Atomic Energy of Canada Limited.

Certainly what we've observed at the IAEA and at the Joint Convention specifically is that Canada is very highly regarded, both from the perspective of the industry but particularly from the perspective of the regulator. I would say that there's -- it's probably amongst the leaders in the regulatory side of things. And in particular, as you'll have seen noted in the best practices in the good performance areas, the level of transparency and public participation that the Canadian regulator offers to Canadians is probably amongst the highest in the world.

So I can't speak for industry as a whole

necessarily, but certainly from the regulator's perspective, Canada is very highly regulated [sic] within the IAEA.

THE PRESIDENT: Okay, anyone from industry?

MR. GIERSZEWSKI: Paul Gierszewski from the Nuclear Waste Management Organization.

Just an observation. I think that in general we are at the state of science in terms of planning for long-term management of used fuel, comparable to our peers. There are certainly organizations out there that are -- we can learn from, but we feel comfortable with where we are relative to our peers.

THE PRESIDENT: Anyone else? Okay.

MEMBER LACROIX: Now that you've patted each other on the back, what is the weaknesses of the nuclear industry in Canada -- compared, of course, to other industries in the world.

MR. McCLELLAND: For the record, Paul McClelland from Atomic Energy of Canada Limited.

The weaknesses were identified in Mr. Jammal's presentation, the challenges that are still open. They are recognized. There are plans and programs being put in place.

For example, disposal plans for non-fuel

for low- and intermediate-level waste. Major projects are in the process and are being worked. And one of the challenges we have right now is though disposal capacity is not realized, but plans are being worked. And that is recognized as a challenge, and that's why it's still an open challenges.

The openness and transparency of the industry is -- we all recognize, agree with, and are working the challenges. And they weren't sprung on us. All of those were self-identified going into the review.

MR. JAMMAL: It's Ramzi Jammal, for the record.

I would like to add with respect to the challenges as it was mentioned, but I think our industry is probably too shy to brag.

The key point here is really where we lead from an industry perspective is with respect to the transfer of fuel from the wet storage to dry storage. So the world is really looking at us because we have the design of the containers, the design of the canisters. So for dry storage removal of the fuel, post-Fukushima, that's one of the key elements, because you've got a lot of contracting parties who are still keeping their fuel in a wet fuel bay. That's not transferring them over to the dry storage. So they look at us and -- us now -- and I'm

speaking as a Canadian -- with respect to the design of dry storage. So that's one of the key elements.

You ask about challenges, as was mentioned, is transparency. But the challenge right now is for us in the future is not the science, because there is a very strong collaboration with respect to the long-term management of the science. Many research were done for DGR. For example, the casing, the storage, the long-term -- what's the shelf life of the casing and the storage for DGR. Those are going to be ongoing challenge.

As any other industry, there are the development stage. Some of the development stage has demonstrated probably inadequacy of using the salt mine as a DGR, as what happened in Germany. So all these information is being put together from regulatory perspective.

The biggest challenge I foresee for us as a regulator is not the science. It's the political acceptance and social acceptability. And that's going to be the challenge that we are going to face internationally, globally.

However, we've got Finland, who is demonstrating quite significant change in their parliament in accepting the deep geological repository as a long-term solution. They've had it for a while, so they were able

to -- even though the Green Party is a significant contribution to the parliamentary system in Finland, that they've publicly declared that DGRs will be a long-term solution.

So that's what I see the challenge, social acceptability, political acceptance, even though the science speaks for itself, that there is political acceptance of a long-term waste management.

MEMBER LACROIX: Very interesting, thanks. Very interesting, thank you very much.

THE PRESIDENT: So let me just follow up on the challenges, given that we've had discussion on that. So on slide number 19, there were two things I just wanted to get more input from you on.

So the second challenge focuses just on non-OPG low- and intermediate-level waste disposal. I wondered why it wasn't for all low- and intermediate-level waste, given, you know, that there's still a bit of an issue around that. And then I have a question on the third one. But if you can maybe comment on the second one.

MS GLENN: Karine Glenn, for the record. I'm the director of the Wastes and Decommissioning Division, and I was Canada's representative in Canada's country group.

