

**Canadian Nuclear
Safety Commission**

**Commission canadienne de
sûreté nucléaire**

Public meeting

Réunion publique

November 6th, 2019

Le 6 novembre 2019

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

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

Commission Members present

Commissaires présents

**Ms Rumina Velshi
Dr. Sandor Demeter
Dr. Timothy Berube
Dr. Marcel Lacroix
Dr. Stephen McKinnon**

**M^{me} Rumina Velshi
D^r Sandor Demeter
M. Timothy Berube
M. Marcel Lacroix
M. Stephen McKinnon**

Secretary:

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Mr. Marc Leblanc

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Ms. Lisa Thiele

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Ottawa, Ontario / Ottawa (Ontario)

--- Upon commencing on Wednesday, November 6,
2019 at 9:00 a.m. / L'audience débute le
mercredi 6 novembre 2019 à 9 h 00

Opening Remarks

THE PRESIDENT: Good morning, everyone,
and welcome to the 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 acknowledging
that the land on which we are gathered is the traditional
territory of the Algonquin and Anishinabek peoples.

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

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

On my right is Dr. Sandor Demeter; to my
left are Dr. Stephen McKinnon, Dr. Marcel Lacroix and Dr.
Timothy Berube.

Ms Lisa Thiele, General Counsel to the
Commission, and Mr. Marc Leblanc, Secretary of the

Commission, are also joining us on the podium today.

I would like to begin today's Commission Meeting with a Safety Moment and talk about fire safety.

This past weekend we all changed our clocks and, as the fire departments across North America say, that's the time when we change the batteries in our smoke detectors and our carbon monoxide detectors. So a reminder to those of us who haven't yet done so, please make that a priority this evening. You could be saving the lives of your loved ones.

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

Marc, over to you.

M. LEBLANC : Merci.

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.

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

To make the transcripts as complete and clear as possible, please identify yourself each time before you speak.

The transcripts will be available on the Commission's website in about 10 days.

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

As a courtesy to others, please silence your cell phones and other electronic devices.

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

Please refer to the revised agenda published on October 31st for the complete list of items to be presented today and tomorrow.

I also wish to note that all 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 participants will have an opportunity to make verbal comments and Commission Members will be afforded an

opportunity to ask questions on the items before us.

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

President Velshi.

CMD 19-M34.A

Adoption of Agenda

THE PRESIDENT: With this information, I would now like to call for the adoption of the agenda by the Commission Members, as outlined in Commission Member Document CMD 19-M34.A.

Do we have concurrence?

For the record, the agenda is adopted.

The minutes of the October 3rd, 2019 Commission meeting will be approved at a later date.

CMD 19-M38

Written submission from CNSC staff

THE PRESIDENT: The first item on the agenda is the Status Report on Power Reactors, as outlined in CMD 19-M38.

I note that we have representatives from the nuclear power plants and CNSC staff in the room or by videoconference. They can identify themselves later, before speaking.

Mr. Frappier, do you have anything to add before I turn the floor to my colleagues for questions?

MR. FRAPPIER: Thank you. Yes, I do.

Thank you and good morning, Madam President and Members of the Commission.

For the record, my name is Gerry Frappier, I'm the Director General of the Directorate of Power Reaction Regulation.

With me today, as you mentioned, are regulatory and technical managers and specialists and members of industry.

The Status Report on Power Reactors, CMD 19-M38, was finalized on October 30th and the following are updates that I would like to bring forward since that date.

For the Bruce site, there are no updates.

For Darlington, of major note is on November 5th the CNSC staff confirmed that OPG had met all of the prerequisites and conditions for the removal of the first regulatory hold point to allow fuel-loading in Unit 2 after its refurbishment. As such, the Executive Vice

President and Chief Regulatory Officer issued a letter to OPG that consented to the removal of the hold point. OPG is planning to begin fuel-loading I believe later this week. More details you could get from OPG itself.

With respect to the Pickering site, Unit 1 is now at 91 percent of full power due to the fuelling machine unavailability. Unit 7, for the same reason, is at 93 percent of full power.

With respect to Point Lepreau, there are no updates.

This concludes the Status Report on Power Reactors and we are available to answer any questions you may have.

THE PRESIDENT: Thank you, Mr. Frappier, and congratulations, OPG, on reaching a very significant milestone.

Members, any questions?

Dr. Lacroix.

MEMBER LACROIX: Yes, I do have a question concerning the fuel-loading of Unit 3 at Darlington. I just want to know, what is the procedure of fuel-loading? Where do you start off and is there a moderator in the reactor core when you fuel...

MR. FRAPPIER: Gerry Frappier, for the

record. I think it would be appropriate for OPG to answer that.

MR. ROSE: Good morning. It's Gary Rose, for the record. I'm the Deputy Site Vice President for the Darlington Refurbishment Project.

Commissioner Lacroix, for Unit 2 we will commence loading fuel, as earlier stated, later this week. Our moderator system is filled with water and is in place. We will start loading fuel at the top of the reactor on a channel-by-channel basis. After each channel is loaded, the Shift Manager will confirm that there are no negative effects of the loading of that fuel and proceed to subsequent channels thereafter. Once they get down to what we call Group 1, which is the top third of the reactor, they will actually load fuel at multiple channels at one time.

THE PRESIDENT: Dr. Berube.

MEMBER BERUBE: Just with regards to the fuelling machine availability at Pickering, that seems to be a chronic issue, right? So is it still the same issues that we have spoken about in the past in terms of parts availability and this kind of stuff?

MR. FRAPPIER: Gerry Frappier, for the record. So, again, I think OPG is best placed to respond

to that.

MS SMITH: Good morning. My name is Stephanie Smith, I'm the Deputy Site Vice President for Darlington Nuclear.

Yes, indeed, we have struggled historically with some of our fuel-handling equipment at both the Darlington and Pickering sites. Currently, we do have an improvement plan and various ways of getting new parts. So, although there are some issues that continue on a daily basis, we're confident that we can improve the fuel-handling reliability across both sites.

THE PRESIDENT: Dr. Demeter.

MEMBER DEMETER: Thank you.

If this is going to be dealt with another report, let me know and we will defer to then, but I just wanted an update on the KI Pill Working Group.

MR. FRAPPIER: Gerry Frappier, for the record.

No, we can certainly update you now and we probably might talk about it again later, but I would ask Lee Casterton to come to the microphone and provide -- since our last discussion on this we've had a workshop that we just had over the past couple of days and, although we don't have all the minutes and all that stuff ready, Mr.

Casterton can probably give us an update on that.

MR. CASTERTON: Good morning, Members of the Commission. My name is Lee Casterton. I work with the Directorate of Power Reactor Regulation and I'm also the Chair of the KI Pill Working Group.

So we held the Phase I workshop on Monday and Tuesday of this week in Pickering, Ontario, and it was agreed by all participants to be quite a success.

All members were present at the workshop. We had 43 participants from 20 different departments and it was a diverse group of public health representation as well as emergency management coordinators, as well as the province, and it was quite a good discussion on the current plans and strategies for distributing KI in an emergency. We also spoke to public education and awareness around emergencies and KI distribution.

We are currently working on the meeting minutes, which will be available publicly once they are approved.

We also got a sufficient amount of information to move forward with the Phase I draft report. That Phase I draft report will also be made publicly available and will include a 30- to 45-day public review period once complete as well.

THE PRESIDENT: Mr. McKinnon.

MEMBER MCKINNON: No questions.

THE PRESIDENT: Okay. Thank you.

CMD 19-M43

Written submission from CNSC staff

THE PRESIDENT: We will now move to the next item on the agenda, which is an update from CNSC staff on the status of Digital Control Computer Systems and how it is managed across Canada's nuclear reactor fleet.

This was discussed during the May 15, 2019 Commission meeting.

I wish to note that representatives from CNSC staff are available for questions, as well as representatives from the nuclear power plants.

Any questions from any Commission Members?

Dr. Berube.

MEMBER BERUBE: I'm just addressing the CNSC staff. I'm looking at the emulators that have been used to replace some of the DCCs over time. Could you just walk me through, for information purposes, the nature of the proofing of that hardware before it's put into service?

MR. FRAPPIER: Gerry Frappier, for the

record.

Yes, simulators are a key component of modernization and I would ask Éric Lemoine to provide more details and perhaps OPG would like to also add to that.

--- Pause

MR. LEMOINE: Éric Lemoine, for the record. I'm the director of the Systems Engineering Division.

So the licensees actually have robust processes for going through this, to make sure that the hardware is qualified appropriately, and I'd ask John Sladek to give you a specific example for Pickering in Pickering's case.

MR. SLADEK: For the record, my name is John Sladek.

The Pickering -- I can speak to the Pickering A DCC replacement, which was the first DCC replacement. During the mid-'90s, this computer emulator was purchased for Pickering A. There was extensive hardware quality assurance performed, as per engineering change procedures. And special software tests were designed to show that the function and performance of the replacement computer was the same for the new computer as the old computer, which allowed the software to be loaded

without modification. You know, there was a formal licensing strategy that was developed and accepted by the CNSC at that time.

THE PRESIDENT: OPG have anything to add?

MS SMITH: Yes, it's Stephanie Smith, for the record.

So indeed, at both Pickering and Darlington, we do have aging management plans for all of our DCCs. For Pickering 5-8, there's actually a spares and restoration acquisition plan, and at Darlington, actually all the CPUs have currently been replaced and upgraded to the newest technology.

THE PRESIDENT: Are we okay, Dr. Berube? Okay. Any other questions on that? Yes?

MEMBER DEMETER: Just to -- because it was brought up in the report that talked about that the digital control computer system was separate from the shutdown computer system. And are the shutdown computer systems going through the same journey relative to emulators and upgrading as DCC and have the same redundancy built in?

MR. FRAPPIER: Gerry Frappier, for the record.

So all of the key components at the stations have an aging management program associated with

them and as was mentioned have strict engineering controls. As for any changes with respect to the particular computers associated with shutdown system, I'd ask OPG to provide an update on that.

MR. ROSE: Good morning. It's Gary Rose, for the record.

In the Unit 2 refurbishment, we are replacing the shutdown systems 1 and 2 computers. Again, we have decades of experience installing new computers and going through the software testing, rigorous testing prior to this.

For the SDS2 computer, during our testing we actually found a problem with one of the hardware cards, and that is an attestation to the fact that the testing and the simulation that we went through is effective. We were able to replace that and reconfigure that for future units. And that testing has been fully complete and ready for service.

MR. LEMOINE: Éric Lemoine, for the record.

I think it's important -- this might actually help a little bit too with the first question, which is -- so software, real-time process computing software such as computers use for the DCCs or used for

trip computers actually go through a categorization process. And that categorization process then lists the level of rigour that you need to do for each category. So for example, category 1 is the most rigorous process and has, you know, very stringent, high-quality assurance. And it would be for the -- you would apply that for the trip computers. The DCC example's actually category 2, which is still actually -- there's still quite high quality assurance, but it's not as stringent as for the trip computers.

THE PRESIDENT: Any other questions? Are we okay at closing this action item, then?

Okay, thank you, we can close Action Item number 19298, then.

CMD 19-M30/19-M30.A

Oral presentation by CNSC staff

THE PRESIDENT: The next item on the agenda is the Regulatory Oversight Report for Canadian Nuclear Power Generating Stations for 2018, as outlined in CMDs 19-M30, 19-M30.A, and 19-M30.B

The public was invited to comment in writing. The Commission received nine submissions. We

will get back to the submissions after CNSC staff's presentation.

Before turning the floor to CNSC staff for the presentation, I would like to acknowledge that representatives from Environment and Climate Change Canada are in attendance and a representative from the Department of Fisheries and Oceans is joining us via WebEx. They can identify themselves later during the question period.

I'll turn to the floor to CNSC staff for their presentation.

Mr. Frappier, over to you.

MR. FRAPPIER: Thank you very much. And again, good morning, President Velshi and Members of the Commission.

My name is Gerry Frappier, and I'm the director general of the Directorate of Power Reactor Regulations.

With me today is Ms Kim Campbell, director of the Power Reactor Licensing and Compliance Integration Division, and Mr. Brian Gracie, senior regulatory program officer in the Integration Division.

Today I have the pleasure to introduce for your information CMD 19-M30, the 2018 edition of the Regulatory Oversight Report for the Canadian power

generating sites. The report, hereafter referred to as the ROR, or R-O-R, summarizes the regulatory oversight and safety performance of Canadian nuclear power plants, or NPPs, as well as the waste management facilities, or WMFs, that are located on the same sites.

We will also present some highlights, some supplemental CMD 19-M30.A, which was submitted by staff to provide brief response to some of the key interventions on the ROR that you mentioned earlier. Also it identifies some errors in the ROR that were discovered after it was posted and describes how information requests from the Commission that were relevant to the ROR were addressed.

The ROR will be presented by the responsible managers and staff from the Directorate of Power Reactor Regulation and from the Nuclear Cycle and Facility Regulations. They are assisted by managers and staff from the Technical Support Branch and Regulatory Affairs Branch, who are available to answer any technical questions the Commission may have.

In addition, representatives from the licensees are also present to participate in the meeting.

Following an introduction that includes background information, today's presentation will provide general remarks and observations that are applicable to

more than one facility covered by the ROR. The presentation will continue with details regarding the safety performance at individual NPPs and WMFs, and I will then conclude with some closing remarks.

While this presentation provides some of the conclusions and highlights from the ROR, it is not intended to be comprehensive nor representative of all the findings and conclusions that are in the ROR. The presentation also includes a few updates on developments of particular interest that have happened since the ROR's posting.

The 2018 ROR for the nuclear power generating sites is one of a series of regulatory oversights that the Commission has requested and that summarize CNSC staff's assessment of the safety of regulated facilities and activities during 2018.

I will now pass the presentation to Ms Campbell.

MS CAMPBELL: Good morning, President Velshi and Members of the Commission. For the record, my name is Kim Campbell and I'm the director of the Power Reactor Licensing and Compliance Integration Division.

This introduction provides some background information that is relevant to the 2018 ROR, as well as

some context for the general and facility-specific highlights that follow in the rest of the presentation.

To begin, I will note that the ROR was intended to primarily cover 2018 and had limited information from 2019.

There were several new features to the 2018 ROR that were not present in previous RORs. For example, as previously requested by intervenors and licensees, section 3.6 of the report on Gentilly-2 was provided in French. The English translation was available if requested, but there were no such requests.

Section 2.15 of the ROR now presents an expanded section on Indigenous relations that provides details on the engagement and consultation activities by CNSC staff as well as the licensees.

As directed by the Commission, CNSC staff have also provided in the supplemental CMD a plain language summary of the report that can easily be translated to Indigenous languages.

Also notable, there is no overall rating provided in this year's ROR as CNSC staff re-evaluated the criteria for ratings.

And finally, for some specific areas there was insufficient information to form an assessment;

however, even where specific areas were not assessed in detail for 2018, CNSC staff were confident based on general regulatory oversight and an understanding of the degree of stability of licensee programs and past performance that no serious safety-significant issues were present under those specific areas.

From this slide, you will note that there are four operating NPPs in Canada. These include three multi-unit plants in Ontario and one single-unit plant in New Brunswick. There is also an NPP in Quebec, Gentilly-2, which consists of a single reactor that is proceeding toward decommissioning. The four operating NPPs have licences for a total of 21 reactors; 18 of these reactors were operating during most of 2018.

It's important to mention that Darlington Unit 2 was shut down in October 2016, as it is the first unit at Darlington to be refurbished. The Darlington site also hosts the Darlington Waste Management Facility.

Additionally, Units 2 and 3 at Pickering have been defuelled since 2008 and continue to be in safe storage state. The Pickering site also hosts the Pickering Waste Management Facility.

The Bruce site is home to both the Bruce A and B Nuclear Generating Stations and the Western Waste

Management Facility.

For waste management, the Darlington, Pickering, and Western WMFs are licensed separately from the NPPs at their sites. There are also WMFs at Point Lepreau and Gentilly-2. These are regulated under the same licence as their neighbouring NPP. The graphic also illustrates the types of radioactive waste managed at each of the WMFs.

Indigenous engagement and consultation with Indigenous communities with an interest in NPPs and WMFs continues to be a priority for the CNSC. In 2018, CNSC staff worked towards formalizing its approach to engagement with interested Indigenous groups. CNSC staff signed engagement terms of reference with the Saugeen Ojibway Nation and Historic Saugeen Métis.

CNSC staff continue to develop and collaborate on the development of engagement terms of references with other interested Indigenous groups, including the Métis Nation of Ontario. As well, CNSC staff will continue to meet all Indigenous groups with an interest in NPPs and WMFs upon request to provide updates and to build these important relationships.

The CNSC's compliance verification program uses a risk-informed and performance-based approach to

verify that each facility maintains compliance with all regulatory requirements in the *Nuclear Safety and Control Act*, its regulations, and the operating licences. The CNSC assigns significant resources to this program, which generated the results that form the basis of the safety performance ratings presented in the 2018 ROR.

In 2018, CNSC staff conducted a wide variety of inspections and submitted the results to licensees in a total of over a hundred inspection reports which were listed for each site in their specific section of the ROR. Although there were fewer inspections compared to 2017, the effort spent on these inspections increased slightly in 2018. These inspections provided the majority of the 1,400 findings that were used for the purposes of the 2018 ROR. The vast majority of the findings were either compliant, negligible, or of low safety significance.

I would like to stress here that due to the significant effort associated with the compliance verification program, the effort is expressed in person days instead of person hours, as it is quantified in the other CNSC RORs.

For 2018, NPP licensees submitted 90 regular reports on a pre-determined frequency and also

reported to CNSC staff on 256 events. Five of these events were also presented to the Commission as event initial reports in 2018. OPG also submitted nine reports to the CNSC staff for reportable events at the WMFs. There were no event initial reports related to WMFs presented to the Commission in 2018.

Furthermore, when the various activities as listed on this slide identified non-compliances with CNSC requirements, CNSC staff tracked all licensee corrective actions until closure and verified closure through our follow-up activities.

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

MR. GRACIE: Good morning, President Velshi and Members of the Commission. For the record, my name is Brian Gracie, and I'm a senior regulatory program officer in the Power Reactor Licensing and Compliance Integration Division.

In the next part of the presentation, I will share some information and findings that are general in nature before other staff members describe some of the more specific results for each facility. Typically, the results in the next section are applicable to more than one site and in some cases provide an opportunity to compare

results between the facilities.

The ROR presents ratings of safety and control areas, or SCAs. These ratings are based on individual assessments of the specific areas that comprise the SCAs. This slide shows all the SCA ratings for the NPPs in 2018. All were rated satisfactory or fully satisfactory, with one exception.

The safety analysis SCA was not rated for Gentilly-2. Only one of these specific areas under safety analysis remains applicable to Gentilly-2. That specific area is deterministic safety analysis. There were relatively few results or observations in 2018 related to deterministic safety analysis, so CNSC staff did not have enough information on which to rate the specific area or the safety and control area. There were no additional changes made to the safety analysis report for Gentilly-2 in 2018. The next revision of that report is expected in December 2019.

This slide shows the ratings for all the safety control areas for the waste management facilities. They were all rated satisfactory for 2018.

As summarized on this slide, CNSC staff have made the following general observations with respect to the safety performance of NPPs and WMFs in 2018. All

events at the NPPs and WMFs reported for the respective requirements were of low safety significance. All licensees took appropriate actions to address the events in 2018. The reactor trips and all transients at the NPPs were infrequent and were managed safely.

In the area of conventional health and safety, the frequency and severity of injuries and accidents involving workers were very low. Lost time injuries were rare at NPPs and did not occur at all at the WMFs. We will elaborate on these observations in subsequent slides.

The radiological releases to the environment from the NPPs and WMFs were very low in 2018. They were well below the derived release limits that link allowed releases of specific radionuclides to the dose limit for the public. These releases were also below the action levels that prompt licensee action well before release approaches its respective derived release limit. These results demonstrated that the public and the environment in the vicinity of the NPPs and WMFs were protected in 2018.

Reported doses to workers at the NPPs and WMFs did not exceed the regulatory limits in 2018.

Finally, CNSC staff confirmed that the

licensees met the detailed requirements for both nuclear security and safeguards. Based on the IAEA's comprehensive evaluation of safeguards-related information and an evaluation of the consistency of Canada's declared nuclear program with the results of the agency's verification activities, the IAEA concluded that all nuclear material in Canada remained in peaceful activities, including the nuclear material at the NPPs and WMFs.

For NPPs, CNSC staff reviewed data for multiple performance indicators, collected in accordance with REGDOC 3.1.1, Reporting Requirements for Nuclear Power Plants, to inform its assessment of conventional health and safety.

This graph shows one of them, accident frequency, which is the number of injuries, and that is fatalities, lost-time injuries, and medically treated injuries per 200,000 person hours worked. We chose accident frequency because it includes all reported injuries and can be compared with a suitable injury benchmark. Also it is relatively easy to include data for third-party contractors, that is subcontractors, an effect that is illustrated on the next slide.

As for the graph on this slide, it uses NPP licensee data that, consistent with existing

requirements in REGDOC 3.1.1, exclude data for third-party contractors. For reference, it includes an industry benchmark, the approximate average data provided by members of the Canadian Electrical Association, or CEA, during the five years covered by the graph. CEA members include integrated electric utilities, independent power producers, transmission and distribution companies, power marketers, manufacturers and suppliers of materials, technology, and services for the utilities. The graph indicates that accident frequency remained steady during the last few years and comparable among the NPPs. Each NPP had an accident frequency rate that was significantly lower than the CEA averages over the same years.

