

Canadian Nuclear
Safety Commission

Commission canadienne de
sûreté nucléaire

Public meeting

Réunion publique

December 16, 2021

Le 16 décembre 2021

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

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

via videoconference

par vidéoconférence

Commission Members present

Commissaires présents

Ms. Rumina Velshi
Dr. Sandor Demeter
Dr. Marcel Lacroix
Dr. Timothy Berube
Ms. Indra Maharaj
Mr. Randall Kahgee

M^{me} Rumina Velshi
D^r Sandor Demeter
M. Marcel Lacroix
M. Timothy Berube
M^{me} Indra Maharaj
M. Randall Kahgee

Assistant Secretary:

Secrétaire adjointe:

Ms. Kelly McGee

M^{me} Kelly McGee

Senior General Counsel:

Avocate-générale principale :

Ms. Lisa Thiele

M^e Lisa Thiele

TABLE OF CONTENTS

	PAGE
Opening Remarks	1
CMD 21-M33/21-M33.A	5
Oral presentation by CNSC staff	

by videoconference / par vidéoconférence

--- Upon resuming on Thursday, December 16, 2021
at 10:00 a.m. / La réunion reprend le jeudi
16 décembre 2021 à 10 h 00

Opening Remarks

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

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

I would like to begin by recognizing
that our participants today are located in many
different parts of the country. I will pause for a
few seconds in silence so that each of us can
acknowledge the Treaty and/or traditional territory
for our locations. Please take this time to provide
your gratitude and acknowledgment for the land.

--- Pause

LA PRÉSIDENTE : Je vous souhaite la

bienvenue, and welcome to all those joining us via Zoom or webcast.

I would like to introduce the Members of the Commission that are with us today, remotely: Dr. Sandor Demeter, Dr. Marcel Lacroix, Dr. Timothy Berube, Ms. Indra Maharaj, and Mr. Randall Kahgee -- ah, you did make it, Randall, good.

Ms. Lisa Thiele, Senior Counsel to the Commission, and Ms. Kelly McGee, Commission Assistant Secretary, are joining us remotely.

Kelly, over to you for a few opening remarks.

M^{me} MCGEE : Bonjour, Mesdames et Messieurs.

J'aimerais aborder certains aspects touchant le déroulement de la réunion.

For this Commission meeting, we have simultaneous interpretation. Please keep the pace of your speech relatively slow so that the interpreters are able to keep up.

To make the transcripts as complete as possible, please identify yourself each time before

you speak.

The transcripts should be available on the CNSC website within one to two weeks.

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 closure of the proceedings.

As a courtesy to others, please mute yourself if you are not presenting or answering a question and please ensure that your notification functions are also muted.

The President will be coordinating the questions this morning. During the question period if you wish to provide an answer or add a comment, please use the Raise Hand function.

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

Please refer to the revised agenda published on December 9th for the list of items to be presented today.

All of the Commission Member Documents (or CMDs) listed on the agenda are available on the CNSC website.

In addition to the written documents reviewed by the Commission for this meeting, CNSC staff and other registered participants will have an opportunity to make verbal comments and Commission Members will have the opportunity to ask questions on the item before them today.

Madame Velshi, présidente et première dirigeante de la CCSN, va présider la réunion publique d'aujourd'hui.

President Velshi.

THE PRESIDENT: Thank you, Ms. McGee.

Today's presentation is regarding the Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities and Research Reactors in Canada for 2020, as outlined in Commission Member Document CMDs 21-M33 and 21-M33.A.

The public was invited to comment in writing. The Commission received three submissions. There will be no oral presentations from intervenors

on this report.

I note that representatives from Environment and Climate Change Canada are available and ready for questions.

I will turn the floor to CNSC staff for their presentation first.

Mr. McAllister, over to you, please.

CMD 21-M33 / 21-M33.A

**Regulatory Oversight Report for Uranium and Nuclear
Substance Processing Facilities and Research Reactors in
Canada: 2020
Presentation from CNSC Staff**

MR. McALLISTER: Good morning,
Ms. Velshi.

Could we have the deck put up, please?
Great. Thank you.

Good morning, President Velshi,
Members of the Commission. For the record, my name is
Andrew McAllister and I am the Director of the Nuclear
Processing Facilities Division.

Each Regulatory Oversight Report is focused on a regulatory program that is managed at a divisional level. As the Regulatory Program Director for the Nuclear Processing Facilities Division, I will present this Regulatory Oversight Report, with support from my team, Jessica Way and Adam Leroux, Project Officers working within the same Division.

We also have licensing and compliance staff as well as subject matter experts with us, who partner in delivering the compliance oversight of the facilities, to help answer any questions the Commission may have.

Today, we are here to present Commission Member Document CMD 21-M33 titled "Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities and Research Reactors in Canada: 2020".

We will start our presentation with a brief description of the Regulatory Oversight Report.

Following that, we provide information on Indigenous engagement and consultation, and information on the facility types reported this year,

which include uranium processing facilities, nuclear substance processing facilities and research reactors.

The presentation then provides key facility highlights, an overview of CNSC's risk-informed regulatory oversight activities and CNSC staff's assessment of the facilities. Information on other matters of regulatory interest, including CNSC's Independent Environmental Monitoring Program and public engagement, are also provided.

Finally, we will cover some of the major themes identified in the interventions which the CNSC received.

Four errata were identified in CMD 21-M33.

For the Action Levels subsection on page 31 of section 6.7, the following action level exceedances need to be added for the Port Hope Conversion Facility:

- fence line gamma action level exceedances that occurred on April 30th and May 31st of 2020; and
- a fluoride air emission action level

exceedance that occurred on July 13th, 2020.

In addition, of the 10 reportable events identified for Nordion on page 42 of section 7.1, five were related to transportation as opposed to four identified by error in the report.

Furthermore, on page 63 of Appendix B, the number of Notices of Non-Compliance at Nordion need to be updated to zero for the Management System Inspection (NORDION-2020-01) and three for the General Inspection (NORDION-2020-02), as opposed to 1 and 2 identified by error in the report, respectively. In addition, I would like to highlight that this correction is not shown accurately on the slide in the third bullet. The "1" in Notices of Non-Compliance should state "0" in Notices of Non-Compliance for NORDION-2020-01.

Lastly, in Table G-1 on page 85 of Appendix G, the total uranium loadings reported to air and surface waters for the Blind River Refinery were reversed in error. The loading to air should be 4.8 kg and the loading to surface waters should be 2.8 kg.

The noted additions will be reflected

in the final published version of the Regulatory Oversight Report and do not affect staff's overall conclusions.

The next few slides will provide a description of the Regulatory Oversight Report.

CNSC Regulatory Oversight Reports are reports from CNSC staff that provide information to the Commission on CNSC staff oversight activities for licensees over a designated time period.

These reports are presented by CNSC staff during Commission proceedings where stakeholders such as licensees, public and Indigenous Nations and communities are able to participate in the process.

The CNSC has established a Participant Funding Program where funding is made available to assist individuals, Indigenous Nations and communities and not-for-profit organizations to bring value-added information to the Commission through informed and topic-specific interventions.

The CNSC currently produces a number of Regulatory Oversight Reports, as shown on this slide. The Regulatory Oversight Report for Uranium

and Nuclear Substance Processing Facilities and Research Reactors in 2020 is one of five Regulatory Oversight Reports that CNSC staff have produced and the last one before you in this calendar year.

This report comprises two complementary components: a text component (CMD 21-M33) and a presentation (CMD 21-M33.A). The text component was made available on the CNSC website on August 30th, 2021.

This report covers the 2020 calendar year for Uranium and Nuclear Substance Processing Facilities and the 2018-2020 calendar years for Research Reactors.

This includes a summary of the CNSC's regulatory efforts; overview sections highlighting performance across similar facilities; and additional sections outlining:

- key licensee information on operations and major developments;
- CNSC staff's safety and control area performance ratings; and
- detailed performance reporting on

three safety and control areas, namely, Radiation Protection, Environmental Protection and Conventional Health and Safety.

As a result of recommendations from the Commission, feedback from intervenors, commitments made by staff, as well as continuous improvement from previous Regulatory Oversight Reports, a number of changes were made to this year's report.

These included:

- acknowledgement of Indigenous Nations and communities at the beginning;
- intervenor review period was increased from 30 to 60 days;
- inclusion of a plain language summary;
- additional information on all safety and control areas;
- changes in safety and control area rating system;
- greater use of hyperlinks; and
- additional data context where appropriate.

I will now provide an overview of staff's engagement and consultation with Indigenous Nations and communities.

CNSC would like to acknowledge that the uranium and nuclear substance processing facilities are located on the traditional territories and homelands of many Indigenous peoples and are covered by several treaties.

This slide lists the Indigenous Nations and communities with traditional and treaty territories located in close proximity to those facilities and that the CNSC engages and works with in relation to those facilities.

In addition, we would like to recognize that the research reactors are located in the traditional and treaty territories of the Mohawk, Mississauga and Haudenosaunee Nations, the traditional territory of the Huron-Wendat peoples, and Treaty 6 territory, which is the traditional territory of Cree Peoples, and the homeland of the Métis Nation of Saskatchewan.

In 2020, CNSC staff continued to work

with Indigenous Nations and communities and organizations to identify opportunities for engagement and consultation.

For example, in May 2020, CNSC staff met virtually with the Métis Nation of Ontario Region 4 as part of our ongoing engagement to support their participation in the CNSC regulatory review process.

CNSC staff have also continued to build a relationship with Curve Lake First Nation through signing a long-term relationship Terms of Reference for engagement, which provides a framework for regular meetings with the Curve Lake Consultation department since 2020 and into 2021.

CNSC staff are committed to building long-term relationships with Indigenous communities who have interest in CNSC-regulated facilities within their traditional and/or Treaty territories.

I will now turn over the presentation to Ms. Jessica Way.

MS. WAY: Good morning, President Velshi and Members of the Commission. For the record, my name is Jessica Way and I am a Project Officer in

the Nuclear Processing Facilities Division.

The next few slides will provide an overview of the facility types covered by this Regulatory Oversight Report.

This slide presents the locations of Canada's uranium processing facilities. They include Cameco Corporation's Blind River Refinery, Port Hope Conversion Facility and Cameco Fuel Manufacturing Facility, as well as the BWXT Nuclear Energy Canada facilities in Toronto and Peterborough, which we will refer to as BWXT-NEC. These facilities are all located in the Province of Ontario.

The licence expiry dates and financial guarantee amounts for these facilities are shown in the table on this slide.