So the way that the challenges work, these

are followed up from the 5th Review Meeting. When we attended the 5th Review Meeting, we had reported on the status of the OPG DGR. And so at that point, because there was a concrete plan, although it is yet awaiting regulatory approval, OPG has a concrete plan that is going through the regulatory process. And so at that point, the challenge that was identified by the country group for us was what about the rest of the waste. And so this challenge was maintained from the 5th Review Meeting, and we report on those challenges and the progress we make towards them in the report, in the national report itself. And so in the 7th report, we will report against the progress we've made in the reporting period against those challenges as well.

So that's why OPG was excluded from that challenge, because it was felt that they were far enough into finding a solution.

THE PRESIDENT: But it didn't show up as a new challenge in the 6th Review Meeting?

MR. JAMMAL: It's Ramzi Jammal, for the record.

That's correct. It did not come up as new challenge. And as Karine -- Ms Glenn mentioned, the specificity is OPG had a solution, although it's been 16 years in the making, no decision being made yet. But they looked at it from globally what the other waste producers

are doing with respect to low-level, intermediate-level.

So the key point here is currently it's safely managed on site if it's required to be, or safely managed according to recycling and so on and so forth. But they wanted to look at what is being done in Canada from a Canadian perspective for low- and intermediate-level, other than OPG's solution.

THE PRESIDENT: Thank you.

And then the third one. And I'll ask AECL to comment on it, on this "continued accelerated decommissioning and remediation of AECL sites." Was the challenges here that AECL actually deliver on this accelerated decommissioning? Or is the challenge on what's being proposed as far as what that accelerated decommissioning and remediation is going to look like?

MS PAGÉ: Maude-Émilie Pagé, for the record.

So again, that challenge came from the 5th Review Meeting, which at the time we were just in the process of implementing the government-owned, contractor-operated at AECL sites. And one of the main objectives of the GOCO model was to accelerate the decommissioning of legacy liabilities and historic waste at the AECL sites or at sites for which AECL has responsibility.

So while as you may recall from the presentation there was an item -- a challenge from the 5th Review meeting which was specifically about the implementation of the GOCO model, so that one was completed by government, but the related one for the acceleration of decommissioning was I guess a remainder of that 5th Review Meeting. So that particular item was really about the objective of the GOCO model and not a comment on the current projects that are underway.

I think there's a recognition that while projects are being proposed and there's lots of decommissioning happening at Whiteshell and at Chalk River, there are still a lot of work ahead of us. And that's why that challenge was kept on the record.

THE PRESIDENT: Thank you.

Ms Penney.

MEMBER PENNEY: I was also looking at the slide 19, the challenges.

And well, first I say congratulations. It makes me very proud to be Canadian, to be associated with such a wonderful group.

These all look like they'll be open for a while, these challenges, you know. I don't know if you have a timeline for when you hope to close them or have solutions.

MR. JAMMAL: Ramzi Jammal, for the record.

That's a very good question. We're going to be tackling these open-ended actually challenges based on what we're doing in Canada. So for example, we're hoping to -- for example, the host community for spent fuel. As we, you know, we're hoping that something would be done within the timeline established by NWMO, because our job as a regulator is to make sure that what's being proposed will be adequate with respect to the safety case.

So is there timelines? Well, we're going to go one step at a time on each on a three-year cycle, provide the contracting parties and the convention progress. Then we can close the elements within an open challenge. And that's what we've done, for example, when Maude mentioned that the GOCO, so that's been -- they closed it because the licence was issued, because the regulatory oversight has been established. So that's how we're going to be closing them.

As you well know, many drivers will be outside the Commission itself and outside this delegation here with respect to the final closure. But as long as we are making progress, we can determine which way we're heading.

On overall, we're looking for a trigger. Could be licence application from NWMO for the Commission

to review. To us, that's one step towards closing the challenge, regardless of the outcome.

With respect to integrated strategy, just finished talking to Fred Dermarkar, who is in the room, with respect to integrated strategy for low-level and intermediate-level from the producer's perspective. That's going to be a challenge. So I would like to see industry propose and for us as a regulator to see how we are able to work with the industry so that there'll be a integrated strategy.

With respect to continued accelerated decommissioning, that will continue to be a challenge, because the decision of decommissioning is by the operator, not by the regulator. We encourage them to do accelerated decommissioning.