In the context of previous RORs, the Commission had requested CNSC staff to obtain injury data for third-party contractors at NPPs for possible inclusion in the ROR. Although REGDOC 3.1.1 does not require NPP licensees to report such data, the licensees were able to provide CNSC staff with data for accident frequency that included workers of third-party contractors.

This graph illustrates using sample data from 2018 how the inclusion of data for workers of third-party contractors does not have an important effect on accident frequency data for the NPPs. For the four NPPs

that report this performance indicator in accordance with REGDOC 3.1.1, the inclusion of third-party contractors did not have an overriding increasing or decreasing impact on the data. Consequently, the data with third-party contractors included remained well below the CEA members' average for 2018, which suggests that conventional health and safety for third-party contractors is generally managed as well as that for the licensees' own employees and direct contractors.

On a related note, CNSC staff and the licensees of operating NPPs are also working on a separate request from the Commission to assess the cost and benefit of generating and assessing data for total recordable injury frequency or TRIF for NPPs. TRIF data is more comprehensive than that required by REGDOC 3.1.1, but it is not immediately obvious if there would be a regulatory benefit in generating, collecting, and assessing it. An update on the work to address the Commission's request is provided in the staff supplemental CMD 19-M30.A.

NPP and WMF licensees and the CNSC also monitor the occupational doses received by workers. The maximum annual individual effective doses as reported by each NPP and WMF for the period 2014 to 2018 are presented in the graph. In 2018, there were no radiation exposures

received by persons at any NPP or WMF that exceeded the regulatory dose limit of 50mSv per year.

These data indicate the ongoing overall effectiveness of the licensees' radiation protection programs in protecting workers in general while limiting the maximum doses to workers. The year-over-year performance for the NPPs and the WMFs in this respect is very steady.

The next three slides describe some notable technical developments in industry in 2018. The CNSC published REGDOC 2.1.2 in 2018. This document sets the requirements and guidance for fostering a healthy safety culture and for conducting periodic safety culture self-assessments.

All licensees committed to conduct all future assessments in accordance to the requirements in REGDOC 2.1.2.

After the publication of Volume 1 of REGDOC 2.2.4 on managing worker fatigue, CNSC Staff accepted licensees' implementation plans. In late 2018, all licensees impacted by Volume 2, with the exception of Hydro Québec, requested amendments to the REGDOC to allow them to incorporate oral fluid testing for tetrahydrocannabinol, or THC, as part of the revised

implementation plans.

CNSC Staff have completed the review of the request and will proceed to amend the REGDOC and present the revised version for Commission approval.

All the licensees continued the implementation of new Regulatory Documents such as REGDOC 2.4.1 and 2.4.2 for deterministic safety analysis and probabilistic safety assessment. The implementation of these REGDOC are long term and involve multiple steps.

OPG and Bruce Power's implementation of REGDOC 2.4.2 was supported by submissions to address the additional requirements. Point Lepreau is already compliant with REGDOC 2.4.2 since 2016.

NPP licensees have worked collaboratively to address direction from the Commission to OPG to develop an approach for whole site probabilistic safety assessment, or PSA. For OPG in 2017 and Bruce Power in 2018 -- excuse me. Both OPG and Bruce Power have submitted their whole site methodologies, which are being reviewed by CNSC Staff.

For its part, CNSC Staff was also involved in activities associated with the establishment of a proposed regulatory position, risk aggregation as it pertains to NPP sites.

CNSC Staff contributed to work at the

Nuclear Energy Agency related to site level PSA, which was completed in December 2018. The final report will be issued by the end of 2019.

As an application of the whole site PSA methodology, OPG and Bruce Power submitted the risk aggregation results for the Pickering, Bruce A and Bruce B sites.

In other highlights, CNSC Staff have observed continuous improvement in maintenance backlogs and deferrals for critical components at the NPPs since 2016.

OPG and Bruce Power continued to participate in the fuel channel life management project to consolidate resources and understanding around issues associated with fuel channel behaviour and service as they age.

Much of the work focuses on modelling fracture toughness of the pressure tube material and using that information to project pressure tube behaviour in operational situations that are expected in the near term in operating reactors having fuel channels with older pressure tubes.

Ontario's Provincial Nuclear Emergency Response Plan, or PNERP, master plan was approved in December 2017, which triggered the development of

site-specific implementing plans and subsequent incorporation of the relevant provisions in the Ontario licensees' emergency plans.

In 2018, Darlington, Pickering and Bruce Power implemented their plans to ensure conformity with the master plan.

The Pickering and Bruce Power implementing plans received Order in Council approval in March 2018, and Darlington's plan received final approval in March 2019.

The Point Lepreau nuclear off-site emergency plan and the full-scale exercise conducted in New Brunswick in 2018 will be described during the part of the presentation dedicated to Point Lepreau.

That concludes the second part of the presentation. I'll now turn the third part of the presentation over to the Regulatory Program Directors for each of the facilities covered by the ROR and they will present highlights of the detailed CNSC Staff assessment for each of their facilities.

The five NPPs will be presented first, followed by the three WMFs and so we'll begin with Ms Nathalie Riendeau for a brief presentation on the Darlington Nuclear Generating Station.

MS RIENDEAU: Bonjour, Madame la

présidente et membres de la commission. Mon nom est Nathalie Riendeau. I am the Director of the Darlington Regulatory Program Division.

In December 2015, the Commission renewed OPG's nuclear power reactor operating licence for Darlington for a period of 10 years. With the current licence, the Commission authorizes OPG to undertake the refurbishment of all four Darlington units.

As previously noted by Ms Campbell, OPG began its refurbishment project in the fall of 2016 commencing with Unit 2, while the other units continue to operate.

As noted on this slide, the Licence Condition Handbook for the Darlington operating licence was revised in 2018. More details about this revision can be found in the supplemental CMD 19-M30.A.

In December 2018, OPG provided a mid-term update to the Commission on its power reactor preparation licence for Darlington. Also last year, OPG notified the CNSC of its intent to renew the preparation licence beyond 2022 when the current licence expires. OPG has not commenced any licence activity covered under Section 4 of this licence.

In 2018, OPG continued to progress through

the refurbishment of Unit 2. CNSC Staff at site and here in Ottawa monitor OPG's refurbishment activities and conduct regulatory oversight to ensure that worker and plant safety is maintained at all times through refurbishment and while OPG is completing its integration -- Integrated Implementation Plan, or IIP.

CNSC Staff focused their oversight in 2018 on major reactor component removal and component reinstallation. As the refurbishment of Unit 2 nears completion, the unit will be returned to service through a systematic process, confirming that OPG has completed all prerequisite and restart activity.

This process includes the removal of four regulatory hold points. As noted by Mr. Frappier earlier this morning, yesterday, on November 5th, CNSC removed the first regulatory hold point allowing for fuel load in Unit 2.

The Unit 2 return to service is forecasted for June 2020.

Concurrently, OPG is preparing to commence refurbishment activities on Unit 3. CNSC Staff have begun preliminary oversight and planning activities in support of the refurbishment of Unit 3.

As reported in the ROR, CNSC Staff are

satisfied with the progress to date with the refurbishment project and with the implementation of the IIP.

CNSC Staff will continue to dedicate significant staff resources to the regulatory oversight of the refurbishment project, including ongoing surveillance, inspection and reviews of refurbishment-related reports.

In the next couple of slides, I will present a few regulatory highlights for Darlington. A number of positive highlights are described in the ROR related to operating performance and safety analysis.

Both safety and control areas were rated as fully satisfactory in 2018. As well, a number of specific areas under fitness for service were also deemed fully satisfactory by staff.

For example, in 2018 OPG continued to demonstrate strong performance during its planned maintenance and forced reactor outages similar to its performance in this area in 2017.

OPG also continued a strong performance in the timely completion of preventive maintenance activities for plant equipment as well as a strong performance in maintaining a low backlog of corrective and deficient maintenance items.

Finally, OPG exercised good chemistry

control of its system during 2018.

Last year, CNSC Staff maintained its increased oversight of OPG's radiation protection program, which started in 2017 as a result of findings related to hazard posting, contamination control and the review of radiological survey results.

Early in the year, CNSC Staff were informed of an event in the retube waste processing building whereby two workers performing refurbishment-related work tested positive for alpha contamination. In response to that event, CNSC Staff conducted a reactive inspection in the retube waste processing building and identified several deficiencies in the implementation of the alpha monitoring program for that building.

CNSC Staff were not satisfied with OPG's response to the reactive inspection and issued a 12(2) request for OPG to provide additional information.

In November 2018, CNSC Staff were informed of another occurrence where more workers had positive indication of alpha-emitting radio isotopes on their personal air sampler. Staff issued a second 12(2) request in December 2018 in response to the second occurrence.

For each of these, CNSC Staff requested

that OPG put in place appropriate compensatory measures and performance specified action, including to conduct a self-assessment of its implementation of OPG's radiation protection program during refurbishment prior to the refurbishment of Unit 3 and to implement changes to its confirmatory alpha bio assay program.

At the end of 2018, these actions were still open. Staff closed both actions in 2018 following submission of information satisfactory to staff.

OPG's progress in completing these actions is being monitored by staff through normal regulatory oversight.

I will now pass the presentation to Dr. Alex Viktorov.

DR. VIKTOROV: Good morning, President Velshi, Members of the Commission. My name is Alex Viktorov. I am the Director of Pickering Regulatory Program Division.

In 2018, the Pickering Nuclear Generating Station operating licence was renewed for a 10-year period. In its licensing decision, the Commission limited the number of hours of operation allowed for the pressure tubes in the reactors at Pickering.

As was discussed during the licence

renewal hearings, OPG intends to cease commercial operations at Pickering on or before December 31st, 2024. Therefore, the 10-year licence period includes on power operation followed by two to three years of stabilization activities such as defueling and dewatering of the reactors.

All Pickering units are expected to be in safe storage by end of 2028.

In support of the licence renewal, OPG conducted a periodic safety review, or PSR, which included the development of the integrated implementation plan. This plan identifies operational, analytical and design improvements to help ensure continued safe operation of Pickering Nuclear Generating Station.

The renewed licence requires OPG to complete the IAP actions by the end of 2020 and communicate the results to CNSC Staff.

The Licence Condition Handbook for Pickering was revised once in 2018. Details about this revision can be found in the supplemental CMD 19-M30.A.

This slide shows the progress being made by OPG in completing the integrated implementation plan for Pickering as well as CNSC progress in reviewing this work. The graph shows cumulative progress at two points in time

as of December 31st, 2018 which correspond to the timeframe covered in the ROR and more recently in September 30th of this year.

There are a total of 63 IIP actions. There is a plan for completion in 2018.

The blue bar shows that 29 of those were successfully completed by OPG by December 31st and three were rescheduled for completion in 2019. This rescheduling didn't result in any increase in risk posed by the operation.

The second blue bar indicates that 50 of the 63 actions for completion by OPG by the end of September this year.

The yellow and green bars show the number of actions being reviewed by CNSC as of that date and how many had been closed by CNSC.

Staff reviewed the completed IIP actions through a combination of desktop reviews and on-site verification activities. Overall, CNSC Staff has no concerns with the progress of IIP implementation at Pickering.

This slide presents some of the main IIP actions completed last year. For example, to further reduce the likelihood of an accident progressing to severe

fuel damage and to mitigate consequences if a serious accident occurs, OPG implemented the following enhancements.

Completion of Phase 2 of the emergency mitigating equipment to provide emergency power and cooling water to the air-conditioning units in the reactor buildings as well as emergency power to hydrogen ignitors and the filtered air discharge system.

Modifications to make fire protection system water available to the steam generators, primary heat transport system and the calandria vessel, and provision of power and support service connection upgrades required to ensure functionality of a main-volume vacuum pump.

Other IIP actions completed last year include a safety analysis for the loss of flow, small break, loss of coolant and over power protection scenarios for Units 1 and 4 which account for aging of the primary heat transport system.

Finally, OPG revised the fuel channel inspection plans for operation until the end of operation.

Some other developments of note from 2018.

CNSC Staff verified OPG's activities to lower the number of preventative maintenance deferrals and

corrective and deficient maintenance backlogs. CNSC Staff were satisfied with OPG progress in this area.

CNSC Staff monitored Pickering implementation of 20 new or updated Regulatory Documents and CSA standards.

In addition, CNSC Staff have received OPG implementation plan for three additional Regulatory Documents.

In the record of decision from the Pickering licence renewal, the Commission directed both OPG and CNSC Staff to act on a number of specific items. CNSC Staff have systematically reviewed the Commission directions to develop a plan to follow up on both OPG and CNSC actions to ensure their timely completion.

The Commission further requested that CNSC Staff report on many of these items through the ROR. These items are detailed in Section 3 of the supplemental CMD 19-M30.A along with requests for closure or recommendations for ongoing reporting as may be appropriate.

CNSC Staff will continue to follow up on all remaining Commission-directed actions resulting from the Pickering licence renewal.

I will now pass the presentation to Mr. Luc Sigouin.

MR. SIGOUIN: Bonjour, Mme Velshi, membres de la Commission. Mon nom est Luc Sigouin, and I am the Director of the Bruce Regulatory Program Division here at the CNSC.

The nuclear generating stations at Bruce A and B are governed by a single operating licence renewed by the Commission in 2018. The licence scope includes refurbishment or major component replacement, which will start with Unit 6 in January 2020.

Bruce A, Units 1 to 4, and Bruce B, Units 5 to 8, were all operational during 2018.

To support the planned major component replacement, or MCR, Bruce Power completed a periodic safety review which resulted in an integrated implementation plan, or an IIP, with practicable safety enhancements. In 2018, CNSC Staff monitored IIP progress at Bruce A and B on a regular basis.

Staff note that the Licence Conditions Handbook for Bruce A and B was not revised during 2018.

We note that Bruce Power and CNSC Staff continue to implement direction from the Commission stemming from the 2018 licence renewal. Progress on these actions is detailed in Section 3 of the supplemental CMD 19-M30.A, along with requests for closure where

appropriate.

CNSC Staff continue to support the application process for an authorization under the *Fisheries Act*, which is now with Fisheries and Oceans Canada.

CNSC Staff are actively monitoring the fitness for service of fuel channels. Bruce Power has adequate programs in place to confirm that pressure tubes are fit for operation.

This includes the assessment that demonstrates that pressure tube fracture toughness will be sufficient for safe operation beyond an equivalent hydrogen concentration of 120 ppm, a condition that could occur as the tubes approach the replacement during the upcoming MCR outages.

With respect to oversight of the preparations for MCR, CNSC Staff confirmed acceptable IIP completion progress during 2018.

In order to maintain minimum shift complement, Bruce Power had some exceedances to the limits of hours of work for certified staff in 2018. CNSC Staff were satisfied with Bruce Power's efforts to revise its procedures to align with REGDOC 2.24 on managing worker fatigue, which should help reduce these exceedances going

forward.

In 2018, Bruce Power continued to improve the safety analysis. For example, Bruce Power updated its fire safety assessments, including the Code compliance review, fire hazard analysis and fire safe shutdown analysis.

In 2018, CNSC Staff were satisfied with the performance of Bruce Power's programs related to reliability of special safety systems. The two systems that exceeded their targets as identified in this slide were Unit 3 emergency cooling injection and Unit 4 negative pressure containment.

CNSC Staff noted that deferrals of preventative maintenance and backlogs of corrective maintenance were lower than industry average and have an improving trend year to year. Radiation doses to workers were below the regulatory dose limits and action levels established in Bruce Power's radiation protection program.

CNSC Staff were satisfied with the radiation protection program effectiveness and the reduction in doses in personal contamination events in 2018.

Bruce Power's environmental protection program met regulatory requirements and the environment was

adequately protected at Bruce A and B in 2018.

This concludes the presentation of highlights for Bruce A and B. I will now turn the presentation over to Mr. John Burta to summarize results for the Point Lepreau Nuclear Generation Station and the Gentilly-2 facilities.

MR. BURTA: Good morning, President Velshi and Members of the Commission. My name is John Burta, and I am the Director of the Gentilly-2 and Point Lepreau Regulatory Program Division.

The current Point Lepreau Nuclear Generating Station power reactor operating licence is valid until 2022. CNSC Staff recommended this five-year licence to provide adequate time for New Brunswick Power to complete a periodic safety review in accordance with CNSC Regulatory Document 2.3.3, period safety reviews.

New Brunswick Power submitted to the CNSC a periodic safety review basis document in support of a 10-year licensing period from 2022 to 2032.

In December 2018, New Brunswick Power submitted the completed basis document, which was accepted by CNSC Staff. CNSC Staff completed the review of all safety factor reports and submitted all comments to New Brunswick Power periodically, with the final comments

submitted October 2nd, 2019.

The upcoming phase of the PSRs, the submission of the global assessment report, which is expected by December 2019.

On October 3rd and 4th, 2018 New Brunswick Power conducted a full-scale emergency exercise titled, Exercise Synergy Challenge at Point Lepreau, which tested the preparedness, response and recovery capabilities and capacities of more than thirty-five organizations, including the CNSC and some non-government agencies with an emphasis on the recovery phase. The exercise was conducted in partnership with the New Brunswick Emergency Measures Organization and other stakeholders.

CNSC staff conducted an inspection during the exercise and the findings observed by CNSC staff were minor in terms of risk and were communicated to New Brunswick Power. CNSC staff is currently monitoring New Brunswick Power's implementation of corrective actions.

Furthermore, the New Brunswick Emergency Measures Organization issued the new Pont Lepreau Nuclear Off-site Emergency Plan in August 2018 which is available on their website.

In 2018 CNSC staff performed an inspection on the solid radioactive waste management facility and

observed New Brunswick Power to be compliant in all areas inspected. CNSC staff were satisfied with the performance of New Brunswick Power's programs related to the reliability of special safety systems.

Staff also noted that deferrals of preventative maintenance and backlogs of corrective maintenance were trending downward in comparison to the previous year.

CNSC staff remain satisfied with New Brunswick Power's conventional health and safety work practices and conditions which contributed to a high degree of personnel safety.

Madame La Présidente, je vais maintenant poursuivre avec les installations de Gentilly-2.

En 2018, les activités de déclassement aux installations de Gentilly-2 se sont poursuivies. La campagne de stockage a été faite pendant la période estivale.

Le personnel de la CCSN a continué de vérifier la conformité d'Hydro-Québec à Gentilly-2 en fonction du profil de risque, qui est en réduction progressive au fil de l'évolution vers le déclassement.

Les activités aux installations de Gentilly-2 sont régies par un permis de déclassement d'un

réacteur de puissance qui a été délivré par la Commission en 2016 et qui est valide pour une période de 10 ans.

Le *Manuel des conditions de permis* n'a pas été révisé pendant 2018, mais il a été révisé en février 2019 afin de refléter l'évolution et les changements survenus aux installations de Gentilly-2.

Tel que prévu, le protocole d'entente entre la Ville de Bécancour et Hydro-Québec a été suivi aux installations de Gentilly-2. Ce protocole encadre les services de brigade incendie industrielle qui sont désormais fournis par la ville de Bécancour.

Cette première année de transition s'est déroulée sans problème, et aucun incident dans ce domaine n'a été signalé au personnel de la CCSN.

De plus, pour fin de mise à jour, le personnel de la CCSN a réalisé une inspection lors d'un exercice incendie aux installations de Gentilly-2 en mai 2019. L'inspection a mis l'accent sur la cohésion entre Hydro-Québec et le Service de sécurité incendie de Bécancour. Dans l'ensemble, le personnel de la CCSN a conclu que la cohésion était adéquate. Le personnel de la CCSN continuera à exercer un suivi dans ce domaine.

De plus, des modifications ont été apportées à la conduite des effluents liquides. Par

conséquent, de nouvelles limites opérationnelles dérivées ont été mises en place au site.

En 2018, le personnel de la CCSN a réalisé des inspections dans les domaines de la gestion des déchets ainsi que de la sécurité. Il a aussi réalisé une visite de suivi relativement à la formation du personnel. Les constats réalisés lors de ces inspections étaient mineurs en termes de risques et ont été communiqués à Hydro-Québec, qui a pris les mesures afin d'implanter les correctifs nécessaires. Le suivi a été réalisé par le personnel de la CCSN, qui s'est déclaré satisfait des correctifs implantés.

Ceci conclut la présentation des faits saillants pour les installations de Gentilly-2. Je cède maintenant la parole à Mme Karine Glenn, qui présentera la partie sur les installations de gestion de déchets.

MME GLENN : Bonjour, Madame la Présidente et Membres de la Commission.

Je m'appelle Karine Glenn et je suis la directrice de la Division des déchets et du déclassé.

I will be discussing the regulatory oversight at the Darlington, Pickering and Western Waste Management Facilities for 2018.

Before moving to highlights, I will note that the licence for the Pickering Waste Management

Facility was renewed in 2018 for a ten-year period subsequent to a Commission hearing in April 2017. The issued licence was modernized and is accompanied by a *Licence Condition Handbook*. The *Licence Condition Handbooks* for the Western and Darlington Waste Management Facilities were not revised during 2018.

With respect to radiation protection, the maximum dose received by a worker in 2018 was 0.7mSv at the Darlington Waste Management, 1.5mSv at the Pickering Waste Management Facility, and 2.5mSv at the Western Waste Management Facilities. These values are all at or below five percent of the regulatory limits for nuclear energy workers.