Although these numbers are accurate for the 2020 reporting year, we wanted to note that a new financial guarantee for BWXT-NEC was accepted by the Commission in 2021. The new amount of \$48.1 million Canadian dollars was implemented in March 2021.

Here are some images of the uranium

processing facilities in Ontario.

The three Cameco facilities refine uranium ore concentrate, process uranium trioxide into uranium dioxide and hexafluoride, and use the uranium dioxide to manufacture nuclear fuel bundles. The hexafluoride end product is exported to companies in other countries for enrichment and fabrication into fuel for nuclear power reactors around the world.

The BWXT facilities manufacture zircalloy tubes and uranium dioxide fuel pellets which are assembled into nuclear fuel bundles.

This slide shows the three Class IB nuclear substance processing facilities, which are also located in the Province of Ontario.

SRB Technologies is a gaseous tritium light source manufacturing facility located in Pembroke.

Nordion is a health sciences organization that provides products used in the prevention, diagnosis and treatment of disease. It is important to note that Nordion sold the medical isotopes portion of the business in 2018, and in

October of this year a Class IB nuclear substance processing facility licence was granted to BWXT Medical to operate the Nuclear Medicine Production Facility in Ottawa, Ontario. BWXT Medical is not covered by this Regulatory Oversight Report, which is why the licence and financial guarantee details are not listed on this slide, but the acquisition will be discussed later on in the presentation.

Finally, Best Theratronics manufactures teletherapy machines, self-shielded irradiators and particle accelerators, and is also located in Ottawa.

Here are some of the images of nuclear substance processing facilities, which are different from the uranium processing facilities in that their end products are not related to the nuclear fuel cycle for power reactors.

The products created by these facilities have a variety of end uses, such as diagnosing and treating cancer, sterilizing items for sanitary reasons, such as surgical gloves, and creating self-luminous emergency and exit signs for

buildings and airplanes.

Finally, this slide highlights Canada's research reactors. CNSC staff first reported on nuclear research reactor facilities in 2015. They are reported on at a three-year frequency and, as mentioned earlier, this Report covers the period from 2018 to 2020.

There are three SLOWPOKE-2 facilities shown here:

- École Polytechnique de Montréal, located in Québec;
- Royal Military College of Canada, which is located in Ontario; and
- Saskatchewan Research Council, which was located in Saskatchewan prior to its decommissioning.

Also shown here is the McMaster Nuclear Reactor, located in Ontario.

As shown on the previous slides, the licence expiry dates and financial guarantee amounts are listed in the table that you see here, but you will notice that two of the SLOWPOKES do not have

financial guarantees.

The Royal Military College facility is the property of the Crown. Therefore, any costs associated with future decommissioning are the responsibility of Canada's Department of National Defence, who is the owner of this facility.

In 2020, SRC held a financial guarantee of \$5.76 million Canadian dollars, but the Commission decided to release the financial guarantee at a hearing on October 1st, 2021, when the licence to abandon was granted. This will also be discussed later on in the presentation.

The research reactors operating in Canada are small reactors designed to operate at low power and are typically used for academic purposes, medical isotope production, neutron radiography and neutron activation analysis for a number of industries, including mining and geological surveys.

Given the decommissioning of the Saskatchewan Research Council reactor, only two Canadian SLOWPOKE-2 reactors are in operation: École Polytechnique de Montréal and the Royal Military

College of Canada. Also shown here is the reactor pool at the McMaster Nuclear Reactor Facility.

I will now speak to some key facility highlights.

This table outlines facility highlights for the uranium and nuclear substance processing facilities and research reactors.

There were two licensing decisions made and six action level exceedance occurrences that were reported to the CNSC over the respective review periods. These will be discussed later in the presentation.

There were also 26 reportable events at these facilities.

The reportable event types that occurred at the uranium and nuclear substance processing facilities and research reactors are shown on this slide.

Licensees conducted investigations and/or implemented corrective actions for all of these low-risk reportable events to the satisfaction of CNSC staff. As a result, CNSC staff have concluded that

all uranium and nuclear substance processing facilities and research reactors managed operations safely and in accordance with their licensing basis.

In March 2020, the Commission conducted public hearings in Toronto and Peterborough for the renewal of BWXT-NEC's operating licence.

In April 2020, the Commission announced a Continuation of Hearing and directed CNSC staff to collect additional soil samples of beryllium on properties adjacent to the Peterborough facility.

CNSC staff completed the resampling and provided a supplementary submission to the Commission as CMD 20-H2.D and CMD 20-H2.E.

In December 2020, the Commission made a decision on the BWXT-NEC licence renewal application, as documented in the Record of Decision 20-H2. In its decision:

- the Commission decided to renew the licence for BWXT's current operations at Toronto and Peterborough for a period of 10 years;
- the Commission issued two separate facility-specific licences, instead of one shared

licence;

- the Commission authorized the conduct of pelleting at the Peterborough facility, as per the licensee's request, but with additional conditions in the Peterborough licence. The authorization of conduct of pelleting by the Commission is currently under judicial review, based on a submission to the Ontario Supreme Court from the Citizens Against Radioactive Neighbourhoods;

- the Commission also issued several directions to CNSC staff on Indigenous and public engagement, which are discussed in the next slide.

CNSC staff provided a memo to the Commission in February 2021 in order to address the Commission's direction and committed to providing an update to the Commission. CNSC staff completed additional Indigenous engagement and public outreach activities associated with the BWXT licence renewal as well as the beryllium resampling in Peterborough. This update was provided to the Commission in June 2021 and covered off the winter and spring 2021 efforts identified on this slide.

As an update to the Commission on activities that took place in summer and fall of 2021:

- CNSC staff successfully and safely executed the IEMP sampling campaign in the Peterborough area, which included Curve Lake First Nation observers;

- in addition, monthly meetings with Curve Lake have continued throughout the year; and finally,

- CNSC staff have re-engaged with Dr. Aherne to discuss beryllium-related aspects.

CNSC staff are committed to continuing the sharing of information related to the BWXT-NEC facilities and continuing to engage with Indigenous Nations and communities, the public and other interested parties.

As noted earlier in the presentation, in April 2018, BWXT announced an agreement to acquire Nordion's medical isotope business. The acquisition was actually completed in August 2018 and I wanted to highlight that there is an error on this slide. The first bullet of April 2018 should state "August 2018",

as this is when it became BWXT Medical, a wholly-owned subsidiary of BWXT.

In December 2018, BWXT Medical applied to the CNSC for a licence to operate the facility under a separate licence. No substantive changes to the licensed activities by BWXT Medical were made in this request, with the plan for Nordion to continue operating the medical isotope facility until BWXT Medical had obtained a separate Class IB nuclear substance processing facility operating licence.

A licensing hearing took place in June 2021, and in October 2021 the Commission granted a 10-year licence to BWXT Medical in order to operate the Nuclear Medicine Production Facility.

The Saskatchewan Research Council SLOWPOKE-2 reactor facility, or SRC, initially came online in 1981.

In May 2018, SRC notified CNSC staff of its intention to decommission the facility. Operations ceased in April 2019.

Following a 2019 Commission hearing, the Commission approved an amendment to the SRC

licence authorizing them to begin decommissioning the facility. The image on this slide illustrates a portion of the excavated concrete and rebar from the reactor pool structure, close to the core centreline, completed in order to meet the unconditional clearance level.

In October 2020, SRC informed the CNSC that decommissioning activities had been completed, and requested a licence to abandon as well as revocation of the facility's non-power reactor operating licence.

CNSC staff concluded that the decommissioning activities were done safely and met regulatory requirements. A hearing in writing took place on October 1st, 2021, where the Commission issued a licence to abandon, and the financial guarantee released.

I will now pass the presentation back to Mr. Andrew McAllister.

MR. McALLISTER: Thank you, Ms. Way.

Andrew McAllister, for the record.

I will now describe staff's regulatory

oversight of the uranium and nuclear processing facilities and research reactors in more detail.

The CNSC regulates Canada's uranium and nuclear substance processing facilities and research reactors to protect the health, safety, and security of Canadians and the environment. Compliance is verified through inspection and verification activities, reviews of operational activities and documentation, and licensee reporting of performance data, including annual reports and unusual occurrences. The extent of regulatory oversight is commensurate with the risk associated with each licensed activity.

CNSC staff performed 19 inspections at the uranium and nuclear substance processing facilities in 2020 and nine inspections at the research reactors from 2018 to 2020. All non-compliances were recorded and are tracked to completion, using the CNSC regulatory information bank database system.

Also shown on this slide is the number of safeguards inspections led by the International

Atomic Energy Agency and the number of CNSC-initiated safeguards field activities for these facilities.

With respect to regulatory oversight, CNSC staff spent a total of 679 person days on licensing activities and 1,307 person days on compliance activities for the uranium and nuclear substance processing facilities in 2020. From 2018 to 2020, CNSC staff spent a total of 412 person days on licensing activities and 553 days on compliance activities for the research reactors.

Of note are the higher numbers for BWXT Toronto and Peterborough and Saskatchewan Research Council licensing activities. The BWXT person days for licensing activities are higher due to the licence renewal efforts for these two facilities, while the Saskatchewan Research Council numbers were higher due to the decommissioning of the facility and requested licence to abandon.

On March 15, 2020, the CNSC activated its business continuity plan in response to the COVID-19 pandemic where all CNSC staff were directed to work from home. Travel to sites for inspections was

suspended until approved COVID-19 protocols were in place.

CNSC staff reviewed all planning on-site compliance activities on a risk-informed basis to determine an appropriate path forward. CNSC staff identified planned compliance activities well suited to be delivered by other means such as remote verification methods and desktop review of documents and adjusted planned activities accordingly. Compliance activities continue remotely and on-site oversight activities have since resumed on a risk-informed basis in observance of relevant COVID-19 health protocols.

In 2020, some inspections were rescheduled or postponed for certain safety and control areas where on-site presence was necessary; however, the majority of inspections continued remotely or were conducted using a hybrid virtual/in-person approach in order to minimize in-person time on site. Furthermore, engagement with parties and Commission hearings and meetings have been performed virtually.

CNSC staff continue to conduct oversight activities during the COVID-19 pandemic to ensure the protection of the environment and the health and safety of people.

In response to the COVID-19 pandemic, uranium and nuclear substance processing facilities and research reactor licensees implemented various measures to reduce operations, activate business continuity plans, and have non-essential staff work remotely where possible. Licensees instituted measures to minimize the spread of COVID-19 by making workers wear face masks and limiting the size of groups of employees in any area.