But on the international scene, there is a lot of play on words. For example, one contracting parties who brags the fact that they've done accelerated decommissioning, but if you look at the report, that facility that they've accelerated decommissioning in a matter of four years has been dormant or in guaranteed safe shutdown for 40 years. So of course, they're saying we've accelerated decommissioning, but everything has been cold for the last 20 years, so they were able to do these things.

So that's the challenge we will be facing, but we will be closing them in chunks rather than the full ... but you're right, they will be open for a while.

THE PRESIDENT: Thank you.

Mr. Berube? Oh, sorry, did you have something to add?

MS GLENN: What I wanted to add is that through the annual -- through the national reports, every three years we'll be an updating on the progress. And it's ultimately not up to Canada to determine whether the challenges are closed; it's up to the country group at the review meeting to accept closure of the items.

And so we recommend in our presentation -- we always put forward which challenges we think can be closed. We recommend that, and you'll see that in the presentation that is posted on the website, which -- how we presented the information for closure for the items that were accepted as closed. But we're also very open and say, No, this one we think should remain open. And there is a healthy discussion about whether or not the challenges should be closed or remain open.

But ultimately, it's not up to Canada to determine that. It's up to the review meeting.

THE PRESIDENT: Thank you.

Mr. Berube.

MEMBER BERUBE: First of all, well done. Obviously I think that's in order, and it has been reiterated around the table.

I find this model fascinating from a global standpoint in terms of the cooperation that's happening here and this external accountability, if you will call it that.

You mentioned that the outcomes here are legally binding, and I'm curious as to how that actually works. How does one hold another country accountable for outcomes within this network? Because this is really, really unusual and I'm just curious how that actually works.

MR. JAMMAL: Ramzi Jammal, for the record.

I can speak to you, as I have two hats. The president of the Convention on Nuclear Safety and the member of the Canadian delegation for the Joint Convention.

It all comes down to the president of the Convention. So in other words, when I took over the Convention of Nuclear Safety, the compliance with the -- because it's an incentive convention, many of the government officials or even the government itself who ratified the Convention were not aware that their countries were not in compliance. So when I wrote to the ministers and even sometimes the prime ministers, telling them,

you're not in compliance with the Convention, which is legally binding, right away the machinery functioned so that they put in place proper reporting, proper engagement and submission of the national report.

So the same thing applies here on Joint Convention. So the president report indicates -- I was not a diplomat, but in this Joint Convention, indicates what contracting parties were not in conformity with the articles. It's very unfortunate this report is not in the public domain. It's in the secure website only for contracting parties. So it's name and shame. I have no other words to say.

But the president of the Convention have awesome power. And I would thank our senior legal counsel, who kept me out of jail multiple times as president of the convention. We pushed the limits with respect to the powers of the president. And I'm very sincere, without Lisa's contribution, because the international law organization -- the international law organization has a different interpretation than what we get from Canadian perspective. There's always the political diplomacy overarching what -- how to go about things. But our job is global nuclear safety.

So it's going to be the president of the Convention.

However, with the president of the Commission, Ms Velshi, she will have bilateral discussion with other regulators. And then Canada always raised the issues of non-compliance with the conventions and/or pushing -- not pushing, but encouraging regulators and contracting -- not contracting parties -- encouraging member states to ratify the convention so they have this peer review process.

Long answer to say it all depends on the president of the Convention, because they have awesome powers to do, and go to the political masters in order to indicate they are not in compliance. Because there is no government official want to live with the fact that they're not compliant with the convention which is legally binding.

MEMBER BERUBE: Just out of curiosity, to that end, is there any mechanism to go to the World Court if things are not satisfied for a period of time?

MR. JAMMAL: Ramzi Jammal, for the record.

No, there isn't.

THE PRESIDENT: Dr. Demeter.

MEMBER DEMETER: Just thank you again for the presentation and the commitment at this level.

There's a portion in your appendices that deals with legacy waste issues and we've talked a lot about that for the last couple days.

Based on the international scene, sort of a snapshot of compare and contrast how we're dealing with our legacy waste issues versus other jurisdictions, is there lessons learned, lessons taught?

MR. JAMMAL: Ramzi Jammal, for the record.

I'll start. I'm going to start in diplomatic way, but I'll tell you which way we're going.