The dose to the public for the waste management facilities is included in the respective site-wide dose.

There were no reported lost time injuries at any of the waste management facilities for the reporting period.

CNSC staff confirmed that all reported airborne and waterborne radiological releases from the waste management facilities in 2018 were below regulatory limits as well as respective action levels.

Based on the review of the 2018

environmental monitoring data, CNSC staff concluded that the public and the environment in the vicinity of the sites were protected.

In 2018 OPG completed their implementation and is now in compliance at the waste management facilities with the requirements of REGDOC 2.10.1 on Nuclear Emergency Preparedness and Response. Inspections conducted at all three OPG water management facilities showed OPG staff working in an organized and safe manner. CNSC staff found that OPG training records were complete and met appropriate regulatory requirements for the tasks being completed.

In the area of fire protection CNSC staff reviewed updates of OPG's documentation for the waste management facilities. All issues identified by CNSC staff were addressed by OPG with some items for the Western Waste Management Facility requiring further disposition. OPG has submitted the documentation to address this and CNSC staff are currently reviewing this documentation.

During a 2018 inspection, CNSC staff identified that OPG was not conducting the required annual fire drills with mutual aid from the local fire department services around the waste management facilities as required in CSA N-393. CNSC staff issued a non-compliance and OPG committed to conduct fire drills at all three of their

waste management facilities. This was completed and CNSC staff observed these drills during the 2019 calendar year.

In total, OPG reported nine events at the three waste facilities, all of which were of low safety significance. For example, there was a loss of communication with IAA surveillance system at the Western Waste Management Facility. However, the event did not result on an impact on safeguards at the facility. Overall, CNSC staff were satisfied with OPG's actions to address the events themselves and the corrective measures taken to prevent recurrences.

This concludes our brief summary for the Waste Management Facilities. I will now return the presentation to Ms Campbell.

MS CAMPBELL: For the record, my name is Kim Campbell. I will now briefly describe the interventions received on the ROR during public consultation and the steps that will be followed so that the ROR can be published and posted on the CNSC website.

A summary of the 2018 ROR was posted on the CNSC website with an invitation for comment on the report from the public and indigenous groups. The posting was announced on the CNSC website through social media and through the CNSC email distribution list. Five

applications for participant funding were approved by the Independent Funding Review Committee.

The Committee awarded over \$30,000 to five recipients for participation in today's meeting through written interventions. In total, nine interventions were received: five from the funded participants and four from other intervenors. Certain comments from the intervenors are identified and additional information has been provided by CNSC staff in supplemental CMD 19-M30.A.

The interventions covered a variety of topics and demonstrated the ongoing interest of numerous stakeholders in the operation and regulation of NPPs and WMFs in Canada. A few of the major topics or themes identified by CNSC staff are listed on this slide. Some aspects of the interventions are addressed in CSNC staff's supplemental CMD.

This slide describes the steps CNSC staff will take after today's presentation on the ROR, on the 2018 ROR. The report itself will be revised based on comments provided during today's proceedings. There are some specific errors that will need to be corrected as identified in the supplemental CMD. Each intervention will be assessed to determine if changes are required in the 2018 ROR or if changes should be considered when writing

the 2019 ROR.

A draft, French translation of the 2018 ROR was recently completed; it will be reviewed and other editorial and formatting changes will be made before proceeding to publication.

Licensee non-compliances described in the 2018 ROR that were not resolved by the end of 2018 will be carried forward for documentation in the 2019 ROR.

The Commission requests for information, as identified in the supplemental CMD that are not considered to be closed by the presentation of the 2018 ROR, will be carried forward as well for the 2019 ROR.

Finally, CNSC staff will continue to monitor licensee safety performance at NPPs and WMFs and plan and conduct rigorous compliance verification activities, documenting them in the 2019 ROR.

I will now pass the presentation over to Mr. Frappier for final conclusions.

MR. FRAPPIER: Thank you, Kim. For the record, my name is Gerry Frappier.

In broad terms, the facilities covered in the ROR were safe in 2018. This conclusion of CNSC staff was borne out by both analyzed data, an assessment of licensee provisions, and actions in the context of robust

and detailed CNSC requirements.

Conclusions were based on the results of an effective compliance verification program. CNSC conducted numerous compliance verification activities that generated findings that were used in these assessments, prompted CNSC follow-up, and informed the evolving compliance verification plan for each facility.

CNSC staff follow-up was conducted until issues that were identified were subsequently resolved to staff satisfaction although, as is the case on any annual report, some issues were still being resolved when the ROR was finalized.

The resolution of issues of a more complex nature were being resolved through a combination of licensees, research and development, the development and implementation of new regulatory requirements, and other activities.

The compliance verification program continues to evolve as operational improvements are initiated for the program itself as the licensee operations change and as the requirements of licensees evolve.

CNSC staff also take into account intervenors comments when reviewing the program itself and the reporting of its results.

CNSC rated all fourteen safety and control area as either satisfactory or fully satisfactory for all facilities except, as mentioned, safety analysis for Gentilly-2 which was not rated.

CNSC staff observed that radiological doses to both workers and the general public were below regulatory limits as reported by the licensees.

Finally, each licensee promoted a healthy, safety culture and conducted its operations at the MPPs and WMFs with due regard to the safety of the facility, workers and the public.

This concludes the presentation. CNSC staff are available to answer any questions that the Commission may have. Thank you for your attention.

THE PRESIDENT: Thank you very much for the presentations.

I'll now ask the representatives of each nuclear power plant licensee if they would like to make comments on what was presented today, and we'll use the same order that the staff used in their presentation. So, I'll start with Ontario Power Generation, if you'd like to make a statement.

MS SMITH: Good morning, Madam President, and Members of the Commission.

Once again, for the record, my name is Stephanie Smith, I am the Deputy Site Vice-President for the Darlington Nuclear Generating Station and Ontario Power Generation.

With me today on my right is Gary Rose who is the Deputy Site Vice-President of Darlington Refurbishment Execution.

And, on my left, I have Lise Morton who is the Vice-President of our Nuclear Waste Management.

Behind me, I have Jack Vecchiarelli, who is the Vice-President of Nuclear Regulatory Affairs and Stakeholder Relations.

In addition, we are joined by other members of the OPG team.

On behalf of OPG thank you for this opportunity to discuss the 2018 Regulatory Oversight Report. Overall, we found the report to be both fair and balanced. We appreciate the CNSC staff's evaluation of OPG's continued strong safety performance and we recognize the opportunities for improvement.

The safety performance of OPG's nuclear facilities is a responsibility shared by all of our employees and contractors. As nuclear professionals we remain dedicated to nuclear safety as our top priority. We

remain accountable to the commission, to our shareholder the province, our employees and in particular the public. We demonstrate this accountability each and every day.

Commissioners, as we previously talked about, at OPG our focus is on six fundamental areas or commitments which, in addition to withholding nuclear safety also include, ensuring the fitness for service; maintaining an engaged workforce; maintaining low impacts of operation; supporting transparency and engagement with the public; and, continuing to invest in our facilities and in our people. We uphold these commitments through our entire nuclear fleet and I will touch on some of the areas here.

OPG's strong safety performance in 2018 was due in large part to our energized, engaged and motivated workforce which drive our healthy nuclear safety culture and who take pride in their ongoing contributions to the safe and reliable production of electricity which is clean and low cost to the members of Ontario.

OPG works diligently to ensure that our facilities operate safely while promoting and protecting the health and safety of the public and its workers as well as the environment.

For 2018 OPG's effectiveness in the area

of environmental monitoring was validated through our annual environmental monitoring reports which stated that the annual public dose resulting from both the Pickering and Darlington station operations were 0.2 percent and 0.1 percent of the annual regulatory limit respectively. As a core value, OPG will continue working to ensure that the radiation to dose to workers and the public is as low as reasonably achievable and well below regulatory limits.

At OPG we recognize that the electricity sector is changing at a rapid pace. OPG continue to foster innovation not only through our X-labs, but also through daily operations and how we execute our projects. We believe that every employee has the capacity to assist OPG and the industry in identifying the many opportunities offered through the innovation of our business.

OPG, in particular, appreciates the regulatory openness and flexibility that would be required as the nuclear fleet considers these new opportunities and their applications across the nuclear fleet.

In OPG's nuclear waste management division our focus continues to be on good stewardship which means accepting, transporting, processing and storing the waste safely while protecting the public, the environment and staff. We continually improve on our efforts in waste

minimization while progress continues to finding lasting solutions for permanent disposal.

In the interests of transparency, at our most recent hearing we committed to making the ground water data from the Pickering nuclear site publicly available. Since this time we have worked in collaboration with the Pickering Nuclear Community Advisory Council as well as other stakeholders. We are grateful for their valuable feedback, and with that we have been able to provide the information in a fulsome manner that is also easy to understand. This was published on OPG's external website in October of this year.

The interactive GIS map was posted along with the 2018 groundwater reports for both Pickering and Darlington which confirms that there continues to be no adverse impacts related to ground water at our facilities.

We also continue to carry out engagement activities with the public. As a recent example, more than 3000 visitors attended our recent open house to learn more about nuclear power, jobs in the skilled trades and nuclear industry, and to tour the Darlington site.

The open house also showcased work underway on the Darlington refurbishment project for which all 2018 integrate improvement plan commitments have been

met.

As discussed, we are pleased to report that all 200 feeder tubes are now installed on Darlington Unit 2. With the reactor installation phase now complete, the project is transitioning to the return to service phase, and we are projecting to start the fuel load within the next couple of days.

During the project our performance on both conventional and radiological safety continues to be very good. We have worked over fifteen million hours with only one unfortunate lost time accident, and our safety performance is almost ten times better than Ontario's construction industry average.

Along with our vendor partners we are pleased to have reached such a critical milestone in the project which will provide over thirty years of clean, reliable and low cost electricity to the people of Ontario.

In closing, we certainly recognize there will always be opportunities for improvement, but as nuclear professionals we learn from these and as a result we will continue to improve on our overall strong performance as we strive for excellence.

Thank you for providing us this opportunity to once again appear in front of the Commission

as we discuss the Regulatory Oversight Report for 2018. We look forward to answering any questions you may have.

Thank you.

THE PRESIDENT: Thank you, very much. Now, I'll turn to New Brunswick Power. Do you wish to make any comments?

MR. NOUWENS: We do, thank you. Jason Nouwens, for the record.

President Velshi, Members of the Panel, CNSC Staff, observers and guests, let me begin today by introducing myself and member of our team who are with me today.

My name is Jason Nouwens, and I am the director of Regulatory Affairs and Performance Improvement at the Point Lepreau Nuclear Generating Station.

With me today are Andy Hayward, director of Engineering and Chief Nuclear Engineer.

Krista Ward, Manager of Regulatory Affairs.

Kathleen Duguay, Manager of Community Affairs and Nuclear Regulatory Protocol.

Jennifer Allen, Senior Health Physicist.

Derek Mullin, Superintendent of Deterministic Safety Analysis; and,

Nick Reicker, Superintendent of Emergency Preparedness Environment.

I want to thank the CNSC for an objective and instructive annual report on Point Lepreau Nuclear Generating Station and our Canadian partners. I appreciate this opportunity to address the Commission and welcome the findings as part of the station's continuous improvement process.

I also appreciate the time and effort that the intervenors took to participate and provide comments on the ROR; their involvement supports our efforts towards meaningful and transparent dialogue with all members of the public.

Overall, we concur with the 2018 regulatory report findings and are pleased that the nuclear generating station once again met the regulator's expectations in all areas.

Furthermore, the CNSC noted three areas of particular strength: operating performance, conventional health and safety, as well as safety analysis. All of these relate to our number one priority, which is safety, and for us this also includes conventional, nuclear, radiological and environmental safety.

As I'm sure you know, the safest plants

are also the best-performing and most reliable plants.

With respect to conventional safety, we are very proud of our safety record and are committed to maintaining a safe work environment for all workers at Point Lepreau. Our conventional safety performance remains very strong, while at the same time achieving some of our strongest plant performance results ever, which include the following:

- We achieved 97 on the 100-point Equipment Reliability Index scale. This result builds on last year's score of 91 and demonstrates the sustained excellence that we are striving for.

- Also in 2018, we had a net electrical production of 4.86 terawatts of low carbon electricity.

- And most proudly, we had the longest breaker-to-breaker run since 1994, at 310 days of consecutive operation. This is the first breaker-to-breaker run since the station has come out of refurbishment in 2012.

These reliability achievements and improvements have supported continued excellence in other station areas, including radiological protection. To date, the radiological releases over the life of the plant are significantly less than the annual limit for a single year.

We also want to take note of the positive feedback CNSC has given on our performance around radiological protection and environmental management. These are especially noteworthy to us as our surroundings are unique given the distinctive ecological features surrounding our station.

To support this, Point Lepreau maintains certification to the ISO 14001 Environmental Management System and just underwent a successful recertification audit in September of 2019. This accomplishment continues to demonstrate the strength in our environmental protection programs.

One of the key highlights is our environmental sampling program. NB Power has an extensive environmental monitoring program that samples and analyzes the water, air, soil, vegetation and wildlife in our immediate area to ensure our operations do not adversely impact our community or our neighbours.

In addition, Members of the First Nation communities of both Mi'kmaq and Wolastoqey continue to work alongside us on this program to ensure that the delicate balance of nature is carefully maintained.

The station's environmental performance is reviewed on a regular basis, which includes environmental

assessments, ecological, and human health risk assessments. Each of these reviews has validated that the station continues to have minimal environmental impact.

Consistent with the nuclear industry's strong focus on emergency preparedness, Point Lepreau also continues to make improvements to our emergency response and emergency planning.

As was already mentioned, in 2018 NB Power conducted our Synergy Challenge exercise. This exercise tested our emergency preparedness response, recovery capabilities and decision-making by both NB Power and NBEMO. Synergy Challenge marked the first time that a full-scale emergency exercise focusing on recovery from a nuclear emergency had been conducted in Canada. The exercise challenged more than 35 organizations and demonstrated our ongoing dedication to enhancing interoperability and coordinated response to a nuclear event.

Reliable, low emission electricity contributes to the health and well-being of the people of New Brunswick and the environment, and these are both of highest importance to us at NB Power.

The 2018 Report confirms that NB Power continues to modernize the station with the latest codes,

standards and regulations, and we are encouraged to continue executing our performance improvements to not only meet but exceed expectations.

The findings in this Report affirm the dedication and hard work done by our leadership team and all staff to improve our station. I want to thank each Point Lepreau employee for their efforts in achieving these strong safety and performance results for the people of New Brunswick.

We are a learning organization and we are always striving to be the best we can be. We are very proud of our workforce and safety is ingrained into everything we do.

Our team of dedicated nuclear professionals continue to let their expertise, leadership and knowledge shine through their work under our Navigating for Excellence framework, which outlines our values and our way of doing business, and represents the cornerstone of our commitment to being one of best and safest nuclear plants in the world.

It is also a privilege for us to be part of the local community. We not only work here, we live here and are dedicated to driving safety and operational excellence into everything we do. This is our commitment

to our communities and we are honoured to have their level of engagement and support.

Point Lepreau is fundamental to providing New Brunswick with safe, predictable, reliable and environmentally responsible electricity. We look forward to future years where small modular reactors will also play a key role in not only New Brunswick but Canada's clean energy landscape.

Thank you for your time. We would be pleased to discuss any aspect of our operation in more detail. Thank you.

THE PRESIDENT: Thank you, Mr. Nouwens. Bruce Power, any comments?

MR. SCONGACK: Thank you, Madam President. Good morning. For the record, my name is James Scongack, I'm the Executive Vice President of Corporate Affairs and Operational Services at Bruce Power.

Other members of the Bruce Power team here today include: Len Clewett, our Chief Nuclear Officer; Gary Newman, our Chief Engineer; and Maury Burton, our Senior Director for Regulatory Affairs.

Consistent with some of the comments made by other licensees, we too appreciate the opportunity to participate in this process. We view this process as one

of many opportunities where the communities around the site, Indigenous groups, stakeholders, intervenors, interested parties, can participate and understand areas of our operation, the areas that we have strengths in and the areas that we continue to be focused on in terms of areas for improvement.

But broadly when we look more globally at the nuclear industry and regulators throughout the world, we view this as a best practice. We view this as something that really sets the bar in terms of regulatory licensee transparency and engagement on an annual basis. So I want to thank CNSC staff and the Commission for their leadership in this area. Transparency serves us all better and providing people the opportunity to engage I think is not only healthy but sets us aside from many other jurisdictions.

I want to start with safety. Safety is our number one value. When we look at safety, as noted in the Report, we look at it from the perspective of four pillars of safety, with the reactor safety pillar being our overarching pillar as an operation, as a nuclear operator.

I would note that in the period of 2018 and since the 2018 period that from a reactor safety perspective we remained in the top quartile of the CANDU

Owners Group in terms of reactivity management index. So, you know, we have to talk about all elements of safety of our business, but in nuclear, the reactor safety pillar is primary and supreme.

Also, a lot of conversation by CNSC staff and other licensees in the area of industrial safety. I would note considerable progress since February of this year. We haven't had one lost-time injury since that time.

I think it's really important to note in terms of continuous improvement and our strive for excellence that we noted earlier on this year, in particular with an increase in contractor staff coming onto site to work on the life extension program, that it was really a time to make a step change in our focus on industrial safety.

You know, obviously when you look at the performance of all licensees, Bruce Power included, compared to other sectors, we stack up very well, but this is one of those areas that you can't get complacent on. We have to recognize we have a lot more volume of work underway at our facility and that is something we are seized with and not taking anything for granted.

Our enhanced focus on industrial safety has really been focused on hazard identification for things

that could be easily characterized as low-risk activities and risk assessments in the field. If you look at where we've had lost-time injuries, it has tended in the past to be on things that were not perceived to be high-risk evolutions, and so at the end of the day we want every one of our employees, anybody who works on the site, whether they are receiving a paycheque from Bruce Power or a contractor, we want them to go home safely. So that rigour is something we continue to be seized with and we will not be satisfied until we hit zero.

In the other pillars around radiological and environmental safety performance we've continued to see a strong sustained performance in this area.

In the area of radiological safety, consistent with other licensees, we focused on the as low as reasonably achievable principle. We would note that in particular our focus on areas such as personal contamination events have been industry-leading and the efforts that we put in place on that front many years ago have not just been a temporary improvement in performance but they've been sustained.

In the area of environmental performance, this tends to be an area that a lot of stakeholders and in particular Indigenous communities have a number of

questions and focus areas on. Our goal in Bruce Power is not just environmental compliance, it's sustainability. So we continue to look at every element of our business, every environmental interaction that we have and seek to minimize those.

In particular, I would note two or three items that have advanced since the 2018 period and throughout 2018.

First is in the area of low-level waste production. We are on track this year to divert approximately 95 percent of the waste generated on our site. Our goal is -- you know, while we have, and I know the Regulatory Oversight Report notes this, very effective waste management processes and safe facilities, our goal is to produce as little radioactive waste as possible and that is a focus in the plant, from minimizing materials that go into the plant, sorting, compaction and other reduction methods.

We're on track this year to hit around 95 percent diversion, which means for every 100 bags of low-level waste that in theory we could produce, we're only sending 5 to Lise Morton's facility over at Western Waste Management Facility. And so that is our responsibility, as safely as those facilities are managed, is to minimize.

I would also note that we're on year five of a coal-free Ontario. Ontario has gone from a high of 50 smog days eight years ago to 1 or 2 smog days a year now. So while we often talk about environmental performance, sometimes we forget about the environmental benefits of our operation, and that means that kids who have asthma can go to school and play at recess. It means we're fighting climate change and, you know, while that is not a core area of performance we're measured on, it's a very important societal component to what we're all trying to achieve.

Finally, from a safety perspective, we just completed a number of weeks ago Huron Resilience, a federal and provincial exercise. We had the opportunity through that process to test our data transfer protocols with CNSC. We had over 40 organizations participate in this.

And, you know, what's really important about these exercises is they're not just an opportunity to demonstrate what your capability is and that you're meeting regulatory requirements, it's really an opportunity to get better, and so we look forward to not only working with the CNSC but challenging ourselves internally from this drill and this exercise and how do we get better.

There's been a lot of conversation about

strong operational performance from the Units. Like other licensees, we have demonstrated throughout 2018 and 2019 record operational runs. Those are runs in terms of individual Unit runs. We just hit a record run of 100 days of non-planned Units out for maintenance having a consistent run, post-refurbishment records on Units 1 and 2.

One of the things we always have to be mindful of is when we're talking about record operational runs, we don't want to leave people with an impression that we're production-focused. We're safety-focused and so when we're safety-focused, that means our equipment is operating to the highest standards and our people, through human performance, are doing the right things. So if you're safe, you're going to get those record runs. So it's really important. We always connect those elements for people, but when our equipment is working and our people are doing the right things, that's how we achieve those record runs.

I also want to take a minute and talk briefly about our Life Extension Program. We will be commencing, as noted, our Unit 6 major component replacement in January. While there's a lot of focus on major component replacement, our Life Extension Project has

been underway since January 1st of 2016. It's on time, it's on budget, and it's a key element to ensuring that we manage a consistent scope of work that is levelized over the course of the next 15 years. So while there will be a lot of attention on major component replacement, we have carried out as much work on site since 2016 as is in a major component replacement and I think that's important to note for the Commission.