The state of reduced operations included only work to ensure sites, facilities, equipment, and grounds were maintained and kept safe and compliant with regulatory requirements. For facility activities that were not put on hold, the licensee worked to follow all public health guidelines and additional safety protocols. All facilities maintained appropriate security measures throughout this period.

Each facility continues to evaluate new information and risk related to COVID-19 at their sites and local communities. CNSC staff are informed as changes are made by licensees to adhere to any new guidelines made available by the provincial health authorities.

I will now pass the presentation over to Mr. Adam Leroux.

MR. LEROUX: President Velshi and Members of the Commission, for the record, my name is Adam Leroux, and I am a project officer in the Nuclear Processing Facilities Division.

The next few slides will provide an overview of CNSC staff's assessment of the facilities covered in this regulatory oversight report.

The CNSC measures a licensee's performance by its ability to mitigate risks posed by the licensed activities and to comply with regulatory requirements. CNSC staff use 14 safety and control areas, or SCAs, to evaluate each licensee's performance, which are shown on this slide. CNSC staff continually assess the licensee's performance

based on results of regulatory oversight activities.

Similar to the 2019 Regulatory Oversight Report, the 2020 Regulatory Oversight Report assessed facility performance using a simplified rating approach. That is, licensee performance was assessed as either "satisfactory" or "below expectation" for the uranium and nuclear substance processing facilities and research reactors over the reportable periods. The "fully satisfactory" rating is no longer in use.

The simplified rating approach allowed CNSC staff to focus on the performance of the facilities. This approach is consistent with a neutral and fair approach that the CNSC strives to implement in its regulatory oversight. In 2020, the Commission agreed with the use of this approach for the regulatory oversight reports.

It is important to recognize that a facility that received safety and control area ratings of fully satisfactory in previous regulatory oversight reports and now has a rating of satisfactory does not necessarily indicate a reduction in performance.

Safety and control area performance is rated using set criteria such as key performance indicators, compliance with licence conditions, events, repeat non-compliances, and licensee action in response to events as well as the nature of the events themselves. CNSC staff assign ratings to safety and control areas based on professional judgment, expertise, and information collected. CNSC staff consider a multitude of inputs and assign a rating that best represents licensee performance in a holistic manner.

All of the uranium and nuclear substance processing facilities met CNSC requirements and received a satisfactory rating for all safety and control areas in 2020. With respect to performance ratings from 2018 to 2020 for the research reactors, all licensees met CNSC requirements and received a satisfactory rating for all safety and control areas. This indicates that all licensees met CNSC's expectations and that their implementation of safety and control measures were sufficient and effective.

Over the next few slides, I will

present licensee performance in the safety and control areas of radiation protection, environmental protection, and conventional health and safety.

First, I will turn our focus to the radiation protection safety and control area. Uranium and nuclear substance processing facilities and research reactors are required to implement and maintain radiation protection programs as required by the *Radiation Protection Regulations* to ensure that contamination levels and radiation doses received by individuals are monitored, controlled, and maintained as low as reasonably achievable.

CNSC staff concluded that the uranium and nuclear substance processing facilities and research reactors were effective at controlling radiological hazards during the applicable reporting periods. The doses received by workers at these facilities were well below CNSC regulatory limits over the reporting period.

As shown on this slide, one radiation protection-related action level exceedance occurred in 2020 at the Blind River Refinery. Action levels serve

as an indication that, if exceeded, may indicate a potential loss of control with a program.

In July 2020, a worker's dosimeter recorded a skin dose of 26.4 millisieverts, which exceeded Cameco's monthly skin dose action level of 15 millisieverts, but was below the regulatory limit for equivalent dose to the skin for a nuclear energy workers of 500 millisieverts per year. Cameco determined that most of the dose was received while the dosimeter was lost in a processing area, so the dose was mostly non-personal. A dose change request was pursued by Cameco and approved by the CNSC. CNSC staff are satisfied with Cameco's responses to this action level exceedance.

This slide illustrates the maximum effective doses to nuclear energy workers, or NEWs. The maximum effective dose to NEWs from the uranium and nuclear substance processing facilities in 2020 occurred at the Blind River Refinery where the maximum effective dose was 10.1 millisieverts per year. The maximum dose at the Blind River Refinery is reflective of the work activities at the facility and influenced

by factors such as production levels and the number of operating days.

For the research reactors between 2018 and 2020, the maximum effective dose was 4.36 mSv, which occurred at the McMaster nuclear reactor in 2019.

In summary, doses to NEWS from all uranium and nuclear substance processing facilities and research reactors continue to be well below the regulatory limit of 50 millisieverts per year.

Turning to environmental protection performance, effluent verification monitoring programs were effective in controlling airborne and waterborne releases of radioactive and hazardous substances. Environmental monitoring programs confirmed that the health and safety of people and the environment remained protected. All releases from 2018 to 2020 were well below regulatory limits at all sites.

There were five occurrences of environmental protection-related action level exceedances that were reported to the CNSC.

With regards to the BWXT Toronto

facility, the following action level exceedances occurred. On March 17, 2021, BWXT Toronto reported that they had been applying the pH release limit set by the City of Toronto sewer use bylaw as their action level, which is less restrictive than the CNSC-accepted pH action level. As a result, there were 27 exceedances of the lower CNSC-accepted action level. None of the releases exceeded the City of Toronto sewer use bylaw requirements.

With regards to the Port Hope Conversion Facility, the following action level exceedances occurred. On March 13th, 2020, the uranium concentration exceeded the sanitary sewer discharge action level due to groundwater infiltration from a heavy precipitation event.

As highlighted in the errata slide of this presentation, the following three action level exceedances also occurred at the Port Hope Conversion Facility. On April 30th and May 31st, 2020, the fence line gamma action levels were exceeded, and on July 13th, 2020, the fluoride emission action level was exceeded. Additional details on these three

exceedances are provided on the next slide as they were not included in CMD 21-M33.

The fence line gamma action level at station 31 was exceeded on two occasions, on April 30th and May 31st, 2020. The April and May gamma radiation measurements were 0.28 and 0.26 microsieverts per hour respectively, which exceeded the action level of 0.22 microsieverts per hour. Cameco's investigation determined that the exceedances were due to uranium hexafluoride cylinder storage in the area. Cameco reviewed and adjusted the cylinder storage in the area to reduce exposures.

On July 13th, 2020, a burnout of a fluoride inlet valve resulted in an elevated fluoride emission of 273 grams per hour, which exceeded the action level of 230 grams per hour. Cameco's uranium hexafluoride plant was shut down immediately. The fluoride inlet valve was replaced, and the plant was restarted the following day.

CNSC staff assessed and confirmed that there was no impact to workers, the public, or the environment as a result of the action level

exceedances at BWXT Toronto and the Port Hope Conversion Facility. CNSC staff reviewed the licensees' corrective actions in relation to the exceedances and are satisfied with licensees' responses.

This slide illustrates the uranium in ambient air around uranium processing facilities and tritium releases from SRBT in 2020. Direct releases of radionuclides to the environment from uranium fuel refinery, manufacturing, and conversion facilities are primarily limited to uranium released to the atmosphere. The Ontario Ministry of the Environment, Conservation, and Parks' standard for uranium in ambient air, shown as the red line on the slide to the left, represents a concentration that is protective against adverse effects on health and the environment.

The monitoring results indicate that concentrations of uranium in ambient air around these facilities were below the provincial standard. Note that BWXT Peterborough does not conduct ambient air monitoring, as emissions at the point of release are already below the provincial air quality standard for

uranium.

The only radionuclide released by SRBT is tritium, as shown on the graph to the right. The licence limit for total tritium is shown as the red line, which represents a value that is protective against adverse effects on health and the environment.

Best Theratronics did not have any airborne or liquid radiological releases, and Nordion had zero releases of radioiodine and noble gases in 2020.

There is no impact to workers, the public, or the environment as a result of these annual releases from the uranium and nuclear substance processing facilities.

This slide illustrates the total annual release of radionuclides at the McMaster Nuclear Reactor from 2018 to 2020. Direct releases to the environment at the McMaster Nuclear Reactor are limited to small residual releases to the atmosphere. The graph on this slide illustrates argon-41 and iodine-125 releases between 2018 and 2020.

No data is provided for the SLOWPOKE-2

facilities as there are negligible airborne and liquid radiological releases from École Polytechnique, Royal Military College, and Saskatchewan Research Council.

There is no impact to workers, the public, or the environment as a result of these annual releases from the research reactors.

This slide illustrates the maximum doses to public. The maximum dose from the uranium and nuclear substance processing facilities in 2020 occurred at the Port Hope Conversion Facility. The maximum public dose from this facility was 0.117 millisieverts per year.

With regards to research reactors between 2018 to 2020, the maximum public dose was less than 0.001 millisieverts per year, which occurred at the McMaster Nuclear Reactor in 2018, 2019, and 2020. Public dose estimates are not provided for Best Theratronics because its licensed activities involve sealed sources and there are no discharges to the environment.

In summary, doses to the public from all uranium and nuclear substance processing

facilities and research reactors continue to be well below the regulatory dose limit of one millisievert per year.

Turning to conventional health and safety, this slide provides information about lost-time injuries. Licensees are required to develop, implement, and maintain effective safety programs to promote safe and healthy workplaces and minimize incidences of occupational injuries and illnesses.

A lost-time injury is an injury that takes place at work and results in the worker being unable to return to work for a period of time. The number of lost-time injuries and corrective actions taken in response is a key performance indicator for conventional health and safety.

There were no lost-time injuries for any uranium and nuclear substance processing facility in 2020 or for research reactors over the 2018 to 2020 period.

I will now pass the presentation back to Mr. Andrew McAllister.

MR. McALLISTER: Thank you,

Mr. Leroux.

Andrew McAllister, for the record.

I will now speak to CNSC staff's assessment of other matters of regulatory interest.

CNSC staff routinely engage with the public by participating in relevant community events as a means to inform them of CNSC's role and to discuss issues of concern related to CNSC-regulated activities.

An example of public engagement in 2020 included two open houses in January 2020, where CNSC staff delivered a presentation to members of the public in Toronto and Peterborough. The open house events provided information about the CNSC, the BWXT Toronto and Peterborough licence renewal, and allowed opportunity for members of the public to ask questions.

A CNSC participant funding program has been implemented to assist members of the public, Indigenous Nations and communities, and other stakeholders in providing value-added information to the Commission through informed and topic-specific

interventions. The funding was awarded based on independent funding committee recommendations. The CNSC awarded funding to the Algonquins of Ontario and Curve Lake First Nation to participate in the regulatory oversight report process.