From international scene, Canada is being used as a great example in the cleanup of the legacy issue. For example, Port Hope, Port Granby. You've got many contracting parties who do have legacy issues from military exercises or whatever it's going to be that they are not doing much with respect to the cleanup. So from Canadian perspective and the government of Canada and the commitment to do the cleanup of Port Hope, even though it radiologically is not high risk, what's being done, we are being used as an example in the world.

And I will pass it on to my colleagues to be specific with respect to what's being said. So Ms Glenn will add, complement this.

But the key point here is on the legacy issue and what we've done in Canada, we've got many contracting parties who are coming to learn how we are dealing with legacy issue, the existing cleanup and the future plans for cleanups.

MS GLENN: Karine Glenn, for the record.

One of the things that's really different about Canada or unique is that we regulate uranium mining as a nuclear activity. Most of the countries that are members of the Joint Convention do not include uranium mine waste as part of their report to the Joint Convention, while we do.

Canada has also done considerable work with respect to remediation of former disused and partially just decommissioned or abandoned uranium mines in Canada and is leading the way with that kind of remediation work. There are many countries -- Kazakhstan, Uzbekistan, Kirgizstan -- which are faced with lots of uranium mining legacy without having the funds or the knowledge to do the cleanup themselves, and Canada is a leader in that area.

MR. JAMMAL: It's Ramzi Jammal, for the record.

To add, your question is there is the government contribution, but the fact that, you know, there is legacy of legacy-legacy and then the future. It's one thing that Canada -- everybody's trying to copy us with respect to financial guarantees. So you're not just licensing now, it's what you're leaving legacy towards the future. So to me, legacy is what happened before and what's going to leave behind.

Financial guarantee is one of the requirements that very few contracting parties have, and if they do have it's not reviewed at the same cycle that the CNSC requires the operators to do. So, that's one element.

The other element is what happens after it's been released from regulatory perspective such as institutional control. And then, you had the presentation done this week on institutional control, what it means.

So, internationally we are way ahead of -- not even on par, we are benchmark as the best practice in the world with respect to financial guarantee.

And our financial guarantee is not only at the uranium mines or the facility, we've established a unique scheme in Canada financial guarantee for radioactive sources which is based on an insurance scheme that we got at the fifth review a good practice by which it diminishes now the disused sources or the capability of orphan sources. So, we have a lot of good practices that the rest of the world is trying to learn from.

And I will pass it on to my colleagues from NRCan.

MR. McCAULEY: Thank you. My name is Dave McCauley, I'm the Director of the Uranium and Radioactive Waste Division at Natural Resources Canada.

I just wanted to -- I think that Mr.

Jammal really focused clearly on the strength of the Canadian approach on managing legacy radioactive wastes, is that the government's been able to find a mechanism to provide the funds necessary for the clean-up of historic wastes which are wastes that the owner cannot any longer be held responsible for and they are not properly managed.

And then, secondly, the other aspect of the legacy wastes are the wastes from the very early nuclear research that was done at Atomic Energy of Canada Limited, but the corporation was not able to fund the remediation at the time because the funding was focused on other areas. However, the government has been able to find a mechanism to ensure that the proper funding is available to allow AECL and Canadian Nuclear Laboratories to move forward aggressively on the remediation of these legacy sites.

THE PRESIDENT: Thank you. So a quick last round of questions.

Dr. Lacroix?

MEMBER LACROIX: I was trying to retrieve the information. But it seems to me that, if I recall, Canada was matched with other eight other countries in this group. Five of these countries, if I recall, are developing countries, so their needs and their -- I would say their plans are completely different.

So, how did you perceive this?

MR. JAMMAL: It's Ramzi Jammal, for the record.

That's why I made a comment in my presentation that the country group consists of developing countries, advanced countries, large nuclear program and small nuclear program, and that's the intent of the peer review process.

I can speak freely, even though I'm not supposed to. Canada was heavily engaged in the discussion, so they had a lot of questions for us on financial guarantees, how do you manage?

So, they've taken that information and then they transform it over to implementation in their own country and we establish bilateral engagements with them, so we continue that networking to help them.

So, for example, they will copy our regulations, they will look at how we put financial guarantees in place and how do we manage reduce, reuse and recycle.

So, your observation is bang on and that's the intent of the country group.

MEMBER LACROIX: But what's in it for us? What's in it for Canada?

MR. JAMMAL: Before I pass it on to Karine,

the key point here is the developing countries will obtain challenges like we do, so that they have to report against for the next review meeting. So, there is always continuity of the progress that's been done and then closure of the challenge is by consensus. So, that's one outcome.