We're working with our friends at Ontario Power Generation and recognizing the success they've had at Darlington and how we share those lessons learned. We're receiving lessons learned from Darlington. They are integrating in their project planning lessons learned we had from Units 1 and 2. And a key element around our site is that we also rely on many organizations to deliver this work program, in particular our contractor community, and about 60 of those contractors have now relocated to the Grey-Bruce-Huron Region, which we believe is a very important not only cultural element but really builds a strong team approach to being successful together.

None of these things are possible without the success of our people and their engagement. In the period of time that we are talking about today, in 2018 we had 329 external hires in the company and since 2001 we've

reduced the average age on site by 10 years. So we've been operating the site for nearly 20 years and we've reduced the average age by 10. So that is a workforce transformation that we have had to undertake, recognizing the life of our business is extended to 2064. That hasn't come without challenges. Knowledge transfer is a focused area, training, development, mentorship, and we are really seeing really strong results in that area and in particular the areas of operations and engineering pipelines.

I would also note that we are very committed to further diversifying our workforce. We believe that will lead to not only better safety performance but operational performance and business results. You look at any benchmarks, more diverse workforces tend to have better results. Over 2018, 35 percent of our hires were women; 27 percent of our hires in non-traditional roles were women and in particular in non-traditional areas is an area, in operations pipelines and others, we're putting a tremendous focus. And also, when it comes to increasing the number of Indigenous people working on site, in 2018 we had 57 hires of Indigenous people.

I would like to wrap up with a focus on our community and also our medical isotope operation. In

2018 we were at full-scale production of our medical grade cobalt program, which, for those of you that are technically inclined, we call that high-specific activity Cobalt-60. It is used to treat brain tumours around the world and that technology is now being expanded. That isotope is being expanded to treat breast cancer currently in Maryland and Texas and soon-to-be announced a clinical trial here in Ottawa that will use our HSA Cobalt to treat breast cancer.

As you may have seen in the media, we are also moving to Lutetium-177 production. We will be making a formal application to the CNSC on that matter in 2020. But Lutetium-177 is a key isotope used to treat prostate cancer but also neuroendocrine tumours. So as we progress, you'll see a lot of great news on that front.

But more importantly, what we're really excited about with this project is the involvement of the Saugeen Ojibway Nation, who are now partners in this project. And so, you know, we have to recognize that as a site, whether it was in the construction, a site from AECL, Ontario Hydro, OPG, Bruce Power, that we are committed to having the next 50 years look different than the last 50 years and that means we all have to think creatively and so the involvement of SON in that is very important.

Finally, I'll wrap up with our commitment to the community, both Indigenous and non-Indigenous communities. Throughout the summer of both 2018 and 2019 we had 5,000 to 6,000 people come to our site on bus tours. It's a popular tourist attraction if you're in Bruce County. So if you want to come to Bruce County and visit and see a great nuclear site, please come on our bus tours. I wouldn't suggest coming in January, February, March, but you're always welcome to.

At the end of the day, you know, we always like to say that reputation is the greatest prize because you don't give yourself a reputation, other people give you a reputation. So while we have really strong community support and we're proud of that, we don't take it for granted and this process that we undertake through the ROR is something we will use to communicate with our stakeholders and communities and talk to them about what we can do better and really explain to them the broader nuclear family that we're a part of.

And to that end, you know, a key element of our operation here at Bruce Power is also our engagement at the international level. Just like the CNSC has international obligations, we as a nuclear operator participate on the international level. Whether that is

with the IAEA previously hosting an OSART mission, sending employees and leaders at Bruce Power to participate in those missions, seconding employees to participate in IAEA activities, Canada is an industry that I think is very respected on the international stage and as operators we take that responsibility seriously.

Also, within our operation, both WANO and INPO, recognizing that that is an industry group that again strives for that excellence, we're as tough on each other as the regulator will ever be on us and that's healthy and our participation in WANO is critical.

And also with our fellow CANDU operators, I think Mr. Frappier noted a lot of work that is underway there common to CANDU units and so our continued participation, that is a top priority for us because we all face similar challenges and opportunities as CANDU operators and, you know, the work that the CANDU Owners Group does is significant. In fact, when you aggregate together all of the work that the CANDU Owners Group carries out on behalf of the industry, it rates within the top 200 organizations in Canada investing in research and development. So it is not insignificant, the investment and talent that goes into this area.

That's it in terms of a Bruce Power

overview. We would be delighted to answer any questions you have and thanks again for the opportunity.

THE PRESIDENT: Thank you, Mr. Scongack. Hydro-Québec, avez-vous des commentaires?

M. OLIVIER : Oui. On va y aller, merci. Donald Olivier, pour le verbatim.

Madame la Président, Membres de la Commission, bonjour. Je me nomme Donald Olivier, directeur des Installations de Gentilly-2, Hydro-Québec.

Je suis accompagné aujourd'hui de Mme Annie Désilets, ingénieure aux Affaires réglementaires pour les installations de Gentilly-2.

C'est un plaisir pour nous de venir vous rencontrer aujourd'hui et de permettre à ceux qui nous écoutent d'en apprendre davantage sur le déclassement de nos installations.

Une mise en commun avec les autres titulaires de permis permet d'apprécier le travail des pairs, mais également de pouvoir évaluer en toute objectivité notre rendement par rapport à l'industrie.

J'aimerais profiter de cette tribune pour souligner ma grande reconnaissance à nos employés qui travaillent très fort à mener à bien le projet de déclassement de nos installations. Je tiens à souligner

leur travail exceptionnel et la rigueur dont ils font preuve à chaque jour, dans un contexte bien particulier de décroissance.

À chaque année, Hydro-Québec sonde le niveau d'engagement durable de ses employés à travers l'entreprise. Pour l'année 2019, ce niveau se situe à 84 pour cent. Aux installations de Gentilly-2, ce taux d'engagement est de 89 pour cent, ce qui est exceptionnel. Les employés ont à coeur de léguer aux générations qui les suivront un projet bien ordonné. Pour cela, je tiens personnellement à les en remercier.

J'aimerais maintenant dire un mot sur l'état d'avancement du projet de déclassement.

Les activités menées aux installations de Gentilly-2 en 2018 se sont inscrites sous le signe de la continuité. Rappelons-nous que le jalon d'état de stockage sûr avec l'entreposage du combustible irradié en piscine avait été atteint en décembre 2014. Nous sommes maintenant confiants que l'ensemble des activités principales du déclassement soit complété d'ici l'année 2021. La cadence et le volume des activités demeurent élevés, mais elles sont bien entendu réalisées en tout respect des exigences réglementaires et des impératifs de sûreté et de sécurité.

Quand l'état de stockage sûr avec

l'ensemble du combustible à sec dans les modules extérieurs aura été atteint s'ensuivra le début de la phase de stockage sous surveillance, et ce, pour une période d'une trentaine d'années.

Afin de mieux connaître l'état d'avancement du projet et les principaux jalons qui nous permettront d'atteindre cette nouvelle phase, j'aimerais vous en dresser un bref aperçu.

En 2017, nous avons achevé l'entreposage de l'eau lourde des systèmes, hors du bâtiment réacteur.

Nous avons également finalisé la dernière phase de transfert des résines usées dans les enceintes de stockage.

Parmi les étapes en cours, il nous reste à transférer, pour la toute dernière campagne prévue à l'été 2020, le combustible irradié qui se trouve toujours en piscine vers les enceintes de stockage CANSTOR, nos installations de déchets.

Les trois dernières étapes seront complétées d'ici 2021. Elles comprennent le drainage du circuit de refroidissement des boucliers; le drainage des piscines de stockage; et la finalisation de la reconfiguration des bâtiments et des salles contenant des matières radioactives résiduelles.

En terminant, il est important de souligner que pour l'année 2018, les doses de rayonnement, tant pour les employés que pour la population, sont demeurées faibles et bien en deçà des limites réglementaires, comme par le passé. Hydro-Québec a pris toutes les mesures requises pour préserver la santé, la sûreté et la sécurité des personnes et pour protéger l'environnement. À cet égard, les résultats d'échantillonnage prélevés dans le cadre du Programme indépendant de surveillance de l'environnement de la CCSN durant trois années sont venus corroborer les données de nos experts en cette matière.

Pour conclure, j'aimerais vous faire un clin d'œil sur la performance en sécurité qu'on a eue à Gentilly-2. Donc, en 2018, le taux de fréquence, de même que le taux de gravité, a été de zéro et à ce jour on est rendu à 938 jours sans perte de temps et assignation temporaire.

Je vous remercie de votre attention et nous demeurons disponibles pour répondre à vos questions.

LA PRÉSIDENTE : Merci beaucoup.

We will now take a 15-minute break and resume at 11:05. Thank you.

--- Upon recessing at 10:48 a.m. /

Suspension à 10 h 48

--- Upon resuming at 11:04 a.m. /

Reprise à 11 h 04

THE PRESIDENT: Welcome back everyone.

Before we get into the interventions, I just wanted to note that we have received interventions and many of the intervenors have raised concerns regarding the regulatory oversight reports, in particular on procedural considerations such as timelines and the inability to present orally, and on the content of the RORs.

I just wanted to acknowledge that we have taken note of these concerns and that the CNSC Staff are going to be looking at the RORs and identifying opportunities for improvement, especially with regards to content, timelines, frequency and participation.

So early in the New Year CNSC Staff will start consultation with Commission Members, with licensees, with civil society organizations, Indigenous peoples, the public, and we're hoping that with the recommendations that come up from that review that next year's RORs will address some of those concerns.

So we won't spend a whole lot of time

going through those concerns, but they have been noted and will be considered.

Prior to opening the floor for questions from the Commission Members, we'll proceed with the written submissions filed by the intervenor. Marc, if you can lead us through those please? Thank you.

CMD 19-M30.1

Written submission from Benoit Robert Poulet

MR. LEBLANC: Thank you, I will.

So the first submission is from Mr. Benoit Robert Poulet as outlined in CMD 19-M30.1.

Are there any questions from the Members on this submission?

MEMBER BERUBE: Just one question for Bruce Power, and maybe CNSC should give me an update first on this, is the status of the DLAN automation. Where is that at? How far are we away from having that functional?

MR. FRAPPIER: Gerry Frappier, for the record. Perhaps Bruce Power would like to comment on that and then CNSC Staff can give its perspective on where that's going.

MR. BURTON: Maury Burton, for the record.

In terms of DLAN we've actually chosen to go a different way. DLAN wasn't really compatible with the web EOC program that we are using in our emergency response centre.

So what we've done is developed a separate tool that does essentially the same thing as DLAN, which provides the automated data every 15 minutes to the CNSC to their emergency control centre here in Ottawa.

With that, we actually tested it out here on resilience. I understand that it went fairly well. There are a few bugs in the system that we still need to clean-up, but that is ongoing and part of the lessons learned that we'll be using.

So in our mind we're pretty much there, we just need to do some final clean-up and then we'll be looking for some further guidance from CNSC to improve that when they update the REGDOC-2.10.1 to actually bring in the final requirements to that for the regulatory framework.

MR. SIGOUIN: Luc Sigouin, for the record. Director of the Bruce Regulatory Program. So just in addition to what Mr. Burton was saying. So we did indeed trial the system during a recent exercise and it proved to be very functional. There were a few bugs that were identified and those will be worked out.

The capability that is now available to

the EOC when we're in a situation with Bruce Power is similar to what is available from the other licensees and it meets our requirements for that.

So we're satisfied with the progress that Bruce Power's taken on this issue and we're quite confident that we'll be able to resolve it and close that action and that issue in the LCH.

THE PRESIDENT: Question for Staff. It's with regards to the comment or concerns raised by the intervenors on the INES rating.

So this is the first time, I think, for the NPP RORs we are seeing any reference to that, but we have seen it in others, in other RORs. So, first, a comment that in the executive summary when we say no event was more than an INES rating 0, frankly, is kind of meaningless to anyone who really doesn't understand, which is probably most people. So I think even a footnote to explain what that means.

But, I mean, I understand the intent is to say, look, no serious accidents took place.

But the question, and I saw the Staff's response to the comments raised, but it really was around the event at Bruce Unit 4 where the rationale that was given for why that was also rated as INES 0 was that the

EOC had not been activated. As I tried to understand from the intervenor what the criteria are for the different rating system, just because the EOC wasn't activated, isn't this really more a measurement of the defence in depth and how well that works?

So I'd like to hear your comments on that please.

MR. FRAPPIER: Gerry Frappier, for the record. I think, first, it's very important to understand what the rationale and what the objective is of an INES to begin with. So it's an international communication tool. So it's very important to realize it has nothing to do with managing accident situations, has nothing to do with initiating any kind of response from ourselves, from the licensees, or the province. But it does have a lot to do with international communications and having some level playing field upon which that can be done.

I think our explanation in the ROR is lacking. I take your point, Madam President, and that's something we've noted we're going to have to look at next year.

But I'd like to give our INES National Coordinator, John Burta, an opportunity to explain exactly how this works.

MR. BURTA: John Burta, for the record.

So to your question, Madam President, the fact that the EOC was not activated isn't the reason that this would be rated as an INES 0. What we're saying in our supplemental CMD is that the CNSC approved procedures for calculating an INES rating and communicating that rating are driven by our EOC.

So if the EOC were to be activated, the EOC Director has procedures and processes that would be used and that would trigger them to have an INES rating calculated.

Since this event did not trigger our EOC to be activated, an INES rating wasn't performed on this particular event. After the submission or the intervention was received we did retroactively go back and look at the event. I'll just provide a little more context here.

So when you do an INES rating you have to look at three very different impact areas. One is the impact on people and the environment, and this wasn't considered since atmospheric releases were within the authorized limits, so the INES rating would be zero.

The next step you look at is the impact on radiological barriers and control. Despite the localized release of heavy water, this was not considered since the total dose was within regulatory limits, therefore the

rating again is 0.

The next impact area you look at is defence in depth. Unlike the other two, which are very quantitative, this one's a little more qualitative, it requires some interpretation. For this particular event, the plant is designed for this, it is something that is considered expected as per the INES definition.

Meaning, it can happen once or several times during the lifetime of the facility. The plant is designed with certain mitigating pieces of equipment and mitigating measures in place so that when this does happen, the consequences are minimized. Since those components were available and they functioned, we arrived at the INES rating of 0 for this one.

If you go on through the INES manual there are opportunities to increase the rating due to different factors. You can add the rating, and for this particular one we didn't think that was necessary.

But to go back to your question, the reason we arrived at 0 wasn't because the EOC wasn't activated. What we're saying is the procedures for CNSC to do an INES calculation on an NPP event are from the EOC. So unless the EOC is triggered, we wouldn't necessary calculate an INES rating.

THE PRESIDENT: I think it kind of begs the question of the value of even including this in the RORs.

MR. FRAPPIER: Gerry Frappier, for the record. Yes, we agree and, as I mentioned, we're going to be looking at the role INES plays within the CNSC regulatory framework and what we should do with it with respect to the ROR.

THE PRESIDENT: Thank you.

MR. LEBLANC: Any other questions from the Members? Dr. Demeter.

MEMBER DEMETER: Thank you. I'm referring to the reviewer's comment on back-up generators, and I saw the supplementary discussion on that as well.

The bottom line question from the reviewer was that the previous rationale to not do testing on generator when you had a minimal compliment was that it would leave you with one less back-up than you might have needed.

In his question at the end, was the basis for amending the requirements as per Bruce Power's request is not clearly explained in the ROR.

So maybe you can help me understand from the staffing point of view and the safety case point of

view at what time it was considered this is the minimum and it wouldn't be prudent to do it when you do a standby testing when you have the minimum, and now we're saying it's okay. What has changed to say it's okay now from the safety case point of view?

MR. FRAPPIER: Gerry Frappier, for the record. So I'll ask Luc Sigouin to introduce this and provide perhaps enough in an answer, but we could go into more detail with some of our technical specialists.

MR. SIGOUIN: Luc Sigouin, for the record. So as described in the supplemental information in the CMD when this change was proposed by Bruce Power it was reviewed by CNSC staff and determined that from a risk standpoint it is -- you're in a better position to assume this small period of increased risk for a few minutes in order to be able to determine that the standby generators will be available when required.

So that assessment was performed within CNSC Staff. We agreed with Bruce Power's proposed approach for that, and accepted the modification to the OP&P.

I could ask Mr. Jeff Stevenson, who's at site, to provide some additional information on that, and then maybe we could go to Bruce Power as well.

MR. STEVENSON: Jeff Stevenson, CNSC Site

Inspector, for the record. I don't have much to compliment what Mr. Sigouin said. One thing I will note is that there is nothing that has changed in the safety case, the safety requirements for the standby generators remain the same.

Really what we were looking at when we reviewed Bruce Power's assessment was the operational considerations of having the standby generators unavailable for a very short period of time in order to confirm that the remaining ones that you were relying on were in fact available to perform their design function.

Thank you.

MR. BURTON: Maury Burton, Bruce Power, for the record. I can just add to this. The main purpose of this, right now we're going through an asset management program and part of that asset management program is refurbishment of these standby generators, which we have four for each station.

So during this we are taking the turbines out and actually sending them offsite for refurbishment before bringing them back, which leaves us with three. So occasionally, when we're doing testing, one of the tests fails, so the idea here is to test the other ones to confirm availability.

During those tests, at the end of the

tests, there is a short window of five to six minutes where the turbine is running down where we can't restart it. So we need a short period of time of unavailability to reposition the system. So that's really what the issue here is. It's five or six minutes, and it really came to light because we are doing these major refurbishments of these pieces of equipment.

MR. FRAPPIER: Gerry Frappier, for the record. If time is allowed, I'd like Mr. Eric Lemoine to also provide some comments on this.

MR. LEMOINE: Eric Lemoine, Director of System Engineering. Nothing much to add. I think another point that is important to recognize too is that we do maintain oversight of this because anytime they get into this situation they would be required to report this to us as part of 3.1.1. So just an additional piece of information, but nothing else to add to Luc and Jeff and Mr. Burton's answer.

MEMBER DEMETER: Okay, so that's good. I think what I'm hearing is this was a re-evaluation of current practice with the reassessment of the safety case and what is, in whole, the best way to go forward given all the variables. So I understand, thank you.

THE PRESIDENT: Question to Staff. More

clarification on some of the terms that have been used.

So the intervenor on the Pickering severe accident analysis where staff provided informal comments, and he asked what is meant by informal comments. So are those comments on a website, are they publicly available? What makes comments informal comments?

MR. FRAPPIER: Gerry Frappier, for the record. So it's probably easier to start with what makes them formal. So formal comments are comments that are sent in writing by the regulator or by a representative of the regulator where there's an expectation for a written response, that the licensee would standby, if you like, as far as the position of the licensee with respect to whatever request it was.

We do a lot of interchanges as well, primarily on the technical side, where we are trying to understand the complicated situation at an NPP, and under those circumstances there could be lots of perhaps emails back and forth between technical groups to clarify things so that we could put an official formal request or a formal position.

But with respect to the Pickering one, I'd ask Mr. Alex Viktorov to add content to that.

DR. VIKTOROV: Alex Viktorov, for the

record. Indeed in interactions between CNSC experts and the industry specialists as through person-to-person meetings or through emails, so in the conversations we may ask questions that are not yet formal CNSC positions, just to make sure we understand the situation correctly. Generally, that's what may be termed an informal comment.

However, in this particular case that was mentioned in the ROR, we dug deeper to verify what actually was communicated to the licensee, and it looks like other than exchanges during meetings there were no informal comments provided. Our CNSC position was communicated formally and generally we are satisfied with the work conducted at the Pickering facility.

THE PRESIDENT: Thank you. So the ROR will get updated to say formal comments were provided, is that the plan?

DR. VIKTOROV: Yes, we will bring precision to the statement.

THE PRESIDENT: Thank you. The other point was in your response to another comment, and it was with regards to inspection, where you said, "compliant findings and noncompliant findings." What's the difference between those findings? It's again Pickering inspection of the fuel handling conveyor tunnel.

MR. FRAPPIER: Gerry Frappier, for the record. Perhaps I'd ask Kim Campbell to talk a bit about the definitions there and, then for the specific area around Pickering, Mr. Alex Viktorov could add to that.

MS CAMPBELL: Kim Campbell, for the record. So the power reactor regulatory program for the compliance verification program has many activities that are executed, one of them being inspections. During inspections inspectors will verify licensee outputs or programs with regulatory requirements. They will capture if they find that the licensee is complaint, meaning they meet the expectations or meet the requirements. They also note if the licensee is noncompliant and they do an analysis around that of what is the significance of that noncompliance finding.

So I hope that provides some clarity for you.

Then for the details on the inspection, I can pass it to Alex.

THE PRESIDENT: That was fine, I just wanted to know what compliant findings meant. Thank you.

CMD 19-M30.2/19-M30.2A

Written submission from Frank R. Greening

MR. LEBLANC: So there are no further questions on this intervention.

We'll move to the next submission, which is from Dr. Frank Greening, as outlined in CMD 19-M30.2 and CMD 19-M30.2A.

Any questions from the Members on this submission? Mr. Berube.

MEMBER BERUBE: Just one question with regard to discharges.

The question is with regard to the WWMF waterborne radionuclide discharges at the Bruce. Dr. Greening here has stated that some of these are unmonitored or not monitored at all.