The CNSC's independent environmental monitoring program verifies that communities and the environment around licensed nuclear facilities are safe. CNSC conducted IEMP sampling in 2020 around the Blind River Refinery, Port Hope Conversion Facility, and Cameco Fuel Manufacturing. Results are posted on the CNSC IEMP website. IEMP sampling at other sites continues to be conducted in accordance with CNSC staff's IEMP sampling plan. The results from the IEMP demonstrate that licensees' environmental protection programs are effective and that the people and the surrounding environment are protected.

I will now provide CNSC staff's safety performance conclusions for the uranium and nuclear substance processing facilities and research reactors.

CNSC staff confirm that licensees operating uranium and nuclear substance processing

facilities in 2020 and licensees operating research reactors from 2018 to 2020 adequately controlled radiation exposure to keep doses as low as reasonably achievable, maintained releases to levels protective of the environment, continued to protect workers with conventional health and safety programs, continued to effectively implement programs in support of all safety and control areas, and addressed all areas of non-compliance in a timely manner.

CNSC staff are satisfied that licensees continue to protect the health and safety of workers, the public and the environment.

The following slides present an overview of the key themes from the interventions received for this regulatory oversight report.

CNSC staff received three interventions on this regulatory oversight report from the Algonquins of Ontario, Curve Lake First Nation, and the Canadian Nuclear Workers' Council. The following key themes were raised in the interventions:

- request for increased consultation and engagement from both licensees and the CNSC;

- recommendation for the co-development of a Terms of Reference with the Algonquin's of Ontario and that the CNSC adopt a "one-window approach" through which all CNSC-regulated site-specific engagement, consultation, and oversight activities are convened;

- participation in environmental monitoring activities, including IEMP;

- lack of language that represents the perspectives, understandings, and relationships to the land that are representative of Indigenous peoples and their knowledge systems;

- improving how Indigenous Nations are acknowledged within the regulatory oversight report, including the inherent and/or Treaty rights of First Nations;

- and lastly, the request for additional information related to environmental protection measures, environmental monitoring data, and transportation of nuclear material.

I will now speak to staff's responses to the key themes.

The CNSC, as an agent of the Crown, has a duty to consult with Indigenous Nations and communities. The CNSC staff are committed to continuing these working relationships in order to better understand and address the issues and concerns raised in these interventions. CNSC staff will work with Indigenous Nations and communities to improve how they are acknowledged and referred to within the regulatory oversight report.

CNSC staff acknowledge that Indigenous participation in the regulatory process should be in its own section of the report and have made this change as reflected in this presentation.

CNSC staff are committed to enhancing our relationships with interested and potentially affected Indigenous Nations and communities, including through formal agreements where appropriate. CNSC staff are continuing to work closely with interested Nations and communities when planning IEMP activities and continue to evaluate other areas where they can be integrated into CNSC processes.

CNSC Staff have carefully noted the

content of the interventions received and will follow-up separately in order to discuss their concerns and provide the information requested.

Before I provide concluding remarks, I would just like to correct one speaking point that we made on the record, and that was with respect to the judicial review on the *BWXT NEC* decision. We made reference to the Ontario Supreme Court, that was an error. The review is happening in Federal Court. I just wanted to correct that for the record.

I will now provide some concluding remarks.

CNSC Staff's regulatory oversight activities confirm that licensees are taking action in a timely manner. Licensees' programs are implemented effectively. Priority areas using a risk-informed approach and verification activities are maintained. And that trends across the uranium and nuclear substance processing facilities and research reactors demonstrate that these industries continue to operate safely.

Staff will continue to conduct

regulatory oversight activities in order to verify compliance, and we anticipate presenting to the Commission our regulatory oversight report covering the 2021 calendar year for uranium and nuclear substance processing facilities in one year's time. And the next regulatory oversight report of research reactors is anticipated to take place in 2024.

This concludes Staff's presentation. We're available to respond to questions from the Commission. Thank you. Merci.

THE PRESIDENT: Thank you very much, CNSC Staff, for the report and the presentation.

I will now ask the representatives of each licensee if they wish to make comments on Staff's regulatory oversight report for 2020, and we'll follow the same order as in the Staff's presentation.

So we'll start with Cameco Corporation. Mr. Mooney, would you like to make a statement?

MR. MOONEY: Good morning, President Velshi and Members of the Commission. And, yes, we do have an opening statement prepared for you.

For the record, my name is Liam Mooney, I'm the Vice-President of Safety, Health, Environment Quality and Regulatory Relations for Cameco Corporation.

With me today virtually from our Fuel Services Division is Tom Smith, Cameco's Director of Regulatory Compliance and Licensing, and Rebecca Peters, our Superintendent of Special Projects.

We are joining you today as part of your review of CNSC Staff's 2020 Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities.

We would like to first emphasize that Cameco's highest priorities are the safety and health of our workers, members of the public and the environment. We take great pride in the quality of our processes and programs that support these priorities, and Cameco's resulting strong performance that is detailed in the report that Staff has presented today.

We had satisfactory ratings across safety control areas in 2020, which is a product of

both our people and our robust and mature processes and programs.

We continue to communicate regularly with the Municipality of Port Hope on our general operations, and in 2020 we provided quarterly environmental monitoring summaries to municipal council.

Dale Clark, the Vice-President of our Fuel Services Division, also meets regularly with the Mayor to discuss our general operations as well as Vision in Motion.

The General Manager of our refinery meets annually with the Town Council in Blind River as well as the council of the neighbouring Mississauga First Nation.

Cameco's environmental performance remains strong, and we have a culture of continuous improvement that supports our commitment to protecting the environment.

In 2020 the Blind River Refinery recompleted another year of operation with no reportable environmental events, and achieved 14 years

with no lost-time injuries. In fact, in 2020, as you heard yesterday, Cameco had no lost-time injuries not only across the Fuel Services Division, but also the entire organization for the first time in our history.

Cameco Fuel Manufacturing continued to safely provide fuel for our customers, which accounts for 30 per cent of all of Ontario's energy while delivering reactor components for Ontario's life extension projects.

The Port Hope conversion facility continued to operate safely while progress on Vision in Motion and the transfer of eligible waste to the long-term waste management facility slowed, primarily due to the impact of the pandemic.

We are proud to operate in Port Hope and Blind River and take our responsibilities seriously to put people and their well-being first.

We demonstrated our commitment to our communities in a variety of ways from providing accurate timing, timely and meaningful communication to supporting and investing in many of the organizations and events that make our community

strong.

Our annual public polling results verify that our communities are both well-informed and supportive of Cameco's operations. The most recent polling results confirmed that 90 per cent of Port Hope residents support the continuation of Cameco's operations and 84 per cent agree that Cameco does everything possible to protect people and the environment.

Our most recent annual reporting polling results in Blind River in 2021 showed 96 per cent of respondents support the continued operation of the refinery, consistent with the long-term trend. Also, 91 per cent of the respondents agree Cameco does everything possible to protect people and the environment.

We believe that our success in fostering and maintaining these high levels of community support is built on our demonstrated track record of operational excellence and our commitment to engagement.

In 2020 we took important steps to

improve our Indigenous engagement. We proactively reached out to Indigenous communities identified in our public information program to improve both open communication and enhanced meaningful relationships. We are committed to continuing to develop relationships and improve our own knowledge of their respective interests.

In Blind River we continue to stay in regular contact with the Mississauga First Nation. In February 2020, at the request of the Mississauga First Nation, the refinery's GM provided an update to council and community members as part of their community consultation.

We also met with the Chief in April to specifically discuss the yard fire.

In the fall of 2020 we provided formal notification to the Mississauga First Nation of the refinery's upcoming change in leadership and our relicensing application.

We met with Chief and Council in February of this year to specifically discuss relicensing, which took place in November.

For Port Hope, we reached out to all the First Nations and Métis Nation of Ontario identified in our public information program in 2020. This has been followed up with further dialogue with the Curve Lake, Hiawatha, and Scugog Island First Nations in 2021.

The safety of our workers, their families and their communities is our overriding priority as Cameco addresses the ongoing COVID-19 pandemic. In March 2020 we convened our Corporate Crisis Management team and our operations activated their local business continuity plans. Employees who could work remotely from home did so, and all non-essential work was suspended.

In the beginning, the newly implemented screening protocols and other measures put in place to align with government and public health directives made it challenging for us to maintain an adequate workforce at our UF6 plant. As a result, we made a careful and measured decision to temporarily suspend production in a safe and planned manner.

This decision also impacted our Blind

River refinery since the majority of the UO3 produced there is sent to the UF6 plant. The two facilities were placed in a safe shutdown state for approximately four weeks.

There's no doubt that COVID-19 has changed the way we all work and that is true at Cameco. Workers are regularly screened before accessing our facilities, requirements regarding physical distancing and mask usage are in place, and enhanced cleaning and disinfection protocols have been implemented.

As we worked through the challenges at our own facility, Cameco's continued to support our local communities. We created a \$250,000 COVID-19 relief fund, which has helped 23 organizations in Northumberland County and 12 in the Blind River area. Cameco also donated PPE to local health care facilities in the Blind River and Port Hope areas.

Throughout the pandemic we have continued to manage our facilities in a safe manner and have maintained compliance to our regulatory requirements. There were no cases of COVID-19 at any

of our facilities until November 2020 when three confirmed cases were identified at CFM Port Hope.

We also implemented voluntary rapid testing for all our workers in early 2021, as soon as those testing resources were available to us, which allowed us to conduct 2,500 tests over 33 weeks across the facilities. We are confident our protective measures have been effective and that without them more workers and their families could have been impacted.

In early 2021 we ran vaccination clinics at our Port Hope conversion and Cameco Fuel Manufacturing facilities. With the help of the Health Authority, we managed to distribute approximately 500 doses to our workers at our sites.

Commencing November 15th, 2021, we instituted a mandatory vaccination requirement for all employees, contractors and visitors. We took the step to ensure we continue to provide a safe workplace for our workers, our families and our communities.

Looking forward, we will continue to work with public health experts as well as continuing

dialogue with our workforce and use of experience to ensure we have the right measures in place to protect our people.

In summary, I would like to thank CNSC Staff for their work in preparing this report for the Commission in these challenging times. We remain committed to working hard everyday to uphold our commitment to the health and safety of our workers, members of the public, and the environment.

Thank you for the opportunity to speak today in relation to Staff's report. We're available to respond to any questions that you might have for us.