The benefit for us is you're reducing globally the risk associated with any radiological consequences, and Canada being the largest exporter of radioactive sources in the world, safe sources, we have an interest that Canadian substance will not be mishandled globally.

In my previous life here at the CNSC we had to respond on many occasions, either from patients being mistreated by Canadian sources, and it was not the fault of the Canadian technology, it was the operator's fault, or sources being found orphaned in countries that did not have proper oversight or management of the sources but they were Canadian origin.

So, there is that interest from global nuclear safety, but Karine can add more here.

MS GLENN: Karine Glenn, for the record.

So, while the actual -- the peer review meeting, so that one week is within your country group, as Mr. Jammal mentioned in his presentation there, any other

contracting party may attend and we did have -- the U.K. I believe was present, the U.S., Romania and Switzerland who also came to ask questions of Canada.

What also is really important is the questions and the answers that that whole cycle that takes place prior to the review meeting, we receive questions from 17 countries, not just the countries within our country group and so, in the same way that we've asked questions of 25 countries, not only the countries within our country group.

So, while the review may be in order to make it manageable and to be able to do that deep dive is limited to eight countries, the actual peer review process is open to all contracting parties who may review and ask questions of any of the contracting parties.

In addition, I think we mentioned during the presentation that we had a member of the Canadian delegation in every country group observing and listening to the presentations that took place.

So, every day at the beginning of the day in the morning we shared some of the experience and some of the lessons learned that we learned from the other contracting parties through their presentations. And so, that's also something that we gain through that whole process.

DR. LACROIX: Thank you.

THE PRESIDENT: Thank you. Ms Penney?

MEMBER PENNEY: Recognizing that the CNSC's role is a regulatory one, but we also have a public information one, I'm interested, Mr. Jammal, in what Finland -- and maybe this is something for NRCan to take home -- in terms of what Finland is doing right to get political and social acceptability?

MR. McCAULEY: Dave McCauley, for the record.

I don't -- I'm not an expert on Finland, but I do know that we had organized a mission of our Associate Deputy Minister along with the NWMO and others to Finland that commenced right after the joint convention to learn about the progress that's being made in Finland with their deep geological repositories.

And I think that one of the experiences was that basically their openness, but also the readiness to trust in the regulator, trust in the proponent in the population that seemed to be quite surprising and -- or different from the Canadian context. And I think that in that regard that was part of the success that we saw.

Because in many cases the situation in Finland is very much similar to the Canadian DGR process in terms of where they are locating these DGRs and, of course,

the climate, et cetera, and their approach, the technology, but really it was kind of the trust they have from the general population in the regulatory bodies and the government and the proponent in their success.

I don't know if anybody else wants to make a comment on the Finnish experience. I'd be happy to...

MR. JAMMAL: It's Ramzi Jammal, for the record.

Dave's diplomatic. Yes, the regulator trust is one element. The key point here is the political, parliament itself that really endorse the fact that the waste management is integral to the operations of nuclear power plants.

So, in Finland the licensing process is approved by the parliament. There is a regulator who makes recommendation. So, the politicians themselves do endorse the long-term solutions, do endorse the fact that nuclear is part of the mix in order to reduce the emission of the greenhouse effect.

That's one of the big elements. Of course, there's the trust of the regulator. We will never be complacent on this, we want to always continue to have the public trust, but there was the political really support as part of the solution, and you could see it in the communities from the municipal level to the equivalent

to provincial level to the federal level that everybody's engaged.

And I was in Korea a few weeks back looking at the social acceptability and you would see even the activists now, and the Green Party in Finland itself made a declaration to say that they accept nuclear as part of the mix and the long-term solutions will be -- there are no other solutions but this solution and they have adopted it and endorsed it.

THE PRESIDENT: Okay. Thank you.

I'm sure there's lots to learn from them.

Finally, Mr. Berube?

Okay. Any remaining burning questions? No. Then this concludes the public meeting of the Commission.

Thank you all for your participation.

MS McGEE: If you borrowed interpretation devices, remember to return them at the reception desk and claim your identification card.

Thank you. Bonne fin de journée.

--- Whereupon the meeting concluded at 12:59 p.m. /

La réunion s'est terminée à 12 h 59