Could you bring us up to speed on what the compliance activities are at this facility?

MR. FRAPPIER: Gerry Frappier, for the record.

So I'd ask Karine to answer from a CNSC perspective, and then I'm sure OPG would like to add to that.

MS GLENN: Karine Glenn, for the record.

We did address some of the concerns by Dr. Greening in the supplementary CMD that staff put forward. So I would like to start off by saying that those really -- any waterborne emissions, they are monitored by OPG, and they are reported to CNSC staff as part of the quarterly and the annual reports. And we review that data on an annual -- as we review those reports.

In addition to that, whatever is captured and sent to the Bruce treatment plant is also -- it's not fugitive emissions. It is mon- [sic] -- captured in the site-wide emissions from the site, and it's part of the dose calculations for dose to the public.

So as I mentioned in my speaking notes today, the dose to the public for the waste management facilities is combined with that of the NPPs and we get a site-wide dose. And so those emissions that do eventually get released after treatment from the Bruce water treatment plant are captured through the dose to the public that way.

But they are monitored. CNSC staff does review that data on a quarterly basis. And then I'll pass it on to OPG.

MS MORTON: Lise Morton, for the record. I'm the vice-president of Nuclear Waste Management at OPG.

I don't have much more to add compared to

what Ms Glenn said, but again just to reiterate that she's correct. These are not unmonitored emissions. The waterborne emissions from the Western Waste Management site are captured completely.

The intervenor specifically speaks to two particular areas, and these are the sumps from our low-level storage buildings, and also the water that we collect from our in-ground containers. So again, that is sent to the Bruce A active liquid waste system, and it is captured as well through that emissions monitoring data.

But also, as Ms Glenn points out, on a quarterly basis we send all of that data, so all of the volume pumped out of those particular structures and the radionuclide content, to the CNSC for review as well. So it's very well captured and documented.

MR. LEBLANC: Dr. Lacroix?

MEMBER LACROIX: Thank you.

This is not a question; this is a request. The issue of pressure tube fracture toughness and equivalent hydrogen concentration recurs on a regular basis at meetings and hearings. And I was wondering if staff could provide the Members of this Commission with a briefing note on the mathematical models and semi-empirical models that you use to make these predictions. Is it

possible?

MR. FRAPPIER: Gerry Frappier, for the record.

Certainly the aging of pressure tubes is of key concern to everyone. And there's lots of world-class sophistication being applied to it. And you can certainly get lost in mathematical models for different things. So we'll certainly undertake that as something that we could put together for yourselves.

We did do a more detailed technical presentation -- oh, I forget exactly when there -- but anyways, it's -- if I've forgotten when it is, it's probably too long ago.

It is a very important subject. And if you want a little bit of detail right now, we could ask Mr. Glenn McDougall to provide a little bit, or if you prefer we'll put it together in a memo that might be more appropriate.

MEMBER LACROIX: I prefer the briefing note, thanks. Thanks a lot.

THE PRESIDENT: Though I would like to get an update on what the latest results are and, you know, whether there's been inconsistency in what the last set of results are and the impact that has on our prediction on

end of life.

MR. FRAPPIER: Gerry Frappier, for the record.

So I'd ask Mr. Glenn McDougall to perhaps review what the last set of results are compared to the predictions -- I think Dr. Greening is showing that maybe there's some inconsistency in our numbers -- and to explain why that's not the case.

MR. McDOUGALL: It's Glenn McDougall, for the record.

Certainly, Madam President. Two things I'd like to point out. Staff are focusing a lot of attention on this particular issue. It was the focus of many discussions and questions at last year's relicensing hearings for Pickering and Bruce. We've actually been following this file very closely since 2010, which is when OPG and Bruce Power initiated a large R&D program, focusing on this topic.

Yes, we've received comments from more than one intervenor on Appendix G in the ROR. What has happened here is that we revised the format of the table relative to tables that we had presented in to the Commission in previous deliverables and also in last year's ROR. The reason was to address the key concern that we

perceived the Commission had at last year's relicensing hearing, which was the point at which the current regulator accepted fracture toughness model would expire. And at that point, the industry would have to have another model which was capable of predicting fracture toughness at higher levels of hydrogen.

So what we did was the left-hand side of Appendix G remains the same as previous years, because we wanted to give the Commission and the public an idea of exactly where the stations are at the end of the 2018 year, which is covered by the ROR.

The right-hand side of the table is the one that we refocused this year. And perhaps we could've done a better job of explaining the two different formats of information that we provide there.

For the majority of the units, the pressure tubes are not expected to reach 120 parts per million of hydrogen equivalent by end of service or by the point at which the utility begins major component replacement. So this case would cover the Pickering and Darlington units and Bruce Units 1 through 4 and Unit 6. So in this case, Appendix G reflects the maximum current prediction of hydrogen before that time occurs.

For the remaining Bruce B units, the

right-hand side of Appendix G reports the anticipated date at which a lead pressure tube will reach 120 parts per million hydrogen equivalent. At this point, Bruce Power will need to complete development of a revised toughness model and get CNSC's acceptance of that model for application to regulatory use.

So to put the dates in context for the three affected units, the licensees have recently confirmed that a revised model will be ready by quarter two of 2020 and will be submitted for CNSC review by October 1st of next year. And staff in my division anticipate being in a position to make recommendations about that review to DPRR by April of 2021.

MR. FRAPPIER: Gerry Frappier, for the -- oh, sorry.

THE PRESIDENT: So well before the September 2023 date, I guess, which is the earliest that's predicted here to reach 120 parts per million?

MR. McDOUGALL: Glenn McDougall.

That is correct.

MR. FRAPPIER: Gerry Frappier, for the record. If I could just add a little bit on this.

So we're always of two minds when we're looking at pressure tubes. Pressure tubes are very

important with respect to the safety case of the CANDU reactors. We are always evaluating today are they fit for service, and the licensees have many requirements on them to demonstrate that on a continuous basis. And of course we would make -- well, they would make decisions themselves if they deemed it was not fit for service.

But we also know that the future operation of the CANDU reactors require that the pressure tubes continue to be fit for service. So we have this a bit more over-the-horizon look at what the -- what is going to happen which has led to a whole bunch of discussions around hydrogen equivalencies and up to 120 parts per million and that.

And but that's about future conditions that we're trying to get ready for. And as you can see by the timelines, there's years before that happens. But that goes by very fast in our world, to make sure research is available in time. And so we don't want to lose sight of that and we want to make sure that we're informing the Commission of where those are.

But to be clear, as of today, there's fitness for service requirements and those are met.

THE PRESIDENT: So thank you for that explanation, Mr. McDougall.

My question was also on the staff's response to Dr. Greening's comment that the results were different from what was presented in January 2018 because of different pressure tubes or different locations that had been measured.

I understand the right-hand side of the table in Appendix G, but this seemed to indicate that depending on which pressure tubes you pick, you may get different results, and the how reliable is the information. I was finding it difficult to reconcile that.

MR. FRAPPIER: Gerry Frappier, for the record.

So certainly this -- there's a lot of pressure tubes we're talking about. We're taking samples. As we get samples, the needle could move a little bit. But for this particular case, again, I'd ask Mr. Glenn McDougall to provide us with some context.

MR. McDOUGALL: Glenn McDougall, for the record.

Yes, I understand your concern, Madam President.

In trying to present projections that we think are the most relevant to the Commission, we have two choices as staff. We can rely on predictive models, which

at their root are based on data that are collected by the licensees and are extrapolated forward in time by some means. That would perhaps give you the kind of continuity that you're looking for in terms of the trending of the numbers.

But our choice instead has been to take the most recent hydrogen uptake data that is provided by the licensees as a condition of their licence. All of the licensees are bound by requirements in the CSA standard for routine monitoring of hydrogen levels in their pressure tubes.

For practical reasons, and principally one of those is ALARA, the licensees do not sample hydrogen in large numbers of pressure tubes in their reactor. They typically do about 10 pressure tubes in a given outage. Those are not selected randomly. The licensees follow explicit guidelines that are given in the CSA standard for selection of pressure tubes for sampling.

So it's to be expected that there would be some variation in the numbers from one reporting period to another, but that is not just a function of which pressure tubes we look at. It's a function of the fact staff is trying to give the Commission the most recent data. So whereas in previous reports you may have in fact been

getting predictions of a model, now what you're comparing those to is actual, more recent measurements that have been made by the individual licensees about their pressure tubes.

THE PRESIDENT: Thank you. So last question. Based on the latest results, what's the trend of reaching the 120 parts per million? Is it later, is it earlier? Does it vary from unit to unit?

MR. McDOUGALL: For the majority of the pressure tubes, but for Pickering, for example, the absolute numbers have changed, but the answer is the same, that we -- CNSC staff does not expect any Pickering pressure tubes to reach the 120 parts per million threshold before the projected end of service.

For Darlington, the news is a little bit better. I believe that the last time that we spoke to the Commission, our anticipation was that one of the units might have had a small number of pressure tubes that would exceed 120 parts per million. Based on the most recent data that we've seen, we no longer believe that. We believe that Darlington, the MCR projects will all begin before that becomes an issue.

And in terms of Bruce, for the majority of the units, the answer is in fact improved. And this is

because since the last time we spoke to the Commission and presented hydrogen equivalent data, the licensee has taken on board new hydrogen measurements for many of its pressure tubes, which have in fact revealed that their previous model was overly conservative.

So while it is still true that some of the Bruce B units that you can see in Appendix G will exceed the 120 parts per million number, that's now stretching further into the future than we had raised concerns at last summer's hearings.

THE PRESIDENT: Thank you.

MR. LEBLANC: Other questions?

Dr. McKinnon?

MEMBER MCKINNON: Just a general question on how you analyze the data, and I guess it's relevant to the pressure tubes as well.

Whenever you make measurements, there's always going to be some variability. So how do you take into account this data variability when you're assessing compliance to acceptable limits?

MR. McDOUGALL: Glenn McDougall, for the record.

The CSA standard prescribes tests that the licensee is obliged to make of newly collected data. The

two tests that are currently present in the CSA standard, one of them has to do with the rate of hydrogen uptake, and that's measured in between individual inspection outages. And the second has to do with the possibility that hydrogen levels in a pressure tube may become high enough that you will have zirconium hydrides precipitated in the tube material as a permanent feature of the tube. That has very specific fitness for service implications.

Beyond those tests, which are mandatory and which the licensees must formally report on, staff also compares measurements against previous measurements that have been made to see that the trends are logical. And we also look at the necessity for the licensee to perhaps do re-examination of specific channels. If we start to see rates that are concerning to us, we will recommend that the licensee select a pressure tube like that for re-examination at the next available opportunity. Generally, the licensees do that.

MEMBER MCKINNON: Thank you.

MR. LEBLANC: Dr. Demeter?

MEMBER DEMETER: I just wanted to follow on that question, if I may.

The intervenor has a discussion about precision measurement and precision error, and inherent

with that is propagation of error when you start manipulating it in a formulaic format.

So at the end of the day, I guess we want to be confident that the numbers that we see are reliable and as precise as they can be. And his sort of bottom-line comment is that reporting data to within 0.1 ppm is not valid, given that the measurement instruments don't measure that, and that there's error introduced with each measurement in manipulating that.

So maybe give me some feedback on how we can be confident in the results given measurement error and propagation of error in this process.

MR. FRAPPIER: Gerry Frappier, for the record.

Glenn might have some comments on that, but perhaps industry would also like to comment, because I think we're talking now about uncertainty of measurements. Certainly from the perspective of measurements that we're taking, the instrumentation has a certain accuracy which can be quite different than what a mathematical model is going to do, once you start putting that in and do statistical assessments around it.

But perhaps Mr. McDougall would like to add a little bit to that. And then I'm not sure, somebody

from industry may also want to weigh in on this conversation.

MR. McDOUGALL: Glenn McDougall, for the record.

I'll just clarify one point. Dr. Greening is quite correct when he raises the issue of the hydrogen uptake results being reported to 0.1 parts per million. And staff will undertake to correct that. That is not a valid number of significant figures for those hydrogen measurements, given the uncertainties that exist.

MS SMITH: It's Stephanie Smith, for the record.

I'm going to turn it over to Sara Irvine, who is our senior manager of Fuel Channels. Sara?

MS SPEAKER: Sara Irvine, senior manager, Fuel Channel Life Confirmation Project, for the record.

So what Mr. McDougall has said is correct, that the appendix does report deuterium measurements to one decimal point.

It's important to note that we do use these numbers in various ways. So when we take samples from the reactor, we do ship them to Chalk River. The samples themselves are measured, and those are reported out at a high degree of accuracy. We then use those numbers to

build models to forecast our deuterium concentration in our pressure tubes.

So when we put those model projections into fitness for service assessments, we don't use numbers that are expressed to one decimal point. We would use whole numbers for that, because it is a model prediction. So while the CMD did have a number reported to a decimal point, we only use that where it's appropriate and we're reporting actual measurements.

MEMBER DEMETER: That's very helpful. Thank you. And I think it might be useful at the end, when you sort of reach a limit that you think is getting close to critical, that in parentheses it puts the plus or minus in, so that we have some confidence of how tight that point estimate is based on all the steps that go into calculating that. And a little statistician's coming out in me, but that's okay. Thanks.

MR. LEBLANC: Any further questions on this intervention?

If not, we'll move to the next submission.

CMD 19-M30.3

Mémoire du Grand Conseil de la Nation Waban-Aki

M. LEBLANC : Donc, le prochain mémoire est du Grand Conseil de la Nation Waban-Aki, tel qu'indiqué au document 19-M30.3.

Est-ce qu'il y a des questions des Membres de la Commission? Any questions from the Members? If there are, you can ask them in English, but I would ask the staff to answer, if possible, in French. Thank you.

Any questions? Dr. Berube?

MEMBER BERUBE: Given page 2 of their submission here, they give a pretty detailed list of what they hunt, trap, fish and harvest, and I'm wondering how the CNSC incorporates this kind of specific information for -- to help you basically understand what you need to test in the field specifically around decommissioning activities of this nature and how that flows into how you regulate the actual activities.

MR. FRAPPIER: Gerry Frappier, for the record.

So I think there's two parts to that answer. One is what we do as staff as part of our

independent environmental assessment and then -- ah, on était supposé de parler en français.

Alors, il y a deux parties à ça. Une partie c'est qu'est-ce que nous autres on fait comme le staff du CCSN, et je vais demander à Kiza Sauvé de peut-être parler un peu sur nos tests environnementaux.

Ensuite, il y a qu'est-ce qu'Hydro-Québec ferait, parce que je pense que c'est surtout l'environnement d'Hydro-Québec, et peut-être M. Donald Olivier voudrait faire des commentaires aussi.

Alors, Kiza.

MME SAUVÉ : Bonjour. Kiza Sauvé, pour le verbatim.

Pour le programme indépendant de surveillance environnementale, on envoie des lettres, on envoie des communications aux groupes avant de faire la surveillance. Dans ce cas, on n'a pas eu une réponse la dernière fois qu'on a fait la surveillance chez Gentilly-2, mais on sait que pour la surveillance environnementale, la dose au public, c'est important que la titulaire et c'est nécessaire que la titulaire prenne les groupes critiques dans leurs calculs. Donc, on sait qu'ils prennent cette information quand ils regardent qu'est-ce qu'ils ont besoin pour faire la surveillance.

Donc, je vais tourner vers Gentilly-2 pour plus d'information.

M. OLIVIER : Donald Olivier, pour le verbatim.

Effectivement, à Gentilly, on a le plan de surveillance environnementale, le plan de surveillance radiologique environnementale. Donc, évidemment, on fait différentes interventions : aller faire des pêches pour capter le poisson; il y a des fermes autour, donc on va chercher différents échantillons. On analyse tout ça et puis, évidemment, les résultats démontrent que tout est sous les limites réglementaires, et bien en deçà des limites réglementaires.

Donc, via ces deux programmes-là, et puis le piece de la Commission a convergé aussi, donc on croit que notre programme permet de bien gérer la situation à Gentilly-2.

M. LEBLANC : Est-ce qu'il y a d'autres questions? Other questions from the Members?

D'accord.

CMD 19-M30.4

**Written submission from the
Canadian Nuclear Workers' Council**

MR. LEBLANC: So I'll proceed to the next submission, which is from the Canadian Nuclear Workers' Council as outlined in CMD 19-M30.4.

Are there any questions from the Members on this submission?

No?

CMD 19-M30.5

Written submission from the Power Workers' Union

MR. LEBLANC: As there are no questions on this submission, we'll proceed to the submission from the Power Workers' Union, as outlined in CMD 19-M30.5.

Any questions from the Members on this submission?

Madam Velshi?

THE PRESIDENT: Question for staff: Did the Power Workers Union submit any comments on the safety culture REGDOC 2.1.2, do you know?

MR. FRAPPIER: Gerry Frappier, for the

record.

I'm not sure, but perhaps Greg Lamarre -- pardon me? Okay. Ross Richardson, the Divisional Director, could comment on that.

MR. RICHARDSON: Ross Richardson, Director of Human Organizational Performance Division for the CNSC.

Unfortunately, I do not have information on that at the moment, but I can take an undertaking and get back to you perhaps after the break, after the lunch break.

THE PRESIDENT: Thank you.

CMD 19-M30.6

Written submission from

Swim Drink Fish Canada/Lake Ontario Waterkeeper

MR. LEBLANC: The next submission is from Swim Drink Fish Canada/Lake Ontario Waterkeeper as outlined in CMDs 19-M30.6 and .6A.

Questions from the members on this submission.

Dr. McKinnon.

MEMBER MCKINNON: I have some questions on the groundwater monitoring, so this would be a question for

OPG.

For the Pickering site, could you describe how the groundwater wells are distributed around the site and how they are instrumented and sampled?

MS SMITH: It's Stephanie Smith, for the record.

Thank you for your question. I'm going to turn it over to Raphael McCalla to give you some details.

However, I just want to state that OPG is confident that the groundwater at Pickering nuclear site has no adverse effect on the environment or public safety and we continue to monitor and validate the results from the groundwater wells within the Pickering site.

So I'm going to turn it over to Raphael McCalla to give you some details on the monitoring wells themselves.

MR. McCALLA: Raphael McCalla, Director of the Environment Program for Nuclear Division, for the record.

The groundwater monitoring program at Pickering is designed to meet three objectives, one being to confirm predominant on-site groundwater flow characteristics, to monitor changes to our on-site groundwater quality and also to ensure there's no off-site

impacts.

The program follows the requirements listed in CSA Standard N288.6, which is established around risk. There are over 300 wells at the Pickering site. However, on an annual basis, we're probably monitoring somewhere in the vicinity of about 150 of these wells, and that is based on the risks that we see to potential impacts to groundwater.

So every year we evaluate what we see for the previous year and we -- and based on that, we design a monitoring program to support those findings.

MEMBER MCKINNON: Thank you.

I have a follow-on question for CNSC Staff also on the groundwater.

Is there an overall hydrogeological model, a flow model for the Pickering site?

I'm just wondering how the -- you know, the groundwater monitoring data is, you know, collectively analyzed and interpreted.

MR. FRAPPIER: Gerry Frappier, for the record.

So I believe Andrew McAllister will be able to talk a bit about the modelling of groundwater movement, if that's -- if I understand that's what you're

talking about.

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

Sorry about that. Andrew McAllister, Director of the Environmental Risk Assessment Division.

All I will say is that the hydrogeological environment is well characterized at OPG. And what I'll have is I'll have one of my staff, Dr. Shizhong Lei, who's worked on the groundwater matters at the Pickering site for over a decade, to comment on our confidence in the characterization of that area.

DR. LEI: For the record, my name is Shizhong Lei and I'm a hydrologist.

Pickering -- at the Pickering site, OPG conducted very comprehensive groundwater studies in the late nineties. In 2000, they submitted a comprehensive report on the groundwater and tritium distribution.

They conducted at that time over 200 boreholes and they also conducted a very detailed three-dimensional groundwater modelling for the general -- for the original site as well as for the local site, so they had a very good understanding for the groundwater flow system.

And CNSC Staff had lots of interaction with OPG, and the -- on the delineation of the groundwater flow regimes at the site.

Generally speaking, I can give you a quick summary of the flow system there.

The groundwater can be divided into the shallow groundwater system near the surface and the intermediate groundwater flow system and the deep groundwater flow system near the bedrock.

And the -- in the shallow groundwater system, the groundwater flows from north to the south to the Lake Ontario, but that's a general pattern. But within the groundwater -- within the controlled area where the reactors are located, because of the foundation drain sumps which are about 11 metres below the surface and they are the hydraulic load, so they act as hydraulic sink so the water in the reactor building area actually flows downward.

Outside of the reactor buildings, the flow would go to the south.

The deeper -- in the deeper zone of the site of the geology, the groundwater, again, in the -- in the reactor building area, it is downward and the original pattern is flowing to the south.

MEMBER MCKINNON: Okay. So again, it's

that background.

There was some concern by the intervenor about tritium plumes. Have any such plumes been detected and could the current system -- is it capable of detecting such a structure in the flow?

DR. LEI: Again, Shizhong Lei, for the record.

And the -- the initiation of the groundwater study in the late nineties was actually because of the detection of the tritium plume in the groundwater. And the plumes are a result of different sources and it's the focus of the study of the OPG and it's also a focus of our attention from the CNSC.