THE PRESIDENT: Thank you, Mr. Mooney.

Let's move next to BWXT. Mr. MacQuarrie, if you'd like to make a statement please?

MR. MacQUARRIE: Good morning, President Velshi and Members of the Commission. For the record, I am John MacQuarrie, President of BWXT Nuclear Energy Canada.

So I'd just like to make two brief comments. But first, I'd like to mention that joining

me virtually from BWXT are Ted Richardson, David Snopek, and Natalie Cutler.

So just two brief comments. First, with regard to the pandemic, I'm pleased to share that our licensed operations operated safely through the pandemic without interruption and, in fact, we've not experienced any cases of employees testing positive in our licensed operations.

Second, with regard to the 2020 licence hearing, we appreciate the feedback that we received from intervenors and we've made a large number of improvements to our public information program.

So we've increased the number and amount of information shared on our website, including environmental dashboards, release data, virtual facility tours, public attitude surveys, webinar about our business, and we've nearly doubled the size of the Peterborough and Toronto community liaison committees over the last year or so.

So thanks for the opportunity to provide these brief updates, and we'd be pleased to

answer any questions that you may have for us. Thank you.

THE PRESIDENT: Thank you very much for those succinct remarks, Mr. MacQuarrie.

Let's move next to SRB Technologies. Mr. Levesque, would you like to make a statement please?

MR. LEVESQUE: President Velshi, thank you very much, and Members of the Commission, thank you.

In 2020 we, as in our entire licence term, operated our facility safely, met the requirements of our licence, we haven't exceeded actually an action level in over seven years. We maintained our relationship with all our stakeholders, and we've really increased our Indigenous engagement, realizing the importance.

In closing, soon we'll be in front of you. We recently submitted a licence renewal application for our licence for a period of 15 years and we intend on continuing to upgrade the facility, as we have, but continue to improve, not rest on our

laurels, try and to find ways to improve in any aspect of the operations.

I'm joined here today with Ross Fitzpatrick, our Vice-President, and also virtually by Jamie MacDonald, our Manager, Radiation Safety, Health Physics and Regulatory Affairs. And we're ready to answer any of the questions that you may have.

Thank you very much.

THE PRESIDENT: Thank you, Mr. Levesque.

Let's move to Nordion. Mr. Brooks, if you'd like to make a statement?

MR. BROOKS: Yes. Thank you, President Velshi. Very brief opening remarks. Good morning, Commission.

Thank you for this opportunity to participate in the meeting. We're available to answer questions with regards to the 2020 Regulatory Oversight Report.

With me today are my Nordion colleagues Richard Wassenaar, our Director of Regulatory, Environmental Health and Safety, Jennifer

Mahoney, our Manager of Environmental Health and Safety, and Sabrina Sng, who is our Senior Environmental Health and Safety Compliance Specialist.

Here at Nordion we're very proud of our safety and compliance record, it's core to our mission of safeguarding global health. We believe that our strong safety and compliance culture is reflected in the 2022 Oversight Report.

The Commission is aware, as mentioned earlier, that BWXT Medical has now been granted their own Class 1B licence and no longer considered a subcontractor under the Nordion licence.

However, during all of 2020 BWXT Medical was working as a contractor under Nordion's oversight and licence. As such, all activities here at 447 March Road in Kanata, Ontario were conducted under the Nordion licence, and we are prepared to speak to any questions that Commission Members may have regarding the activities on our site covered under this oversight report.

We'd like to thank the Commission, the CNSC, for allowing us to operate under this framework

since 2018. That framework proved to be effective in ensuring the safety of our employees, the community, and the environment, as well as maintaining compliance with regulations.

Thank you very much, President Velshi, we turn it over to you for questions.

THE PRESIDENT: Thank you, Mr. Brooks.

From Best Theratronics, I believe we've got Mr. Efseaff with us, if you would like to make a statement please?

MS. MAYDA: Good morning. This is actually Jess Mayda, the Quality and Regulatory Manager here at Best Theratronics. With me is Dr. Efseaff, who is our RSO, and Marilee Jackson, who is our Radiation Safety Specialist.

I just wanted to thank you for the opportunity to be part of these discussions. Best Theratronics has been operating safely throughout this whole pandemic and COVID. We have not had to shutdown any of our operations or anything else, and we have been working well and safely under our licensing conditions and handbook.

So that is actually all I would like to say. Thank you.

THE PRESIDENT: Thank you, Ms Mayda, we appreciate that.

Let's move next to McMaster Nuclear Reactor, and I believe we've got either Mr. Zic or Mr. Heysel with us, if you would like to make a statement?

MR. HEYSEL: This is Chris Heysel, for the record. I'm the Director of Nuclear Operations and Facilities here at McMaster. And with me today virtually is Joe Zic, the Senior Health Physicist for McMaster, and the Director of the Department of Health Physics on campus.

Just a short statement. We've reviewed the report and we thank the CNSC Staff for putting together what we thought was a very fair and accurate report.

The last two years has been challenging for everybody here on this phone call, and I'm really quite proud to say that we were able to operate throughout the pandemic so far, and to thank the staff for all their efforts to make that happen,

and I'm talking about McMaster staff.

And to the point that the small group here on a large university campus actually won the prestigious President's Award for their efforts on maintaining the supply of these life-saving medical isotopes across the globe throughout this very challenging time. So I'm quite proud of our staff for achieving that.

In summary, we've operated safely and securely throughout the last two years of this report, and I look forward to answering any questions that you may have.

Thank you.

THE PRESIDENT: Great. Thank you, Mr. Heysel, and congratulations on that recognition.

I don't know if we've got anyone from l'École Polytechnique de Montréal with us? Madame Chilian is here, if you'd like to make a statement?

I don't believe we have anyone then.
Okay.

Then let's move over to the Royal Military College of Canada, and I believe Mr. Chan is

here with us. Over to you if you wish to make a statement please.

MR. CHAN: Good morning, President Velshi and the Commission Members.

I must thank the staff for their hard work and I have no comments on the report. And I just want to make a statement that Slowpoke was successfully reviewed -- just recently reviewed, and again the Staff has put in a lot of time and the support from staff is highly appreciated.

And I'm available for any comments from the Commission Members, the President and from the public. Thank you.

THE PRESIDENT: Thank you very much.

I don't know if anyone from the Saskatchewan Research Council is here with us but, if you are, you have an opportunity to make a statement. I guess not.

Okay, then let's open the floor questions from Commission Members, including questions from the three written submissions that we have received: one was from Curve Lake First Nation, as

outlined in CMD 21-M33.1; one was from the Algonquins from Ontario, as per CMD 21-M33.2; and, the third from the Canadian Nuclear Workers' Council, in CMD 21-M33.3.

And let's begin with Mr. Kahgee please.

MEMBER KAHGEE: Good morning. Thank you, Madam President.

I just want to say thank you to the Staff for their efforts and hard work in putting this together this morning, really appreciated content and the outline and the effort put into the report.

Also thank you to the licensees for your efforts in these unprecedented times.

And Meegwetch to intervenors for sharing with us bringing their voice forward to these proceedings.

I just have one question, perhaps for Cameco and CNSC. I was just wondering if you can briefly outline the existing mitigation measures that are in place to reduce and/or prevent fish impingement and entrainment at the Port Hope conversion facility?

MR. MOONEY: Thank you for that. I'm going to ask Tom Smith to provide the details in relation to some of the changes that we've made over the last couple years as we have continued to safely operate the conversion facility.

MR. SMITH: For the record, Tom Smith, Cameco Fuel Services Division. Thank you for the question.

We take fish impingement and entrainment very seriously at the Port Hope conversion facility. We've done a number of studies historically. We have a number of features in place. We have thrusters behind the screens to blow material, including fish and debris, away from the screens.

And, more recently, we installed a barrier just immediately south of our intake to counteract both algae build-up and the migration of fish towards the screens. It's a two-component barrier; an outer barrier, and then behind it a bubble barrier which discourages fish from getting close to the cooling water intake screen.

I might add that we will be abandoning

our cooling water intake in 2022. We've decided to go to a closed loop system and we'll no longer be taking in cooling water from the confluence of Lake Ontario and the Ganaraska River.

MR. MOONEY: It's Liam Mooney, for the record. Maybe I would just add in addition to those. Improvements have been made, we did change some of our approach to that. And so now there's daily documented visual inspections that are undertaken.

And our operator care round checklist actually has been updated to include that inspection requirement. And the operators look to see if there's any fish or debris and, if there are, the Chief Operating Engineers receive a report in that regard. And we updated our work construction and our environmental protection plan to include that requirement.

So I think Tom touched on some of the physical changes that were made, and then like how we responded to the notice of non-compliance speaks to some of the administrative changes that were made as well.

THE PRESIDENT: Thank you. Ms. Maharaj.

MEMBER MAHARAJ: Thank you, Madam Velshi.

I'd like to ask a question with respect to the discharges or releases into the Port Hope Harbour. And I understand that, you know, there were a couple of corrections made by Staff this morning. So perhaps if Staff could answer first, and then maybe the licensee.

I just want to make sure I'm clearly understanding the releases of the fluoride are different from the releases that were previously reflected in the report with respect to Port Hope Harbour.

And just if I can take you to -- it was on Slide 21, and PDF page 47. I just want to ask for some clarification here and an understanding of what were the releases and the impact of the releases to the harbour of effluent.

MR. McALLISTER: Thank you, Ms. Maharaj.

Perhaps with the first part of reconciling the events of the recent fluoride in the presentation versus the deck, I will ask John Thelen, who is the Project Officer on the Port Hope Conversion Facility, to help clarify that. And then when it comes to impacts, I will turn to our environmental protection team who can provide further information on that.

MEMBER MAHARAJ: Thank you.

MR. THELEN: John Thelen, CNSC staff, for the record.

I will start and then I can also pass this off to Adam Leroux to add further information as required.

Just to clarify for the record, Cameco does not have direct effluent releases to Port Hope Harbour or to Lake Ontario. They do have, as Mr. Smith from Cameco mentioned, a cooling water intake and discharge system. So this is taking water from Lake Ontario and discharging it. And as part of their monitoring requirements they are to determine whether or not there were any changes during that process

through the piping that could influence or cause uranium or other constituent of potential concern to make it into that water before discharge into the harbour. So there isn't a direct effluent release to the harbour from those activities. Cameco does do evaporation as one form of dealing with the liquid effluent releases, rather than discharge to Lake Ontario.

MR. McALLISTER: And on the topic of impacts, can we have someone from the Environmental Protection staff perhaps provide a bit more clarifications?

MS. FABIAN MENDOZA: It's Melissa Fabian Mendoza from the Environmental Risk Assessment Division.

So what I can add is just putting the leak into some context I guess with our guidelines. So I believe what we are speaking about is the fluoride leak on July 22, 2020 at the Port Hope Conversion Facility. This resulted in a peak release at the stack of 1600 grams per hour of fluoride and an analysis of the monitoring equipment indicated that

the results were below the Ontario ambient air quality criteria. So based on being below this criteria, the risk to the environment and human health was determined to be negligible. Thank you.

MR. McALLISTER: So to conclude, Ms. Maharaj, the fluorine releases that we are making reference to were atmospheric in nature and not to the harbour.

MEMBER MAHARAJ: Okay. Okay. So then if I can take you back to -- it will be page 31 of the staff's submission, which is on PDF page 37. There are two releases that are disclosed here. One is PHCF and this is the release of uranium in the sanitary sewer discharge, and then the other is BWXT-NEC, which is again another exceedance in liquid effluent. Are either of these two releases in excess of any other municipal, provincial, federal allowance levels or are these exceedances both unfortunate but still under levels of concern?

MR. McALLISTER: I will ask --

MR. MOONEY: Oh, sorry. I was going to suggest we have Rebecca Peters online that can talk

about that. I think the initial clarification on the fluoride releases are in relation to air, and the sanitary sewer matter that we are talking about on page 31, Rebecca will provide some further detail in that it was an action level, not near a limit. But Rebecca Peters has some more detail in that regard.

MS. PETERS: Thanks, Liam.

Rebecca Peters, for the record.

So the discharges to the sanitary sewer from the Port Hope Conversion Facility, as well as CFM, have been assessed in the derived release level reports and the environmental risk assessments for both facilities and these action levels are set well below what the release limits would be set under either of those assessments and well below what an exposure-based release level would be derived from the CCME criteria. So these, while unfortunate, are above our action level. They are due to actually the penetration of contaminated groundwater into the sanitary sewer network on the Port Hope Conversion Facility that is being replaced as part of the Vision in Motion project.

So there have been activities taken to repair these lines where we are identifying the specific breaches, but we are also looking to replace all of this infrastructure going forward as part of the VIM project. So we will continue to see occasional occurrences over the next couple of years, but it will all be corrected as part of the VIM work that is currently ongoing at the Port Hope Conversion Facility.

MEMBER MAHARAJ: And does that VIM work include addressing the contaminated groundwater?

MS. PETERS: Rebecca Peters, for the record.

Yes. So the Port Hope Conversion Facility has a groundwater collection system to address the historic groundwater contamination in various areas of the facility, including in the area where the sanitary sewer line discharges from the site to the public sewer system, and that pump and treat will remain during the VIM project and after the VIM project to ensure that we are mitigating the contamination at the facility.

MEMBER MAHARAJ: Okay. Thank you.

And then perhaps somebody from BWXT could speak to the release, the 27 instances of exceedances of a lower pH action level?

MR. MacQUARRIE: It's John MacQuarrie, for the record, from BWXT.

So we did have these releases that were below the City of Toronto's allowable limit for us to release into the sanitary sewer, but they were above the CNSC action level. So there was confusion with our staff at that facility and they were focused on the Toronto limit and not the CNSC action level limit. We have corrected that so that we are going to be within those CNSC action levels going forward and we don't believe that there is any impact due to these releases because it is regarded as safe by the City of Toronto.

MEMBER MAHARAJ: So the release was triggered as a result of pH limits, not a contaminant within the effluent. Is that correct?

MR. MacQUARRIE: Yes, that is correct.

I will ask David Snopek from BWXT to

comment, if you would like to add anything to what I have said.

MR. SNOPEK: Just to put a point on that, that that is correct. This is just in relation to the pH or the acidity of the water, that the City of Toronto has a wider range of acceptable pH for any user of the sewer in Toronto and the action levels set by the CNSC inside are smaller than that. So it was on the one side that we missed the action level, but none of the cases exceeded the sewer use bylaw for Toronto. And it's only on pH, it doesn't have anything to do with uranium or any other contaminant.

MEMBER MAHARAJ: Okay. Thank you.

THE PRESIDENT: Mr. McAllister...?

MR. McALLISTER: I guess just to conclude that, you know, the action levels are like our defence in depth in our Environmental Protection Program and exceeding an action level will happen from time to time. It is not meant to indicate there is an adverse effect. Rather, it is that early warning, it is a sign that something may be amiss and as such we make it reportable. There are reporting requirements

around that and, as indicated, the system is working, those were identified, reported and appropriate actions put into place, and at no time was there impacts to the environment as a result of these action level exceedances.

THE PRESIDENT: And Mr. McAllister, like even if I looked at slide 21, and as I was even listening to your presentation, at no point was it said that all these events were of negligible or low safety significance and I think it would be helpful if a statement to that effect was put in certainly in the presentation.

MR. McALLISTER: Noted. Thank you.

THE PRESIDENT: Thank you.

Dr. Berube...?

MEMBER BERUBE: Yes. Thank you for the presentation. I really appreciated the way that you actually broke it down. It just made it very easy to read, very quick to review. And because of the nature of the way you actioned on this actually illustrates, I have a couple of areas that are brought to mind in terms of the notices of non-compliance in

particular and I noticed there are a number of them in training systems and security. Knowing full well we can't talk about security openly in this kind of forum, let's just look at the training side of it.

Can you just give me some detail on what you found across the whole sector in terms of the non-compliances with regard to training and what actions actually have been put in place to actually fix this? And maybe you can give me some insight, too, as to why we are seeing some issues in that area?

MR. McALLISTER: Thank you for the question. Andrew McAllister, for the record.

Certainly our licensees have sort of a systematic approach to training in their programs and I will ask our Training Specialist, I believe Corinne Françoise is able to provide more details that you are seeking, Dr. Berube.

M^{me} FRANÇOISE : Bonjour. Corinne Françoise, pour le verbatim. I am the Director of the Training Program Evaluation Division at the CNSC.

Thank you for the question.

So the regulatory document that we use

to do our evaluations is REGDOC-2.2.2 Personal Training, and when we do our inspections of licensee training systems and programs, we verify that these requirements are met. It is not uncommon for us when we go and do these inspections to find some deficiencies in certain areas. Most of the time they are related to procedural non-compliances, for instance, certain job training matrices or things like that are not completed as they should, but in no way does it necessarily affect the robustness of the training programs.

MEMBER BERUBE: I just want to --

MS. FRANÇOISE: Is there anything in particular that you would like me to expand on?

MEMBER BERUBE: I just wanted to clarify actually that this isn't an issue with personnel training, this is an issue with more documentation than actual training itself?

MS. FRANÇOISE: Yes, that is correct. So we expect all the licensees to have a training system in place and it is through this training system that we gain the assurance that the workers at the

very end do have all of the knowledge, skills and abilities that they need to conduct their duties safely.

So when we go in, we want to make sure that they are being implemented, that the systems are being implemented properly. And so we will find -- as I said, it is not uncommon for us to find little deficiencies here and there. And again, these are sort of early warning signs that we want to make sure that we capture so that they can be corrected. So sometimes it's the outputs of those various processes or procedures where we will find some issues and then we require for them to be corrected. But a lot of those things, as I said, if we ask for a training needs analysis, for instance if there was a change to an operation, procedures or so on, we would expect them to use that process and in doing so then we are assured that the workers receive the most current training they need.

MEMBER BERUBE: Thank you.

THE PRESIDENT: Mr. Mooney...?

MR. MOONEY: Thanks. It's Liam

Mooney, for the record.

I think one of the things I would add to the CNSC staff's commentary on that is that I do sit through every one of our facilities' annual management review and there is a good deal of discussion at every one of those about training, making sure that our staff are trained appropriately and there are a number of mechanisms in place. A lot of times what we see is that it is refresher training that is in play and in that space we have additional levels of defence in depth, as Mr. McAllister said earlier, to ensure that the workers who are assigned the work are properly trained. So there is a robust process to ensure that only fully trained workers are carrying out the work that is assigned to them on any given day.

THE PRESIDENT: Thank you.

Mr. MacDonald...?

MR. MacDONALD: Yes, thanks.

Jamie MacDonald for the record, SRB Technologies.

Just to add to that for Mr. Berube's

clarity.

As one of the licensees that had some of those notices of non-compliance, just an example of what was levied for SRB and the actions we took. In one case we had identified that improvements to our training process were needed just to make sure that we were fully aligned with the regulatory document.

In our case, with the three NNCs we improved the scope of our systematic approach to a training program just to better define the positions and the activities that were encompassed by the systematic approach. We also enhanced our refresher training processes and tied them to the analysis of the difficulty, importance and frequency of those activities. And then finally, the third was a revamp of our training needs analysis process, including an expansion and some of the triggers that would cause us to have a non-routine analysis done.

So that is the sort of level of the non-compliances that were identified in the inspection report. We put those process improvements in place and CNSC accepted in our case all of the actions that

we put forth and closed those NNCs in May, May 15th of 2020.

So that is the kind of, for us at least at SRB, the kind of notices of non-compliance that were identified in the training realm.

THE PRESIDENT: Thanks very much for that.

Dr. Lacroix...?

MEMBER LACROIX: Thank you very much.

Thank you, staff, for providing us with such a comprehensive ROR. This is a question that was raised -- this is an issue that was raised by the Algonquins of Ontario and it is with regards to well MW06-10 at SRB's site. They are concerned with the elevated tritium concentration in the well and also the potential impacts on the surrounding environment. Now, although this has been addressed in the ROR, I would like to hear it first from staff and then from SRB Technologies, please.

MR. McALLISTER: Thank you,
Dr. Lacroix.

Andrew McAllister, for the record.

Certainly the SRBT site and surrounding area, its groundwater quality has been well characterized and it's well understood. I will ask Melissa Fabian Mendoza to provide further details regarding that.

MS. FABIAN MENDOZA: Thank you.

Melissa Fabian Mendoza, Director of the Environmental Risk Assessment Division.

So regarding the specific groundwater monitoring well, the MW06-10, this is the well that is directly beneath the area where the active ventilation stacks are located at SRBT. So if you look at the results from 2020, this well was the only well that represented -- or that had a tritium concentration that exceeded the Ontario drinking water guideline value of 7000 Bq per litre. An important thing to note though is absolutely this well is not used for drinking water, there is no way that that is possible, it is on the SRBT site and completely restricted.