And the -- so far, because -- like in 2018, the groundwater had been assembled at 146 locations, and those wells included shallow groundwater wells, deep groundwater wells, the groundwater monitoring wells in the bedrock as well as the ground tubes.

The ground tubes are an important feature at the site. They were built in during the construction of the reactor buildings. They were -- at the bottom, they were connected to the foundation drains and at the lower part of the ground tubes, they were perforated so they can give a very good indication of what's leaked into the

foundation drains.

And so because of the extensive network and the -- they are acting to detect leaks pretty well and has been functioning as designed.

For example, in 2018 they were able to detect the leakage into Unit 1 foundation drains. And they are detecting the -- the leakage. They also serve as detection of the effectiveness of any repairment because the concentration that's reported and submit to CNSC through the annual groundwater monitoring report would give very good indication whether the concentrations are having no -- decreasing a lot.

MEMBER MCKINNON: Okay. Thank you.

And one final question. There was also mention of spikes of tritium moving through the system, but that would require quite a high frequency of sample monitoring.

So could you comment on the sampling frequency and if any spikes have been detected?

DR. LEI: Shizhong Lei, for the record.

The groundwater is sampled for primary tritium on a quarterly basis, but at this location, Unit 1, in the early 2018 OPG noticed a sharp increase or a spike of tritium in the ground tube sampling, so they increased

their sampling frequency to weekly.

And under normal conditions, it's quarterly.

MEMBER MCKINNON: Thank you very much.

THE PRESIDENT: So maybe I'll start off with OPG and then maybe staff can comment. And it's a follow-up to the line of questioning that Dr. McKinnon has pursued.

So how does the Commission reconcile what the intervenor says on page 12 of their submission around this Unit 1 that it appears as though the 2018 Unit 1 leak could have been the worst groundwater contamination event in the facility's history?

And the intervenor, of course, has raised concerns about access to information that has been requested.

Have they perhaps reached this conclusion because they don't have the information they need?

Help with that, please.

MS SMITH: Thank you for the question. Once again, it's Stephanie Smith, for the record.

So yes, we did detect some leak in the groundwater around -- in 2018. I will mention that there was no adverse off-site impacts.

We did sample the sample points around Lake Ontario. There was no appreciable tritium detected in any of those sampling wells. As well, the water treatment plant in Ajax, which is sampled at a frequent -- at a very frequent time, never detected any increase in tritium. It's normally around four to six Becquerels per litre against a standard of seven -- less than 7,000 Becquerels per litre.

So we continued to work through the issue that we did determine at the site.

From a relative side, it was actually a very, very small portion of tritium compared to what the limits are with respect to release to the environment or release to the water treatment plant.

So we did determine that it was elevated tritium in the groundwater from the Unit 1 and from Unit 5. All of those conditions have been investigated and repaired as well as we've done extent of condition on all of the other operating units.

THE PRESIDENT: Again, my question is, why would the intervenor have reached a different conclusion? Is that maybe because they don't have the information they had asked for?

MS SMITH: At this time -- again, it's

Stephanie Smith.

We're continuing to work with this intervenor to understand exactly what data that they are looking at. We did release the information on our GIS system to the public on October 22nd. I understand that there's some questions regarding information in there.

So what I will say at this point is we will continue to work with this intervenor to understand why the data that we have released is being interpreted that way.

THE PRESIDENT: Staff, any comment? Can you help facilitate a common understanding on this issue?

MR. FRAPPIER: Gerry Frappier, for the record.

I think I'd ask Mr. Andrew McAllister, perhaps, to add to the -- where there may be some confusion and what we can be doing to make sure we understand both ourselves as to what the issue is or if there is an issue and (b) to ensure that the intervenor and the licensee could get together and make sure we all are on the same understanding.

So Andrew, I don't know if you have some comments, please.

MR. McALLISTER: Andrew McAllister,

Director of the Environmental Risk Assessment Division.

I guess all to say is that certainly they based a lot of their comments on the 2018 groundwater monitoring report.

We at CNSC Staff, you know, look at those reports on an annual basis, and so are able to trend data and examine both spatial and temporal aspects to groundwater matters. And so you know, we have -- we have confidence in the program and the results that it's generating.

Certainly Mr. Ruland flags some issues that I think, as OPG indicated, would benefit from further discussion with themselves to get a better understanding of, I guess, the cause or root of them. But I guess what we can just iterate is that sort of -- we are certainly here to support if needed, but again, just to reiterate on sort of a groundwater perspective, you know, the program's robust and, you know, the environment is protected.

I think what's important to remember is yes, the perimeter wells are below the drinking water standard, but this all gets wrapped up into the overall environmental risk assessment, which does look at if you think from a pathways perspective, you know, Lake Ontario as being a sort of receiving environment and then all

analyses done shows that the risk is negligible.

THE PRESIDENT: So maybe to close this off -- and I'm glad OPG's following up with the intervenor. I wouldn't want us to wait for another year and then still have this same issue in front of us.

So again, staff are here to help as needed, but the more you can discuss with the intervenors, make available the information that they request to get an understanding of what's happening and reconcile the differences, I think it'll be very helpful for us.

MS SMITH: Once again, Stephanie Smith, for the record.

So thank you for the comment. And certainly we will work in the effort to be open and transparent with this intervenor and anybody else in the public that requires information.

THE PRESIDENT: Thank you.

MR. FRAPPIER: Gerry Frappier, for the record.

Perhaps I could add just -- so don't want to lose sight of the fact that there was an increase in tritium, there was corrective action taken. The regulator is also concerned to make sure that we understand what all's going on that.

And perhaps just from a licensing and regulatory perspective, I'd ask Mr. Alex Viktorov to comment on this.

DR. VIKTOROV: Alex Viktorov.

The groundwater monitoring system essentially fulfilled its function. When the tritium happened to leak in the groundwater, the system allowed to see that quickly and OPG reported to CNSC and was -- OPG and CNSC Staff followed with appropriate actions.

We had the regulatory enforcement action for OPG to identify the cause of this leakage, repair it, evaluate the extent of condition, whether similar situation exists in other units.

During last year, OPG has done this and they identified the source, implemented repairs, tested that the leakage is stopped again by seeing the groundwater concentration of tritium is going back to normal. And CNSC was satisfied with actions taken.

Thank you.

MR. LEBLANC: Any further questions from the Members?

CMD 19-M30.7

**Written submission from the
Canadian Environmental Law Association**

MR. LEBLANC: So then we'll move along to the next submission, which is from the Canadian Environmental Law Association as outlined in CMD 19-M30.7.

Any questions from Members on this submission?

MEMBER LACROIX: May I?

MR. LEBLANC: Dr. Lacroix.

MEMBER LACROIX: This is a general question, and I would like to hear from staff.

Under what circumstances will the new Act, the *Impact Assessment Act*, apply to the nuclear industry?

MR. FRAPPIER: Gerry Frappier, for the record.

I would say -- I'm not a specialist, but I would say for the items being discussed here it will not impact what we're doing. It would impact new projects.

But perhaps I could ask the person who does know it very well, and that's Candida. If you could come and provide some context to this.

MS CIANCI: Candida Cianci, for the

record. So I'm the Director of the Environmental Assessment Division.

So to your question, the Government of Canada when the *Impact Assessment Act* came into force also issued a regulation which establishes a list of physical -- or sorry, designated activities that would -- or otherwise known as project list for the types of projects that would be considered designated projects and may require an impact assessment.

There's also the discretion of the Minister to designate any other project in requiring an impact assessment.

With respect to nuclear projects, there are a list, and I can follow up and provide the link to the regulation so you can see for yourself, but that includes any new uranium mine or mill with a threshold above 2,000 tonnes of ore -- sorry, tonnes of ore production per year.

So there are thresholds for the select provisions of nuclear projects.

There's also nuclear reactors, again, with certain thresholds. I don't know them off the top of my head, but I could provide you with that.

But it is a subset, and the intent of choosing those types of project is that it's focusing on

the projects that may have adverse effects to the environment that are in the areas of federal jurisdiction.

MEMBER LACROIX: Thank you.

MR. LEBLANC: Any other questions from the Members?

Dr. Berube.

MEMBER BERUBE: Just one question for staff.

With regard to the equipment replacements that are going on now on a large scale, retubings and stuff, looking at one of the comments from CELA here with regard to asbestos handling and asbestos remediation work, is that being done as part of the refit activity and do you actually monitor that? How do you do that?

MR. FRAPPIER: Gerry Frappier, for the record.

So there is a new set of regulations associated with asbestos that are not regulations by the Commission here, but by Environment Canada and Climate Change.

And we -- perhaps I could ask Mr. Lee Casterton to give a bit of information and perhaps the representative from Environment Canada would like to. But in general, the regulations apply and the licensees must

abide by them and have a program that will fully implement that regulation.

How much of it is going to be done as part of major component replacement or just ongoing, perhaps industry would have an opinion on that.

But perhaps Mr. Casterton could talk first.

MR. CASTERTON: Hi. Lee Casterton, for the record, with the Directorate of Power Reactor Regulation.

So we did work with Environment Canada, Health Canada and licensees on looking at the impact of this regulation and also the implementation of the regulation.

In looking at that, we looked at a four-year exclusion that allows time that licensees can identify what products contain asbestos and then have enough time to conduct the analysis that's appropriate to ensure safety. And so that four-year exclusion was decided on in consultation with Environment Canada, Health Canada and the licensees and determined to be a suitable amount of time in order to identify all potential asbestos or asbestos-containing products.

And just further to that, they are also

required to report annually to Environment Canada, and we have updated our Memorandum of Understanding with Environment Canada so that we can support them as needed.

MR. LEBLANC: Environment Canada?

MS ALI: Should I use this mic?

So as Mr. -- I'm Nadia Ali, Environment and Climate Change Canada, for the record.

So as Mr. Casterton just said, as of December 30th, 2018, the manufacture, import, sale and use of products containing asbestos is prohibited by our new regulations.

The prohibition does not apply to asbestos that has already been installed, but does prohibit the use of spare parts from stores.

Based on issues raised by the industry in our Gazette 1 of the reg, nuclear facilities in Gazette 2 or the final publication of regulation were given an exclusion from the prohibition until January 1st, 2023 subject to certain conditions to allow the nuclear industry time to phase out the use of products containing asbestos for which there are no technically or economically feasible asbestos-free alternatives.

One of the conditions requires that sites have an up-to-date asbestos management plan. If asbestos

containing materials are being used then an asbestos management plan must be available and be provided to Environment Canada upon request. It doesn't have to be submitted to Environment Canada, but just has to be kept updated and available in case it was requested or needed.

Also, if asbestos containing material was used during the period December 30th to 31st, 2018 then a report would have had to be submitted to Environment Canada on March 31st, 2019.

So, I think the industry was given this exemption but they will be working to phase out parts containing asbestos so that they can meet the requirements of the Reg. by 2023.

Thank you.

MS SMITH: So it's Stephanie Smith, for the record.

I'm just going to add a comment from the industry. So at OPG and I would expect at the other utilities we have a comprehensive asbestos management program. The plan requires that if any material is thought to be containing asbestos that we use a safe work plan and that we involve the appropriate people and the appropriate protective equipment when we're removing that. As well as through our procurement process we're endeavoring to - of

course, when we replace parts, to reorder non-asbestos material. And we are continuing to do that with the goal as Environment Canada set, meeting the requirements of March in 2023.

THE PRESIDENT: So just a quick comment to staff. Would the RORs, future RORs cover the licensees plans to get into compliance by 2023?

MR. FRAPPIER: Gerry Frappier, for the record.

Normally, I would say no. There's a lot of regulations that apply to licensees that are not under the *Nuclear Safety and Control Act*, and if we wanted to start that, that could become quite onerous. I think as items, like in this case, that are perhaps new or that there is a request from the public, we see that in some of the *Fisheries Regulations*, we see that in some of the other environmental regulations.

We're certainly not opposed to putting into the ROR but I think it would be more on an exceptional basis.

MR. LEBLANC: Any more questions from the Members? President Velshi?

THE PRESIDENT: And I know we don't have anyone here from the Office of - the Ontario Office of the

Fire Marshall and Emergency Management, but maybe staff can help. On a concern the intervenor raised about not being able to get the PNERP technical study, and I see Mr. Cole is coming up. Maybe you can comment on that, and is this something that we can facilitate access to?

MR. FRAPPIER: Gerry Frappier, for the record.

So you may recall that during the past hearings, in particular around Pickering, there was quite a bit of discussion around the provincial's -- the Emergency Response Plan, and in particular some of the technical assessments that were done, the technical details around weather forecasting and things of that nature. And at the time we had mentioned that there was this additional study going on, and so I would ask Mr. Chris Cole to maybe bring us up to date with where we are with that, and its potential release to our constituents.

MR. COLE: For the record, Christopher Cole, I'm the Director of the Emergency Management Programs Division at the CSNC.

I'd just like to echo what Mr. Frappier has said, that the technical study was initiated to consider other aspects of a severe accident throughout all the nuclear power plants in Ontario in support of analysing

the emergency planning zones.

So, in particular, we look at a greater breadth of weather; a full year of weather was analysed to see the impact over a one-year period.

Presently, the report has been completed. It was submitted to the Office of the Fire Marshall and Emergency Management in Ontario, and they then subsequently submitted that to the Solicitor General of Ontario who is presently holding that document for release.

So I've spoken with the staff of OFMEM and they tell me that at this time they are not aware of when the Solicitor General will release that report and to whom they will release it. So we're in a waiting stage just like the intervenor and we look forward to getting that report upon its release.

MR. LEBLANC: Thank you. Any further questions?

MR. FRAPPIER: Mr. Leblanc --

MR. LEBLANC: Oh, sorry, yes.

MR. FRAPPIER: Gerry Frappier, for the record.

Just through the power of this wonderful new WiFi we have here, Mr. Ross Richardson has gotten back to us to - the question I couldn't answer earlier. So,

yes, the public - the Power Workers Union did comment on the REGDOC and were supportive of it.

MR. LEBLANC: Thank you. So the next submission is from Ms. Anna Tilman and Mr. Eugene Bourgeois as outlined in CMD 19- M30.8.

Any questions from the Members on this submission?

Doctor McKinnon?

MEMBER MCKINNON: There's a question in connection with the DRLs and how they are set, and it was stated they are based on models. So the question is, how are the models validated? Is it just done once or is it necessary to calibrate and validate for each site according to the conditions?

MR. FRAPPIER: Gerry Frappier, for the record.

I believe Kiza Sauve would be the appropriate person to answer that.

MR. RINKER: Mike Rinker, for the record. I'm Director General for the Environment and Radiation Protection and Assessment Directorate.

So the model is published in *CSA Standard N288.1*. And it is updated based on new science and new considerations of the mobility of radionuclides in the

environment, as an example, every five years, and the licensees would use this model to determine what their derived release limits would be.

And while it is not a model that validated in the sense of what a modeller would call validation, but there are monitoring to determine the levels of radionuclides in the environment, and the modelling results are compared to what the actual measurements are.

MR. LEBLANC: Any further questions from the Members? President Velshi?

THE PRESIDENT: A question to Staff around the event -- the reportable events and the access of those to the public. So tell me of all those that have been reported does the public have access to those event initial reports?

MR. FRAPPIER: Gerry Frappier, for the record.

I'd ask Kim Campbell to respond to that, please.

MS CAMPBELL: Kim Campbell, for the record.

So all licensees need to report their events as per REGDOC 3.1.1 and they are compliant with that REGDOC.

Also, through the Public Information Disclosure Protocols they do post the events on their websites which they can speak to, but it is just the title of the event or the number of the event.

THE PRESIDENT: So maybe I will ask the licensees to speak to -- because, as I look at Staff's response, it says most event reports are classified, and I find that kind of hard to understand; why would a brief one-liner description at least not be available and then that allows for follow-up as interest requires.

So we'll start with OPG, first, and then go through the other licensees.

MR. VECCHIARELLI: Jack Vecchiarelli, for the record. I'm Vice-President of Nuclear Regulatory Affairs and Stakeholder Relations.

I'll ask Jennifer Knox to elaborate on this - on your question, but we do provide information on our external website on a quarterly basis as mentioned. This is in the spirit of being open and transparent.

We do need to recognize that there are certain sensitivities in terms of confidentiality that is sometimes security sensitive information which cannot be fully divulged with a fulsome accessibility to these sorts of reports.

But, I'll ask Jennifer to elaborate on this.

MS KNOX: Jennifer Knox, Director of Nuclear Stakeholder Relations for Corporate Affairs, for the record.

In accordance with REGDOC 3.1.1. and 3.1.2, OPG posts quarterly a listing of all station events, including a title and reference number as noted. These are posted onto our OPG.com public reporting page.

Additionally, items that are considered to be significant from a regulatory perspective or from a public interest perspective are posted within one business day along with a brief explanation of the event, and a contact -- a contact is noted who can assist in answering any questions.

In the last two years there have been very few significant events. In 2018, posted on a significant event page were five items, and OPG did not receive any public enquiries on those items.

THE PRESIDENT: So again, in the spirit of transparency five are posted on your website. I don't know how many EIRs were reported. As a member of the public I'd go, well, I don't know, maybe the criteria you use, I'm not quite happy with. So even a brief description without

giving away any security sensitive information, why would that not be possible, Mr. Frappier?

MR. FRAPPIER: Gerry Frappier, for the record.

So we do have a very low threshold with respect to things that must be reported. But anything that we view as being an event that's reportable to the Commission we would - we would bring to the Commission as an event initial report, and those are made public through the CMD process.

With respect to the requirements on industry to make things public, I might ask Ms Meaghan Gerrish to expand a little bit on what our REGDUC 3.1.3 --

MS GERRISH: 3.2.1.

MR. FRAPPIER: -- REGDOC 3.2.1, requires of the licensees.

THE PRESIDENT: So Mr. Frappier, my question isn't so much on what the REGDOC requires. My question is more around -- I mean, we all have said in interests of transparency put stuff out unless we can't. Is that the behaviour the REGDOC is driving? Or, is it saying you know, there has this -- we've established a threshold and then we'll put it, and one doesn't know what's below the threshold?

MR. FRAPPIER: Gerry Frappier, for the record.

So yes, I understand you're looking to see what both -- I think it's important, from a requirements perspective, to understand what the driving force is, and then perhaps industry would like to talk a bit more about from a culture perspective what they believe is appropriate for increasing transparency.

THE PRESIDENT: Right. So it's not so much as meeting or not meeting regulatory requirements; it is, you know, you yourselves have said that's a priority for you. And would that not drive greater disclosure?

Maybe I'll ask Bruce Power before OPG responds. What are your thoughts on this?

MR. BURTON: Maury Burton, for the record.

And just to be clear, when - when the original RD/GD 99.3 came out, the licensees did get together and discuss our disclosure programs and - and very much aligned through a working group. So we all do the same thing which for this particular thing, the REGDOC 3.1.1, we post titles of each of the events for each quarter. So there is enough description in there to get an idea of what the event was.

I can tell you, between us we actually had

a chat, the Reg Affairs Managers or VP's -- Vice-Presidents last week when we were out in Point Lepreau and between us in the last ten years we've probably had five requests. So there isn't really a whole lot of public interest here, and it may be because they don't know that the stuff is there, or the only time that we seen to get requests are during this annual report review, or for license renewals. So it comes down to us, is the effort of putting the extra work in to put the information out worth it based on the public interest.

Now, the intervenors in question have never requested any of these reports from Bruce Power, and Mr. Bourgeois has - he makes a lot of requests of us, but he's never made a request for any of these reports.

THE PRESIDENT: Okay. Point Lepreau?

MS DUGUAY: Kathleen Duguay, for the record.

I'll follow what Bruce Power just stated, as well. In addition to that, we also discuss those event reports at our quarterly meetings that we have with key stakeholders as part of our community relations group.

And I was there originally when we met as the industry to pose these reports, and the title does indicate adequate information to pique the interests of the

members of the public. But the intent of that was to - the members of the public, when they're requesting the report is to start building a relationship with those folks who are asking for the report, because sometimes they may be asking for the report but it could be taken out of context. So to be respectful to the requester, we wanted to create dialogue and perhaps they were interested in other areas of our operation and to open those dialogues to build further relationships.

THE PRESIDENT: Thank you.

Hydro-Québec, anything to add?

M. OLIVIER : Donald Olivier, pour le verbatim.

C'est un peu la même situation à Hydro-Québec. Bien, premièrement, il n'y a pas eu d'événement rapportable en 2018. Donc, on n'a pas eu l'opportunité de voir comment le public réagissait. Mais il y a une très faible demande. Nous aussi, on indique le titre, qui est quand même significatif, contact si les gens veulent plus d'informations. Mais si on regarde, assurément pour les quatre-cinq dernières années, il n'y a pas eu de questions, il n'y a pas personne qui a appelé pour avoir plus d'informations sur des événements. Est-ce qu'on pourrait être plus transparent? Peut-être, mais je

suis obligé de vous dire qu'il n'y a pas nécessairement eu beaucoup de demande en ce sens-là.

MR. FRAPPIER: Gerry Frappier, for the record.

Just so to maybe wrap this up a little bit, I think it is important for the public to realize, so all the events are put out there. And we have a very, very low threshold, so in 2018 that turns into about 256 events at NPPs and nine at the Waste Facilities. Those are listed, there's a title, if you like, that's supposed to give some sense of what the event might have entailed, and the public is asked to -- and I think they make the contact known as to if you want more information please call here, and they'll be happy to provide that.

So I think there's just a level of effort involved here that perhaps is we're doing a reasonable amount.

THE PRESIDENT: Thank you. OPG, did you have anything to add? Yes?

MR. VECCHIARELLI: Jack Vecchiarelli, for the record.

No, I think Mr. Frappier summed that up very well. There are multiple means by which we communicate this sort of information. The titles that are

included on our website are fairly descriptive; you get a very good idea of the nature of the issue. And there's a contact name there. It's not very often that we do get requested for more information, but -- and through our community we do have open and frank discussions about the operations of the facility. So I think it's a matter of striking the right balance.

MR. LEBLANC: So any further questions on this intervention?

No. So, we'll go to the next submission which is from Mr. Gordon Dalzell as outlined in CMD 19-M.30.9.

Questions from Members on this submission? President Velshi?

THE PRESIDENT: Maybe it would be helpful if each of the licensees were to discuss how do you use this ROR? I think some of you have said that you then use it in your community meetings.

It would be useful to know how this then gets disseminated by you.

So, we'll start with Bruce Power.

MR. BURTON: Maury Burton, for the record.

Yeah, actually James might want to answer this one, how we use this. But, one of thing we do -- I'll

let James talk about the external. But, internal we actually roll it out to our management staff so that they're well aware of the issues and that the CNSC are tracking it and deem it as important. And it's really a learning - an experience thing for them to understand what the key issues are from a regulatory perspective because they hear it from the management what our goals are, but they don't often, a lot of them, get interaction with the CNSC on a day-to-day basis; there's a small group that do, but the majority of staff don't see that, so we try to roll it out that way to our internal staff.

And I'll let Mr. Scongack talk about what we do externally.

MR. SCONGACK: Thanks. James Scongack, for the record.

This is a reminder don't try to sneak out for a quick washroom break, you never know what question is going to get asked. So, thank you for that, Madam President.

Now, I appreciate the comments. So we look at this from a - through a number of avenues externally, so the first is, we have protocol agreements with our indigenous communities and so our teams will talk about the upcoming ROR and share information as available.

As we engage with municipal governments, county governments we'll talk about CNSC ratings and you know provide them a proactive opportunity reminding them there is an opportunity to engage.

But, more importantly, one of the questions that we often get throughout the year is, you know, how do you stack up? And that's really where the ratings help. So if we have a question in the area of let's say environmental protection, we're able to point to, you know, in addition to meeting the many, many regulations and requirements, a section of the ROR that says, Okay, looking at the area of environmental protection, here is how the regulator assesses the aggregate of that performance.

I think one of the things that's often really difficult for members of the public is, there are just - there are just so many sub-elements to all of these, and I think what the ROR does is that it aggregates them up into sort of a top line area.

I will say very openly and honestly that one of the areas that is still an area of confusion for people with the ROR is actually the ratings themselves. So when people think of nuclear power their expectation would be well, everything is fully satisfactory. Whereas, when

something is satisfactory we know what that means. So it is the one area we talked to CNSC staff about, and I'd leave with the Commission to also consider as you're thinking about this, is, is the message that the ratings send right and you know I've talked before about, for example, a reduction in the waste management rating.

We actually know our performance improved. You know, CNSC staff, and as they deemed appropriate, looked at that criteria and changed it and all of our ratings moved from a fully satisfactory to a satisfactory.

There's nothing wrong with that, but when you're communicating with the public it can suggest a decline in performance. So that would be the one area I would say we need to look at. But this is a very helpful tool, but I wouldn't say it is in one place; it's kind of a rollout, it's an ongoing point of reference for people.

THE PRESIDENT: Thank you. OPG.

MR. VECCHIARELLI: For the record, Jack Vecchiarelli.

I think overall the ROR, we found it to be fair and balanced. It is something of keen interest to OPG. Like Bruce Power articulated, we share this and discuss it internally with our staff, and there are a lot of questions and discussions.

I think what's important is that this is yet another form of independent assessment in addition to what we already do internally. We have an independent assessment organization that will evaluate all our programs. They are subjected to discussions at our Nuclear Executive Committee as a form of oversight.

And while we can't really draw an apples to apples comparison between the evaluations, the ratings from the safety control areas in the ROR to our programs, it does give us insights. And I would say that we learn more about which areas upon reflection by the CNSC staff are of particular interest to the CNSC, and that helps to have a better alignment in terms of the expectations. So it's very valuable to us.

And we do also share it externally with our community. We have often talked about the sort of results that we have there and the public is very interested in that. So I think it is a very valuable and useful report for us.

THE PRESIDENT: Thank you.

Hydro-Québec.

M. OLIVIER : Donald Olivier, pour le verbatim.

Donc, c'est sûr que le rapport est très

utile pour la gestion, l'équipe de gestion. On peut vraiment voir où se situe, voir les zones où on devrait mettre des efforts. Puis c'est sûr que pour les communautés, c'est quand même peut-être pas facile pour des non initiés de s'appropriier le contenu du rapport. Nous, ce qu'on fait, on s'assure via une infolettre, premièrement, comme exemple, d'aviser les gens qu'on est ici aujourd'hui et puis qu'il y a la tenue d'un tel événement. Et puis c'est sûr que quand on a des échanges avec les communautés, souvent, c'est davantage le volet, le rapport de surveillance environnementale sur lequel ils ont de l'intérêt. Et puis souvent, on doit quand même faire des sommaires pour rendre tout ça digestible pour les gens de la communauté pour être sûr que ça puisse être compréhensible puis avoir des échanges autour des rapports. Parce que je le répète, mais pour des non initiés, ce n'est pas nécessairement facile de s'approprier ce type de rapport là, qui est quand même assez spécifique à notre domaine.

LA PRÉSIDENTE : Merci.

And I left Point Lepreau for the end because someone from your community - so how do you use the RORs in communicating with the members of the public?

MR. NOUWENS: Jason Nouwens, for the

record.

So similar to comments you have heard already, internally this report is very important to us.

We value all independent perspectives on our performance, but in particular the Regulator. And although there's some -- you've heard some sentiments, I guess, on the subjectivity around the ratings, there is a flavour in this report of moving beyond compliance and considering industry best, which is really what we're striving for. We're not striving to just meet the minimum compliance requirements; we want to be the best performance safest station we can in the world.

So this report helps us sort of calibrate and reset our picture of excellence on where we stand around our Canadian partners, but also give us a perspective from a regulator's point of view on where we sit with the world.

So we use this internally with all of our departments to understand exactly where we're at, where our gaps are, and solidify the improvements we need to make. Externally, obviously, with Gord Dalzell being a New Brunswicker, we use the report for external communications and we'll share -- we'll the insights and the areas that we know we need to focus on a little more with our external

public, and we use it as an opportunity to, as Kathleen mentioned already, open that dialogue with our external members.

Thank you.

THE PRESIDENT: Thank you.

MR. LEBLANC: Any further questions on this intervention?

No. So we'll move to the lunch period.

After lunch -- we're not done, because there's a series of rounds of questions from the members that are not linked directly to the interventions. So we'll resume in one hour, so at twenty-five to.

Thank you.

--- Upon recessing at 12:38 p.m. /

Suspension à 12 h 38

--- Upon resuming at 1:38 p.m. /

Reprise à 13 h 38

THE PRESIDENT: Okay, good afternoon everyone. We'll resume the meeting.

We'll now open the floor to the Commission Members for any other questions they have on the Regulatory Oversight Report. We'll start with you, Dr. Lacroix.

MEMBER LACROIX: Thank you, Mrs. President. On page 44 of the ROR there is a comment that says that we have operating nuclear power plants that experience challenges related to fuel performance over the past several years.

I was wondering, why over the past several years? Is it a question of the aging equipment or is it a question of manufacturing the fuel arrangement? Could you expand on this matter please?

MR. FRAPPIER: Gerry Frappier, for the record. Perhaps our Physics and Fuel Division would like to talk about that. Wade Grant will talk to that.

MR. GRANT: For the record, Wade Grant, Technical Specialist with Physics and Fuel.

This was really just an alignment of a number of different issues and I guess timings of different situations.

So we had the Bruce A refurbishment, and after the Bruce A refurbishment there was a small period of time where there was an increased number of defects due to debris that had been introduced as part of the refurbishment activities.

At Bruce B a vibration issue came up a couple years ago that's now still being looked after but is

well under control. We also had an issue with Darlington in terms of some deviation in the manufacturing specifications.

Each of them were still within the design specification, but the combination of all three of them moving at the same time resulted in some small defects existing for about two years before that was brought back under control.

MEMBER LACROIX: Thank you.

THE PRESIDENT: Dr. McKinnon.

MEMBER MCKINNON: Thank you. I have a general question about maintenance. As various components of the reactors are maintained or replaced are they tested and evaluated to compare their condition to the original design performance or to update their design specifications?

MR. FRAPPIER: Gerry Frappier, for the record. I'm not sure I quite understood the question. Are you asking the sort of objective of maintenance, as to whether it's to stay up-to-date or whether it's to stay the same as it's been or...?

MEMBER MCKINNON: No, it was more in the sense of when a component is originally designed there would be a certain life expectancy in performance for that

component or system. Based on the actual replacement condition of the part or system, is there a comparison between the original design expectation and the actual performance, and how is that used, if it's used?

MR. FRAPPIER: Gerry Frappier, for the record. Thank you for that. So I think the question then is about how much we use operational information of what really is the condition of components to define perhaps better as to what sort of maintenance would be there.

Perhaps Eric Lemoine from CNSC would like to talk about that. But industry I would think might have comments on that after.

MR. LEMOINE: Eric Lemoine, for the record. So we have a REGDOC, REGDOC-2.6.2 which sets out requirements for maintenance programs for nuclear power plants. In that it has high-level requirements on how you take into consideration time-based preventative maintenance or predictive maintenance. So both are allowed under that.

For example, licensees would perhaps use vibration analysis or oil analysis to influence or inform their preventative maintenance program for certain components, for example.

We have a number of oversight activities related that we do execute to make sure that the licensees

are making sure their maintenance programs are adequate in order to make sure that equipment is within the licensing basis.

MEMBER MCKINNON: I'm just curious, on that basis has there been any significant changes to the lifecycle management plan on the basis of this, you know, ongoing updating of information?

MR. LEMOINE: So I would say yes, but I think the appropriate people to answer that would be the licensees.

MR. NEWMAN: Good afternoon. Gary Newman, for the record. Maybe I'll start at Bruce Power. So, as correctly noted, we consider a number of inputs when we do our time-based or condition-based PM program.

We're always comparing back to what the original design life was of the component, because we're also interested in making sure that when we buy a new replacement component that it actually lasts over the duration that we intended it to.

In some cases we will have aging management practices as well where we will -- it's worthwhile doing additional inspections and surveillance to make sure that a critical component will last for the full duration. So fuel channels are one example of that where

we do extensive surveillance on those to ensure the life of those, because to replace them is a very costly activity.

Other components on the smaller end of the spectrum we might just decide to swap them out every 10 years type of thing, but we always do compare to the original tech spec to make sure that we're getting value for the money that we've invested in those components.

I hope that answers the question.

MEMBER MCKINNON: Yes, thank you.

THE PRESIDENT: Dr. Berube.

MEMBER BERUBE: Well, I note across the industry that the maintenance backlog has dropped significantly. So congratulations to you all on that work, it's a considerable effort to get that done.

However, when I'm looking at Figure 2 in the ROR on page 32 it shows us that the unplanned transients for last year were up significantly. CNSC, could you give me some understanding where that's coming from? Given the fact that we're catching up on the maintenance backlog thing, should be more stable, not less stable.

MR. FRAPPIER: Gerry Frappier, for the record. I think it's probably better if industry would maybe take a first stab as to what is the reasons for the

number of unplanned transients to have grown. Then perhaps we could comment on whether we're concerned about that.

MS SMITH: Thank you for the question. It's Stephanie Smith, for the record again. So, unfortunately, at Pickering we've had -- in 2018 we had quite a bit of struggles with our algae ingress, so we did have five transients which were a manual setback on a trip that were a result of a massive algae ingress that we had back in July of 2018. So that accounts for five of the transients at Pickering, we had 15. There were three additional manual setbacks for the additional algae runs later on in the season.

So I can imagine you're probably going to ask what are doing about algae would be your next question. So what we realized during the algae season is we weren't quite thinking ahead about the risk, we never thought that we would have this amount of large plume of algae come in and shutdown the entire site.

So from that we've developed a mitigation plan, that includes a bubble curtain that we're going to be installing. That's a curtain that goes across our intake, the bubbles that are supposed to scare the fish away and the algae away. We also have developed predictive tools based on wind and lake current, and had demonstrated that

we're better at predicting wind and algae when it's coming into the site.

MR. CLEWETT: Len Clewett, for the record. So at Bruce Power every transient -- we have unplanned transients, we either perform like a root cause analysis or a sort of apparent cause analysis. So one of the ones we did discuss earlier today was a Unit 4 pump seal. We've also had a few secondary items, a turbine steam valve and a turbine mechanical trip solenoid that we took the units offline to repair.

But that, as you mentioned the backlogs, to reduce that challenge to our operations in the plant, we've had a large focus on the backlogs and you've seen those reducing. Also with the lifecycle management plan that Mr. Newman talked about, we have a very large program there to replace aging and obsolete equipment to reduce that impact on our operators.

MR. FRAPPIER: Gerry Frappier, for the record. So transients are important from a regulator's perspective because it does stress the equipment at the site quite a bit, and we want to follow that.

However, we view these trends, we're going to continue watching them. We haven't had any sort of view that would say that we're particularly concerned about

them. So perhaps we'll get our Specialist Division to add a little bit to that.

I think the last thing is there is a small error in the ROR and so that has been corrected in the supplemental. Just so if you... It's still going up though, I think the point is still the same, but just to be clear on that.

But, Wade, you may want to add some comments.

MR. GRANT: So for the record, my name's Wade Grant, I'm a Technical Specialist with the Physics and Fuel Division.

So I think what's important to note is that trips and transients are not necessarily by themselves an important performance indicator. We have, as part of our programs, requirements to have these reported as part of REGDOC-3.1.1.

We have a program which then goes through and investigates or evaluates each one of these reports, especially for trips, and we determine if there's actually a safety significance behind that trip.

It's important to note that a lot of trips happen not because of a safety reason, but to protect equipment and processes at the plant. So as part of the

assessment we make sure that that was indeed the reason the trip came in, and that it wasn't actually a reason to protect the fuel or a barrier, for example.

We've gone through all the events in the 2018 period and we continue to do that on a regular basis, on an ongoing basis throughout the year, and we did not find any event that seriously would have challenged or did challenge any of the barriers or would have led to a release during that period of time.

THE PRESIDENT: Thank you. Dr. Demeter.

MEMBER DEMETER: Thank you. I'm going to refer to, for me, what I thought was the most concerning paragraph in the 290-page report.

So I'll preface this with saying upfront that this is in relation to the Darlington alpha incident and also preface it with fortunately the committed dose equivalence were low of minimal, if any, significance. So that's the good news.

But the report summarized -- the summary for that part of the report is -- compliance is page 109. To summarize:

"Compliance verification activities conducted in 2018 observed a declining trend in the performance of

work dose control, most notably with regards to radiation protection practices in the unit under refurbishment." (As read)

It goes on to say that, notwithstanding that, the doses were below dose limits.

To me, that's a very concerning statement. I sat here during the period where the discussions were how the information was initially communicated to CNSC Staff and how CNSC had to proceed with regards to trying to rectify the situation to get more information to make it better. It was a bit awkward to be honest, because it seemed to be not forthcoming from the licensee. To me, this speaks of a potential problem of safety culture, to be honest.

So if this happened at this point, is this a surrogate? So I want to sort of get some reassurances from the licensee that this in fact is not a broader radiation protection safety culture issue, and also from CNSC Staff that based on this incident is there going to be increased oversight of their radiation protection program to ensure this isn't a safety culture issue?

MR. FRAPPIER: Gerry Frappier, for the record. So perhaps OPG would like to answer about the

Darlington culture and that?

MS SMITH: It's Stephanie Smith, for the record. So I'm going to turn it over to my colleague, Gary Rose, who can talk a little bit more about what's being done with radiation protection in the refurb organization.

However, I just want to state that there is no radiation exposures received that exceeded regulatory dose limit. Our program in place does meet all regulatory requirements and industry standards.

Gary will talk a little bit more about the alpha and around the reporting. So I'll turn it over to my colleague.

MR. ROSE: Thank you. It's Gary Rose, for the record. Specifically to your question, is it a sign of a declining nuclear safety culture at OPG or within the Darlington refurbishment project? I want to first put on the record that it is not. We take this very seriously.

The 2018 events have provided OPG with many opportunities for improvement. We're committed to ALARA and with safety as overriding priority we've invested and continued to improve our performance in the RP program at Darlington and beyond that.

I will turn it over to John Duhig who is here to talk about some of the specific things that we have

done in the past year or two to improve our performance in this area. Although there have been areas for improvement, our overall performance is relatively good at Darlington with no radiation exposures, no contamination control action levels were exceeded and no safety-significant performance issues.

Notwithstanding that, we're a learning organization in this part of the nuclear safety culture and we are a learning organization with three more units to refurbish. We will continue to adopt and apply the lessons learned from these events, OPEX from the industry as a whole, the feedback from the regulator as we work through this process, and with a goal of achieving performance, the lowest to the best performance possible and a dose records as low as reasonably achievable.

But I'll turn it over to John for some more specifics about the work that we have done this year.

MS SMITH: Actually, before you turn it over to John, I just want to add a little comment around nuclear safety culture.

So I can understand why you would have some concern about that. But at OPG we take our nuclear safety culture very seriously. We regularly assess that by interacting with the staff to ensure that our culture is

maintained. We do that on a regular basis, at least three times a year. We go out and we ask people to make sure that if there's issues to be reported they are being reported.

So now I'll turn it over to John to give you a little bit more on the alpha program.

MR. DUHIG: For the record, John Duhig, Senior Health Physicist at Darlington.

Thank you for the question. It is important to note that our workers are being protected and it is important to note that OPG has self-identified some of these issues and we take the very seriously.

A couple of things in particular that have been done. One, is there's been a third-party assessment conducted by McMaster University to provide us a critical review, in particular of our alpha program, and to recommend where we can enhance our program as we move into subsequent refurbishment units.

So we have already conducted that assessment, McMaster University has conducted that assessment, and we have actions in place, some have already been completed, and other ones will be completed so that we can be prepared for Unit 3.

We have also, in regards to our rad worker

practices, completed a common cause analysis of some of the events that are referred to in the report to look at how we can improve our rad worker practices, improve knowledge and look at specific areas where we can make sure that our workers are performing to the standard that we'd expect.

MR. FRAPPIER: Gerry Frappier, for the record. So, first, this is the report from 2018, we're now well into 2019. So the report properly reflects our views in 2018, which we were in front of the Commission a couple of times, but certainly staff was not happy with these occurrences.

I think the culture part is a good angle on this. I would point out that a lot of this has to do with a building that's outside of the reactor building, so the incidences were at a new building, and had a fairly complicated interaction with contractors as opposed to OPG staff.

We did take some actions, both short term, and we can go over those. Also, longer term, we insisted on a confirmatory program with respect to alpha workers.

Perhaps I'll ask Nathalie Riendeau to maybe give us a bit of a summary of why this is written this way, but also where we think we are now given it's 2019.

MS RIENDEAU: Nathalie Riendeau, Director, Darlington Regulatory Program Division.

I'll first indicate that this is -- the OPG has their radiation program is a compliant program, it's a program that we know well. However, during the execution of refurbishment there might have been some opportunities for improvement that were identified.

So as part of our oversight of the refurbishment project we had activities where staff was focusing on the execution of the refurbishment. But when we identified that there were potentially some issues, we did enhance our oversight and we had essentially increased presence in the field, we've communicated that to the Commission.

But we've put in place increased presence in the field, more frequent field inspection, also a reactive inspection if there was some changes that we wanted to monitor.

Through our oversight we've again identified some deficiencies that were communicated to the Commission in an EIR and through various updates. OPG has essentially put in place acceptable corrective action, but they've also undertaken a self-assessment that OPG has referred to in their presentation, which was a significant

exercise, a serious self-assessment to essentially identify further improvement independently from staff for refurbishment in Unit 3.

There's been enhancements in terms of the oversight they provide during refurbishment. There's been also enhancements in training. There's been also enhancements in terms of characterization, monitoring of hazards, and looking at better RPPE. Staff is cognizant of that and we're monitoring those progresses.

Like Mr. Frappier indicated, there's also been improvement to their alpha dosimetry program, not only with the bioassay but with the use of personal air samplers. So there have been improvements following those occurrences that we reported in 2018.

THE PRESIDENT: I'd like to follow up on that with what's on page 97 about human performance program and there's a similar statement in there:

"CNSC staff identified recurring deficiencies with respect to procedure use and adherence ... [and] a focused area of improvement..."

We didn't hear procedural adherence as an issue with all the other areas that you said OPG has been working on. Was this in reference to the same kind of

issues or is this something different? Because this is for the Darlington site, not the Waste Management Facility.

MR. FRAPPIER: Gerry Frappier, for the record.

Certainly, as Madame Riendeau mentioned with respect to the alpha incidents, it was less about a program problem and more about an execution problem. So in that perspective, the human performance item resonates.