Regarding this well as well, tritium concentrations have been extensively studied. The tritium concentration has been decreasing and

stabilizing, as projected by CNSC staff, over the years. In terms of the impacts to the surrounding environment, CNSC staff's independent modelling indicates that even the historical high levels measured, you know, going back to 2006, would not impose adverse impacts to the receiving surface water in the Muskrat River. So by the time the tritium in the groundwater would migrate from SRBT to Muskrat River it would be decreased below the detection level.

And if it would add some value, I know that our colleagues from ECCC are also on the line and would be happy to add their perspective on this if you wish. Thank you.

MEMBER LACROIX: Okay. Yes, please.

MS. FABIAN MENDOZA: Okay.

THE PRESIDENT: Ms. Ali, over to you.

MS. ALI: Nardia Ali, Environment and Climate Change Canada.

So I would like to say that ECCC, Environment Canada, has been involved in past studies of tritium released from the stack at the SRBT site and also on potential -- on studies on potential

impacts on groundwater and local surface water on the Muskrat River. So ECCC had concluded at that time that the levels were elevated but the potential for impacts on the local groundwater and the surface water were below -- was low because the levels were below the radiation dose thresholds for fish and other non-human biota.

MEMBER LACROIX: Okay.

MS. ALI: Yes. We are further sure, though, that the latest information continues to confirm that biota are not likely to be adversely impacted and we are pleased that SRBT has been taking measures to reduce tritium emissions and these measures appear to be successful.

MEMBER LACROIX: Okay. That's great.
Okay.

And SRBT, any reply on this?

MR. LEVESQUE: Yes. Thank you very much, Member Lacroix, for the question.

I appreciate the comments from the Algonquins of Ontario. For your information, we wrote a response to them to these comments and I will

basically paraphrase exactly what we responded to them. Like it was indicated by the CNSC staff, the monitoring well is in a secure area, in a fenced compound directly below the stacks of the facility. It is not a well that is used for drinking water.

MEMBER LACROIX: Right.

MR. LEVESQUE: So that is very important to note.

As everyone stated, to give some numbers to it, since we drilled the well in 2006 the concentration has decreased by 79 percent --

MEMBER LACROIX: Okay.

MR. LEVESQUE: -- since it was drilled originally, and if you want to put it down to the last five or six years, it has decreased by 43 percent since 2015.

MEMBER LACROIX: Okay.

MR. LEVESQUE: So it keeps -- as any of our other wells, although they are well below the drinking water -- continuously decreasing.

And we explained to the Algonquins of Ontario that the reason why this is expected to

continue to decrease is we have taken several years ago a number of actions to basically reduce the emissions of the facility. If you look, we reduced our weekly emissions by 98 percent and so they are only 2 percent of what they were in 2005.

MEMBER LACROIX: Okay.

MR. LEVESQUE: It's something that we reported as well on our brochure to the public that we send members of the public.

We have also discontinued the operation of certain pieces of equipment, a piece of equipment called reclamation rig that added to tritium oxide in the air, so that is also a help.

We have also discontinued some maintenance activities, pressure washing of our stacks where the water wasn't captured and basically dripping into the ground right below our stacks. So we have discontinued those activities.

MEMBER LACROIX: Okay.

MR. LEVESQUE: A number of years ago, in the early '90s, there was also right near the stacks some waste at the facility that was stored in

containers that weren't leak-proof which leaked into the ground and that was ceased a number of decades ago.

So that on top of other emission-reduction initiatives that we have taken, we expect that the concentration in this well and other wells will continue to decrease over time to below the drinking water level.

MEMBER LACROIX: Okay. And furthermore, I have noticed in this well that the concentration of tritium reaching minimum in June and a maximum in February, is it related to the weather or is it related to the operation of the facility itself?

MR. LEVESQUE: Stephane Levesque, for the record. Thank you for the question.

It's actually -- the numbers that you see the fluctuation don't relate in any way whatsoever to the operations of today.

MEMBER LACROIX: Okay.

MR. LEVESQUE: When we did our groundwater study in the mid-2000's, we had done a number of soil profiles that basically it takes

several years for the water to infiltrate and go down into the ground.

MEMBER LACROIX: Okay.

MR. LEVESQUE: So what we are seeing is basically fluctuations that occurred a number of years ago in our emissions and that is really it.

MEMBER LACROIX: Okay. Okay. I understand. Thank you very much. Thank you.

THE PRESIDENT: Thank you.

Dr. Demeter...?

MEMBER DEMETER: Thank you, staff.

It's a very well-written report, easy to follow. I love all the links and internal and external hotlinks.

I had a question on slide presentation 43, which is the annual dose to the public. I just wanted a bit of an orientation about the Port Hope Conversion Facility. It's one to two orders of magnitude higher than all of the other facilities, uranium and nuclear substance processing facilities, and obviously much higher than the nuclear power plants. And it's sort of reaching 10 per cent of the annual dose limit.

So from staff's point of view, from an ALARA point of view, is this the best we can do?

And maybe from Cameco, maybe there's an explanation why this particular public dose is one or two orders of magnitude higher than other processing facilities. Help me understand what this dose represents.

MR. McALLISTER: I'll start the -- I'll start it with Dr. Demeter. We'll have -- with dose to public we'll have our Health Science and Environmental Compliance staff elaborate on that regarding the public dose.

MS. SAUVÉ: So this is Kiza Sauvé. I'm the director of Health Science and Environmental Compliance Division. I'm going to start, and for a little more technical information some of my staff may jump in, and we might go over to Cameco as well.

So the dose to the public, it does appear higher than previous years as a result of some of their updated operational release limits. In the updated operational release limits, a fence line monitoring location that is closer to the operating

facility was used in the dose calculations compared to previous years.

So one of the important pieces is the increased dose is not a result of increased emissions or dose from the facility. So the public was not at risk prior to or after. The dose to the public was calculated in accordance with N-288.1. So I think the really important piece here is that we're still quite low. We're very low. We're less than 10 -- we're around 10 per cent of the public dose limit.

I'm not sure if any of my HSECD staff wants to add more or if we should turn to Cameco, but it really is -- we need to really, you know, look at we're still at a really low dose here.

THE PRESIDENT: Okay, if no one else from CNSC, let's turn to Cameco. Ms. Peters?

MS. PETERS: Hi, Rebecca Peters, for the record.

So I'm just going to elaborate a bit on what Ms. Sauvé said. The dose to the public calculation was revised by Cameco in 2016 as part of the review of the derived release limits. At that

time, we made much more conservative assumptions in the DRL, specifically related to the water releases from the facility as well as the fence line gamma.

And this -- some of these conservatisms included assuming that the critical receptor or the member of the public lived at a specific location close to the facility and spent all of their recreating time on our fence line. So essentially, this person doesn't leave, you know, 150 to 200 metres from the Port Hope Conversion Facility ever. So it is very conservative.

However, we opted to do that because the Port Hope Conversion Facility is situated in the downtown area of the Municipality of Port Hope and it was important to ensure that we were adequately capturing what the dose to the public was, so we opted to go on the more conservative route.

There was one other change to note. In 2019, the Centre Pier property, which used to be part of the licensed site, was transferred to Canadian Nuclear Laboratories after all of the accumulated waste had been transferred to the LTWMF. Prior to

this, the critical receptor for the Port Hope Conversion Facility was actually on the far side, on the east side of the Ganaraska River, which is quite a distance away from the conversion facility operating site. This was due to that legacy waste that was stored at the Centre Pier.

When the Centre Pier came out of our operating licence and went to CNL, we re-evaluated what that critical receptor was following the process under N-288.1. That critical receptor is actually a resident now who lives just north of the train tracks that are north of the conversion facility and assumed also to be a person who does all of their recreation around the facility.

So the receptors are represented by dosimeters on our fence lines. There's two dosimeters included in the calculation, one on the east side of the facility in an area where, when the harbour is not being remediated by CNL it's a prime fishing location, as well as on the north fence line.

I think it's also important to note that these monitoring locations are literally metres

away from our storage facility, from our operating plants. And as we know that gamma dose decreases with time, distance, and shielding. And this dose to the public calculation is estimated exactly at our fence line, which is not a realistic situation for any member of the public.

So yes, the numbers are higher when you compare them to the other facilities in this group, but it's because we are very conservative in how we are calculating that dose to the public.

The other thing I would like to point out, it doesn't show in the CNSC documentation, but the reported dose to the public for 2020 is actually well within the normal range that we've had since we redid the calculations in 2016. So it's a little bit lower, actually, than 2019. It just looks a little different when we're comparing to the other facilities. But it is -- as Ms. Sauvé said, that change did not represent an increase in emissions; it just represented a change in where we were actually performing the calculation from. And it is much more conservative.

MEMBER DEMETER: Thank you. And I do want to comment that there is a bit of an apples to apples comparison here in that all of these industries have critical receptors at the fence line as their public -- I mean, a similar methodology used for all these facilities for the critical receptor at the fence line and the public dose limits. So it's not like you're measuring things more, you know, closer to your plant. Blind River will have also a critical receptor at their fence line.

So I understand what you're saying. I know it's way below the dose limit and you've explained enough for me. Thank you.

MS. PETERS: Could I just respond to that? Rebecca Peters, for the record.

Actually, the critical receptor for the Blind River Refinery is not on the fence line. It's actually further away from the facility. There is a buffer zone around the Blind River Refinery. So within the Cameco facilities, the Conversion Facility is very different from the Blind River Refinery and CFM as well, just in the size of the facility and the

amount of material stored on site, they are very different calculations. So it really is not the best to compare apples to apples unless you have the math that goes behind it, which unfortunately doesn't translate into a simple table.

MEMBER DEMETER: Okay, thank you.

THE PRESIDENT: Ms. Peters, I have a follow-up to that. And it's from the Curve Lake First Nation intervention, where the question was asked, well, how does this dose to the public factor in the diet of perhaps your critical -- and may make someone a critical receptor based on the fish and the food and the hunting and so on.

So can you help us understand how that is factored in?

MS. PETERS: So Rebecca Peters, for the record.

So both the dose to the public and our environmental risk assessment assessed the uptake of uranium by people living in the area. Both of those include uptake through vegetation and other foods that may have consumed the vegetation as well as breathing

it in.

In our ERAs, we have completed desktop work to ensure that the assumptions we're making are consistent with the dietary patterns of First Nations people in Ontario. It is -- that work suggested that we are conservative in that approach. However, through our ongoing discussions with Curve Lake in 2021, we've actually had some really good dialogue on some specific studies based on local items that they're foraging for in our local areas that we're actually going to do some specific field work, get some data, incorporate that into our future work. So we've done it kind of from the theoretical level, and now we're getting the boots on the grounds.

THE PRESIDENT: Thanks very much.

CNSC staff, do you have a perspective you want to share on this?

MR. McALLISTER: Andrew McAllister, for the record.

Maybe I'll start, and I see Ms. Sauvé has popped up on the video. But certainly, I guess to complement what Ms. Peters said, that gets to sort of

our environmental protection framework where things are not static. They do get updated based on the change in the science, new information. It's great to hear what Ms. Peters said with respect to engaging with Curve Lake, because these ERAs do get updated on sort of that five-year basis, and we look forward to any information that those studies might glean and how that gets integrated into the risk assessments moving forward.

I'll ask Ms. Sauvé if she has anything else to add.

MS. SAUVÉ: Thanks, Mr. McAllister.
Kiza Sauvé, for the record.

What I would add from a regulatory perspective, the CSA standards, N-288.6, which is your environmental risk assessment, and N-288.1, which is the -- which describes how to calculate the dose to the public, do require considering the dietary needs of Indigenous communities near the facility. So there is a regulatory requirement to this as well.

THE PRESIDENT: Thanks very much.
Dr. Lacroix?

MEMBER LACROIX: Okay, I got it.

Thank you. Well, these are not questions. I got two clarifications.

First, I noticed that staff, you refer to skin dose, and I think that you make a difference between skin dose and whole body dose according to the penetration depth of radiation. Am I right?

MR. McALLISTER: Andrew McAllister, for the record.

I'll ask our radiation protection specialist to provide that clarification.

MS. PURVIS: Caroline Purvis. I'm the director of the Radiation Protection Division, for the record.

So you are correct, Dr. Lacroix. There are dose limits in place pursuant to the CNSC's radiation protection regulations, both for the effective dose -- which takes into account external and internal exposures, so whole body, essentially -- and there are also dose limits for the skin and for the extremities and the lens of the eye.

MEMBER LACROIX: Okay. Okay --

MS. PURVIS: So licensees will monitor -- sorry, sorry to interrupt you; I'll --

MEMBER LACROIX: No, no, not at all. That's okay.

MS. PURVIS: -- just finish -- so licensees in their radiation protection programs have to demonstrate compliance with these limits. And they will traditionally for measuring dose to the skin wear a whole body dosimeter. So there are two chips in it that will -- one is at the depths which measures the whole body dose, and there's another chip in it that's at a different depth that represents the dose to the skin.

MEMBER LACROIX: So if I understand correctly, there's no well-defined line between a skin dose and a whole body dose. Both are measured?

MS. PURVIS: Both are measured using the same device, typically. But because radiation interacts differently with the two different parts of the dosimeter, you get two different results.

MEMBER LACROIX: Okay. Okay, that's great.

And my second question, it's not for you, it's for McMaster Nuclear Reactor. I've noticed on page -- it's on page 44 in the ROR. And it's respect with a problem with the flapper that was probably stuck at the bottom of the pool, and this flapper changes the -- triggers an alternate core cooling. And I read that it went from forced cooling to convective.

What does it mean, "to convective"? Does it mean to natural convection cooling? Is this what's supposed to be?

MR. HEYSEL: It's Chris Heysel, director, Nuclear Operations, for the record.

You're correct. If you can imagine on a big swimming pool that we house our reactor in, the pool actually drains. And as it drains, it's draining through the fuel and provides the cooling as the water drains by gravity through the core.

MEMBER LACROIX: Right.

MR. HEYSEL: When we lose power or a pump or other interruptions to that gravity flow, the water then naturally will go up through the core just

through thermal cycling.

MEMBER LACROIX: Okay. Okay.

MR. HEYSEL: The valve at the bottom of the core that opens and allows that flow pattern to occur.

MEMBER LACROIX: Okay, that --

MR. HEYSEL: [indiscernible - multiple speakers] indication of that valve status that was lost.

MEMBER LACROIX: Okay, I understand. Yeah, no, I was confused with the word "convective," and I was trying to understand what sort of convection. I understand. That's great. Thank you very much. I'm done.

THE PRESIDENT: Thank you.

Dr. Berube?

MEMBER BERUBE: Yes, my question is for CNSC staff, again related to page 44 on your CMD 33, with regard to EPM and that they were operating their SLOWPOKE actually without a valid operator's licence or certificate for a month. I'd like to hear your explanation of how that actually happens. I

would think somebody should be tracking this fairly carefully to make sure that they're not operating out of compliance. Could you give me some insight as to what happened there?

MR. McALLISTER: Thank you, Dr. Berube. Andrew McAllister, for the record.

I'll have both Pierre Tanguay, who's a project officer for that file, speak to it as well as staff from our personnel certification who will be able to complement his answer. So over to you, Pierre.

MR. TANGUAY: Yes, Pierre Tanguay, for the record.

École Polytechnique operated the reactor for about one month without their operator licence actually in the valid standing. École Polytechnique discussed the causes as possibly related to the COVID situation, whereas mostly they're not working from their offices, and however they do show up to the reactor for whichever operations they need that are scheduled on that particular day. So they discussed that as a cause.

So we certainly came back with some serious concerns in different areas, including their management system and how they're tracking these items. These are important things that should not be taken lightly.

This being said, École Polytechnique came back with some corrective actions that we believe they're implementing effectively. And since then, they've also certified a second operator, which will help in their resolving some of the operational issues that they might have been facing.

So right now, we are satisfied with École Polytechnique's response to the event.

THE PRESIDENT: Okay, thank you.

Dr. Demeter?

MEMBER DEMETER: Thank you. I just had an observation and wanted maybe to get some feedback from the industry and staff.

So under section 7, which is reportable events, of the 24 reportable events for uranium and nuclear substance processing facilities, 10 came from Nordion, and of those 10, six or seven,

depending on the errata that was discussed in the -- were dealing with shipping, receiving, or packaging.

That seems proportionately high out of this spectrum of operators, to have 10 of the 24 reportable events. And from a Nordion point of view, they're in the business of shipping, receiving nuclear substances. So maybe Nordion can comment on the frequency of reportable events related to shipping. They're outlined on page 42 of the staff CMD of shipping, receiving, and packaging.

And maybe from staff's perspective, is this an outlier for this year? Or is this status quo for this industry?

So maybe we'll start with Nordion and comment on their reportable events saga for 2020.

MR. BROOKS: Kevin Brooks, president of Nordion, for the record.

Thank you very much for the question. I will invite Dr. Wassenaar, who is our director of regulatory, to address that question. Richard?

MR. WASSENAAR: Thank you. Richard Wassenaar, for the record.

It's not much different than other years. Again, this is now going to be moving forward between two licensees, BWXT Medical and Nordion, but we are a different type of licensee.

And we do have a lot of shipments that do leave our facility. The medical isotope side in particular, those are patient doses that are going out, and we do thousands of shipments per year. And what we do find is some of those shipments, basically, these are yellow cardboard boxes that are shipped to hospitals that contain a single patient dose. And so there's the sort of risk profile of what that's shipping.

To be honest, they sometimes get lost through the carriers. FedEx is one of the carriers that often moves these products for us. They sometimes misplace them. And typically they're found again several days later or a day later. And then in this case, there were -- just get my numbers right -- three related to lost packages, all of one single patient doses. Two of those were found within about a day and one was subsequently not found; however, it

would have decayed, you know, very quickly to background levels. Again, this is yttrium-90 shipments.

We also see in our larger packages, you know, some of the other incidences we find are reportables are damaged packages. And we have a pretty low threshold for reporting damages to packages. But the fact of the matter is, some of other type B packages which contain high levels of activity are very large and very heavy, and people treat them accordingly. And they come back with dents and scrapes and other things. And so we do report that. But it doesn't impact the safety of that package.

I hope that answers your question.

MR. McALLISTER: Andrew McAllister.

Dr. Demeter, would you want any commentary from CNSC staff?

MEMBER DEMETER: Just from a trending point of view, is this, given the volume and the business that they're in, is this a unique year or is this part and parcel of their practice and not

unexpected?

MR. McALLISTER: Okay, thank you.

I'll ask François Dagenais, who's a transportation specialist, to respond to that question, please.

MR. DAGENAIS: Yes, hi there. So hopefully you can hear me.

So yes, for the record, my name is François Dagenais. I'm a transport officer with the CNSC.

So yeah, in regards to Nordion, actually, the numbers are actually expected. So I think that it's pretty much on average for the past years.

And what I would add too is that many of the lost packages that they have reported, those are events that actually occurred outside of Canada, so they actually occurred in the United States at one facility, which is almost typical for that particular facility. But yeah, so just to sum up, it is expected. It is on par. So Nordion, they ship a very large amount of packages from their facility. So the numbers are to be expected. Thank you.

MEMBER DEMETER: Thank you very much.

THE PRESIDENT: Thank you.

I have a quick question for Saskatchewan Research Council. And I understand that Mr. Chorney has joined us, so maybe you can take this opportunity to make a statement if you wish on the staff's regulatory oversight report.

The question I had with the abandonment of -- after the decommissioning of your research reactor and getting an unconditional clearance level achieved, does this make it a greenfield site? Or is it a brownfield site? Are there any restrictions at all on what happens to that site?

MR. CHORNEY: Dave Chorney, for the record.

Yeah, the condition of abandonment was to be returned to a greenfield site where there is no residual equipment, contamination, you know, no radiation field above unconditional clearance levels. And SRC's intent was to turn the building back over to the landlord as soon as possible after the licence to

abandon was issued.

THE PRESIDENT: Thanks very much.

And Mr. Chorney, did you want to make a statement at all around the staff's regulatory oversight report?

MR. CHORNEY: No, SRC didn't have any comments on that.

THE PRESIDENT: Okay, thank you. Thank you for joining us.

I won't see any hands up, so I think all the Commission Members' questions have been answered.

I want to thank staff, the licensees, and intervenors for a number of things: staff, for the excellent report, the strong oversight during these tough times; licensees, for your excellent performance and continuous improvement in the performance; and for the intervenors, to make sure that we continue improving and address some key areas of challenges. And so to all of you, thank you very much.

This concludes the public meeting of

the Commission. Thank you all for your participation.
Stay safe; stay well. Happy holidays and see you next
year in 2022. Bye bye.

--- Whereupon the hearing adjourned at 12:00 noon /
L'audience est ajournée à 12 h 00