But perhaps I would ask Ross Richardson to talk to this paragraph in the ROR and what the complete picture is there.

MR. RICHARDSON: Ross Richardson, Director of Human and Organizational Performance Division.

Just to respond and to elaborate a bit on what was said previously because there's implications of safety culture from the previous question as well.

So OPG did conduct a safety culture self-assessment in 2018, and I think OPG in the room can speak specifically to that, and they conducted safety culture self-assessments for the Darlington Station and for the Darlington Refurbishment Project.

And so specifically for the Darlington Station this was considered and OPG has put measures in place to look at this specific area. And obviously, we

know that procedural use and adherence is critical to nuclear safety. It's one of the pillars of the event free tools, human performance tools that licensees undertake.

So CNSC staff have had a look at this. We're satisfied with the industry's performance in this regard, but I think industry or OPG in specific may want to speak to its safety culture self-assessments that were recently undertaken and I think industry may be in a better position to speak to that because it does speak to this particular issue at Darlington and at the Refurbishment Project.

THE PRESIDENT: Thank you.

OPG.

MS SMITH: Yes. Thank you for the question. It's Stephanie Smith, for the record.

So yes, we did complete a 2018 Nuclear Safety Culture Assessment that included both our contract partners. We did determine -- the overall results of the assessment that we did communicate to the CNSC found that we have a consistent and healthy nuclear safety culture, a healthy respect for nuclear safety, and nuclear safety is not compromised.

We have tentative schedules coming up for both Darlington nuclear projects, Pickering Waste in

corporate, and we're also working with the CNSC on implementation of REGDOC-2.1.2, which is the safety culture, and there's a working group that's working on that as well.

THE PRESIDENT: And was there a difference between the refurbishment side of the facility and the rest of it as far as what the results showed?

MS SMITH: Stephanie Smith, for the record.

Unfortunately, right now I don't have the details from each one of them. I can get that at a later date and correspond.

THE PRESIDENT: Thank you.

MR. ROSE: It's Gary Rose, for the record.

I actually have some information on the refurbishment nuclear safety culture. Similarly to the Station one, the assessment team concludes that in nuclear projects nuclear safety culture is improving and there's a healthy respect for nuclear safety. In fact, as Stephanie Smith indicated, our contractors do participate in our nuclear safety culture reviews and from 2015 to 2018, as we've been doing these nuclear safety culture reviews in the influx of a large volume of contractors, our nuclear safety performance across the 10 nuclear safety culture

traits has continued to improve.

THE PRESIDENT: Good. Thank you.

Dr. Lacroix.

MEMBER LACROIX: This is a question for Point Lepreau. I read on page 213 that Point Lepreau has been experiencing higher than expected temperatures at the reactor inlet and apparently it's caused by the fouling deposits in the steam generators. So I was surprised to find out that this problem already affected the steam generators at Point Lepreau since it went through a major component replacement a few years ago and I presume that at the time the steam generators were clean. And if it is the case, then could it become a safety issue in the case of an emergency, for instance?

MR. NOUWENS: Jason Nouwens, for the record.

I'll ask Derek Mullin to come up and provide some more details, but I would like to highlight that we are well aware of this issue and during refurbishment, although the steam generators were not replaced, you are correct that they were cleaned. But the cleaning process is very -- it's a very intricate process to do it and to do it completely, so there were some challenges that we had with that cleaning process and we do

believe that there still is some magnetite within the steam generator. But Derek Mullin can provide more details.

MR. MULLIN: Derek Mullin, for the record.

Yes, we collected a significant amount of data from inspections from the steam generators. That information was used by the Centre for Nuclear Energy Research at the University of New Brunswick where they developed some detailed models of the steam generators and the primary circuits so we could understand what the mechanism was and what happened. We confirmed through that that the primary side cleaning that was performed during refurbishment was not as we had desired. So there was still, as Jason had mentioned, a significant amount of magnetite still in the boilers, which resulted in a higher reactor inlet header temperature. So we have had discussions with our vendor for primary side cleaning on improvement to that process and what that would look like and we are planning on another steam generator primary side cleaning. In the interim we are monitoring the reactor inlet header temperature and its growth rate to ensure that we don't exceed any safe operating limits. Thank you.

MEMBER LACROIX: So this is fouling on the primary side, so that means it could affect the reactor itself? There's fouling inside the reactor; do I

understand you correctly?

MR. MULLIN: Derek Mullin, for the record.

Not quite correctly. The CANDU design is such that if there's going to be any type of magnetite deposition, we want it in the steam generator and not on the fuel. So it's expected that if there is some corrosion as a result of wear of primary heat transport system components that any of that magnetite builds up in the boilers and then we can clean it when we need to later.

MEMBER LACROIX: Okay. And what is the reason for this sudden fouling phenomenon?

MR. MULLIN: Derek Mullin, for the record.

This is a known phenomenon with the CANDU design. It is not a sudden thing. We have had primary side clean campaigns in the past periodically. It's all part of our equipment program plans as to when we're going to do those. Thank you.

MEMBER LACROIX: And what about the secondary side, on the shell side?

MR. MULLIN: Derek Mullin, for the record.

Again, yes, we also -- as part of our equipment program plan, we also do what we call boiler lancing. We inspect the secondary side, look for any sludge build-up or anything like that, and they also get

cleaned on a periodic basis.

MEMBER LACROIX: Okay. Thank you.

MR. NOUWENS: Jason Nouwens, for the record.

I just want to add one more point to one of the comments you made in that, Derek, clarify it a bit. This issue that we're dealing with is not one that develops over weeks or months. This is something that progresses very slowly over years, so we have a lot of time to analyze it and make plans for the future. So this is not something that poses any immediate threat.

THE PRESIDENT: Dr. McKinnon.

MEMBER MCKINNON: I have a question about compliance verification.

There was a Table No. 5 that outlined a number of compliance inspections conducted and there was some basic discussion of the type of inspection, the nature of the inspection, but my question is prompted by actually what I read in one of the other ROR reports in connection with inspections being records-based or performance-based and I think the success of the move to performance-based.

Could you comment on whether that has occurred for the power plants for the inspections carried out?

MR. FRAPPIER: Gerry Frappier, for the record. I would ask Kim Campbell to comment on that and then perhaps some of our site supervisors might want to comment on it.

Sorry, what page was that Table 5 on there?

MEMBER MCKINNON: Yeah, 19.

--- Pause

MS CAMPBELL: Kim Campbell, for the record.

So for the compliance verification program for NPPs, there's different types of activities that will be conducted for compliance verification such as Type I inspections, Type II inspections, field inspections, and surveillance and monitoring.

The inspection plan is set up -- we have a five-year baseline that takes five considerations into the development of that, that include probabilistic safety assessment as well as deterministic safety, other considerations like human performance in other program areas. So when we develop the five-year baseline, we do have many activities throughout all of the SCAs, the safety and control areas, over five years, looking at sort of the more high-risk items for the verifications.

So that's how the compliance program is set up. For details on how it's executed, I can pass that to Kim Hazelton, the site supervisor.

MR. FRAPPIER: I think John Burta will take it first.

MS CAMPBELL: John Burta first.

MR. BURTA: John Burta, for the record.

So I believe when you make reference to performance-based versus records-based, that is something that is done in the Directorate of Nuclear Substances and Radiation Devices. There's a distinct difference between the way they conduct compliance activities and the way they're conducted for nuclear power plants.

Nuclear power plants have site inspectors who are at the site of the licensed activity at all times. Therefore, we've got access to the licensee records and we've got access to go observe activities in the field, giving us this performance element at all times.

With respect to DNSR, their inspectors, they have a much larger group of licensees, they're not on site at all times, and they have to physically go and inspect the site. It involves some travel and logistics to get there.

So the distinct difference, I would say,

is because we have site inspectors who are there to look at the performance and records elements at all times. Most of our inspections include both.

MEMBER MCKINNON: That clarifies it.

Thank you.

THE PRESIDENT: Dr. Berube.

MEMBER BERUBE: CNSC staff, I'm looking at some of the IIP deliverables and noticed that a few of the dates actually slipped on the report. If you could bring me up to speed on where we are on the IIP actions across the spectrum of reactors at this point.

MR. FRAPPIER: Gerry Frappier, for the record.

Of course, all the licensees have IIPs now. I don't know if you're talking about a particular site or you would like -- that's fair because I'll go to each one of the RPDs and they can talk about some of the major slippages, if you like, that have occurred in IIP.

I would point out that, as we discussed at several licensing hearings, the IIP implementation is part of their licence, but we do allow a certain marge de manoeuvre, as we say in French, so a little bit of leeway, if you like, with respect to some of the dates from a pragmatic perspective as long as they don't interfere with

the fundamental objective of what the IIP item was going to be.

But perhaps we can start with Darlington, who probably has the most intense IIP right now.

MR. ROSE: Hello. It's Gary Rose, for the record.

Starting with Darlington, all of our IIPs for 2018 were completed and on track. Looking forward to 2019, we have 99 IIP tasks, of which 74 are already complete. There are some, 11, which will be moved to 2020 to coincide with the movement of the return of Unit 2 to service. Of the remaining 14, there's 3 of them that are likely going to be at risk for completion in 2019 and have been presented and discussed for rescheduling into 2020. Other than that, they all remain on track.

MS SMITH: It's Stephanie Smith, for the record.

So for the Pickering Generating Station, we currently have three IIP actions that have been moved from 2018 to 2019. All three of those actions were on Pickering 1 to 4, LOF safety analysis, small break LOCA and NOP. The due dates were moved because we had some issues obtaining the appropriate nuclear safety analysis people, they were limited, but I will emphasize there was no

increase in nuclear safety risk and it has been communicated to the CNSC that these IIP actions have been postponed to 2019.

MR. BURTON: Maury Burton for Bruce.

At Bruce Power we've completed 33 of the 191 IIP actions. Twenty-two of those are considered closed by CNSC staff now. The other 11, they're still doing the assessment to ensure that we've done what we said we were going to do. There are a few actions that we are tracking at risk for the completion dates, but we do keep in close contact with the CNSC staff on this and advise them of the risk and where appropriate we'll ask for extensions to IIP items. Most these are based on delivery of equipment or in some cases we're looking to extend some of the IIP items. For example, for moderator heat exchange replacements which we've committed to due to ongoing fitness assessments that show that we have another 10 years of operation before we need to replace those. So those requests will go to CNSC staff when appropriate.

THE PRESIDENT: Point Lepreau.

MR. NOUWENS: Jason Nouwens, for the record.

I hesitated to answer because, as you're aware, we're under a five-year operating licence which is

not based on an IIP. So in our current plans right now we're in the process of developing our periodic safety review for our 2022 licence renewal, which will at that time have an IIP.

THE PRESIDENT: Thank you.

And staff, I think it may be helpful for the next ROR if you presented it as a chart with how many were planned, how many were completed, reviewed, closed, and then, you know, whatever gets deferred down so that one can track how these are proceeding.

MR. FRAPPIER: Gerry Frappier, for the record.

Certainly, we will do that.

I just wanted to mention that, as I said, some of the IIP changes we're quite comfortable that it's still within what the licence was expecting. Some were not and so in the case of Darlington we did request that they formally submit an amendment that did go to the Commission, and perhaps Nathalie could add a little bit on which IIP items those were.

MS RIENDEAU: Nathalie Riendeau, for the record.

As Mr. Frappier has indicated and the licensees have also indicated, some IIP commitments

sometimes are deferred due to just work organization and planning.

But also, you have to understand that the IIP includes many commitments and some of those in the case of Darlington, they were planned prior to the licence renewal in 2015. So through the execution of the IIP and additional work, OPG in 2018 identified a group of IIP commitments where they essentially identified alternate solutions, solutions that were in some cases more desirable because they were actually achieving full compliance with requirements. And in some other IIP commitments, OPG just identified a better engineering solution that was not thought of initially.

So since those changes to the IIP were different than was first considered at the time the licence was issued in 2015, OPG put in a request to the Commission in February requesting changes to their IIP. The changes were assessed by staff and the results of our assessments were presented to the Commission in a CMD in May and the changes to the IIP were approved in July.

So they are, in terms of -- I don't know if OPG would want to speak to the details, but for one IIP change there was the provision of an alternate and independent source of emergency water supply, and this was

also identified as an SIO, as a safety improvement objective from the EA, and OPG identified an alternate, different engineering solution that was first considered.

In the case of another IIP, OPG was proposing to essentially meet the code requirement fully by extending a system to provide fire protection to outdoor transformers. So that's the example of the kind of alternate solutions that OPG proposed.

I don't know if OPG want to add.

MR. ROSE: It's Gary Rose, for the record.

I would ask Imtiaz Malek to speak to the SIOs that we've asked for some changes to.

MR. MALEK: Imtiaz Malek, Refurbishment and Reg Affairs, OPG, for the record.

I don't think there's much more I can add to what Nathalie Riendeau just expressed. We asked for the staff to look at a number of changes we wanted to make to the wording of the IIP and after a technical discussion over several months we then submitted an application to the Commission.

The specifics around the IIPs that required some change, one of them was emergency call calling for a very infrequent or beyond design basis accident, to add water to the core in case of a station

blackout. We had suggested that we would use diesel firewater pumps and that solution we held onto for a while, but as we got into more details, we found that in that case it was becoming more challenging and also there was a better solution that we could apply. As we were having three emergency power generators which are brand-new, highly reliable, seismically qualified, EQ'd and in rooms which can stand severe weather, we thought this was a better solution. So we went away from the original solution that was committed and introduced the idea that we could use an EPG with a hardened route to supply ESW pumps, emergency service water pumps, to get water to the core in the case of a severe accident to prevent it getting worse.

Now, we had the same solution for another IIP, so it was a common solution using diesel firewater pumps. Now, that also was not a good defence in depth approach. So what we said was for the first one, for getting water to the core we would use EPGs and this is a much better solution, and as a backup to that we would use emergency-mitigating equipment which we would also install. So there was backup to backup, defence in depth.

And for the other solution, which was bringing out the firewater pump up to increasing its margins, we decided that it was more economical and simpler

to have automatic load-shedding such that when these are required, they can bring the firewater up to code as well, to requirements.

In the case of -- there was another one. In the case of fire dampers, we had asked the CNSC staff that these fire dampers should be really station-wide, not linked to Unit 2. So we had asked for that delink. And we also suggested that to test them, we needed to have spare parts and processes available and ready because some of these were in very sensitive areas, and this extension of time was requested and granted. It doesn't pose any further risk as we do inspections already and we want to be able to plan out this work more carefully.

I think those are the ones, if there's any further questions.

MR. FRAPPIER: Gerry Frappier, for the record.

So just to add at least a little bit of discussion there. This has all happened in 2019, which of course is not the purpose of the ROR, but I wanted to just illustrate how the IIP is managed. But certainly, we can discuss some more either specific cases or in general.

THE PRESIDENT: Thank you.

Dr. Demeter.

MEMBER DEMETER: Just a quick question. The ROR discussed worker certification in a number of aspects, and I suspect there's different classes of certification, depending on the position that it applies to both within this ROR and actually in Class II facilities as well.

I wanted to get a sense of how the examinations are validated externally. So you've got a certification, but who sort of certifies a certification exam? That's what I'm really getting at.

MR. FRAPPIER: Gerry Frappier, for the record.

This is -- certification is done by our certification group, so I would ask Lucie Désaulniers to come up and give an answer, please.

MS DÉSAULNIERS: Lucie Désaulniers, for the record. I'm the acting director for the Personnel Certification Division.

In 2008, we transferred the examination to the licensees. So what the CNSC is doing now, we have regulatory requirements in RD-204 which set out the requirements for the certification of personnel, including which position needs to be certified.

We also have examination guides which sets

out our requirements for the initial examinations, the simulator examination, and also the requalification of personnel.

Our involvement at this time is more -- is done through the compliance certification program. So we do verify through field inspection type of inspection, and desktop previews that the licensees are implementing the program it should be.

MEMBER DEMETER: So as I understand you, you provide the syllabus or the context, and it's the licensees who provide the testing and examination for this, and you oversee that.

Do you get detailed reports back on each individual, what their results were as well?

MS DÉSAULNIERS: Lucie Désaulniers again.

Yes, we do receive information on each candidate. We don't observe each candidate in the field when we do our inspection, only a sample of the candidate. But for each candidate, we have their examination results.

We also have the exam, the examination that was given to the candidates. So we receive that information. What else? Yeah, I think that's it.

MEMBER DEMETER: I just want to get a sense of a validation tool, so that you might have a health

physicist at three different nuclear power agencies, and are the certification exams similar between the three of them? And is there some opportunity for you to take those and have them reviewed -- certification process and exam -- externally so that you're comfortable?

I know that the licensee has the most deep content knowledge of what they and what's needed in that site. I'm just looking for oversight to make sure that the tool is valid.

MS DÉSAULNIERS: So our regulatory documents are prescriptive in nature. So when they were developed 10 years ago, they have all of the requirements are set out and to make sure that the program are similar through the industry. And we're confident that if the licensees implement these regulatory documents, the examinations are going to be satisfactory. I don't know if ...

MR. FRAPPIER: Gerry Frappier, for the record.

So perhaps as Lucie has mentioned, the bulk of the actual hands-on sort of review and examinations is now handled by the licensee. So perhaps licensees would like to add a little bit with respect to validation of the results that they obtain? I'm not sure who's best here

to ...

MS SMITH: So, again, it's Stephanie Smith, for the record.

I'm going to turn this over to Ephraim Schwartz.

MR. SCHWARTZ: For the record, Ephraim Schwartz, manager, Health Physics, for Ontario Power Generation.

So there are a number of questions, and I believe the specific question that was asked by the Commission Member was the certification of Health Physicists at all the companies.

With regards to that, 204, that certification at OPG is at least performed by the CNSC staff. So we do the initial vetting of our candidates; we ensure that we meet the training qualifications that are specified in 204; we go through the educational requirements; we present that as a package. The final examination on the regulations and safety culture aspects knowledge specific to health physics is all performed by CNSC training officers.

MEMBER DEMETER: Thank you.

MS DÉSAULNIERS: Maybe I can -- Lucie Désaulniers, again. Sorry.

Earlier I focused on reactor operators. I'd like to concur that we are, in fact, administrating the examination for the health physicists. So we are the one doing the exams, conducting the exam and grading the examination here internally.

THE PRESIDENT: Question for representative from the Department of Fisheries and Oceans. Jennifer Thomas, are you online?

Well, maybe the licensees can give an update, maybe Bruce Power and Point Lepreau. What's the status of your DFO authorization?

MR. SCONGACK: James Scongack, for the record.

We should have this by the end of the year. We made a tremendous amount of progress in particular over the course of the last 12 months.

Although what I would say, I mean, obviously these -- this Fisheries authorization is of particular interest to our Indigenous communities around the site. And you know, in response to the question, I think some feedback is really helpful on this front. We've obviously had really good engagement with both DFO staff and CNSC staff.

An approval of this nature taking six

years to complete is -- you know, I don't think it serves anybody well. I don't think it serves the agencies involved from a continuity perspective; I don't think it serves the licensees well; and I don't think it serves the public and Indigenous communities well.

So good news is, is that we are almost at the end of this process.

I would also note that for the purposes of an update that all of the offset projects that Bruce Power put in the application a number of years ago, even though we're still waiting on the approval, we actually completed those offset projects. So we had a dam removal that we just announced just over a month ago.

But you know, I think once we get over the finish line on this, I think there's a really good opportunity for us all to take a step back and look at, you know, what are some of the lessons learned out of this process. Because I don't think the six years has really changed any of the outcome. And the most important piece is we've carried out the offsets, and those are done even before we receive the application.

THE PRESIDENT: Thank you. Point Lepreau?

MR. NOUWENS: Jason Nouwens, for the record.

Before I turn this over to Nick Reicker, I just want to highlight that we have been working on this file for a number of years as well. It was a first for us, and we had progressed a Point Lepreau-specific application. And then within the last year have progressed that to a company-wide application.

But I'll turn it over to Nick for more details on the current status of where we're at with that application.

MR. REICKER: Thank you. Nick Reicker, for the record.

So as Jason mentioned, we have been progressing this for several years through our *Fisheries Act* authorization, under the federal *Fisheries Act*. Through the process, our focus remains on environmental protection and ensuring strong engagement with our local community fishermen and Aboriginal communities.

From an update of where we're currently at, we just recently submitted our authorization to the Department of Fisheries and Oceans several weeks ago with the final application and are waiting for concurrence back on that file. This is also in addition to our Point Lepreau site. All of our conventional sites within NB Power who use condenser cooling water in through the

process and making it a global application for all of NB Power and is going to be looking at a larger offset initiative in support of that as the go-ahead forward.

THE PRESIDENT: Thank you. I understand that we do have a DFO rep on the line. Do you have anything to add to what's been said here?

MS THOMAS: Yes. Jennifer Thomas here from DFO. And apologies --

THE PRESIDENT: You'll need to put your speakerphone on. We can't hear you.

MS THOMAS: Hello, Jennifer Thomas. Is that better?

THE PRESIDENT: Much better, thank you.

MS THOMAS: Okay, great. Apologies for that. Unfortunately, just as this topic came up, I got disconnected from the Webinar.

If the Panel could please repeat the question, I'll be happy to answer.

THE PRESIDENT: So the question was to get a status update on DFO authorization for the Bruce site and Point Lepreau.

And Point Lepreau just told us that their application's only been submitted the last few weeks for all of New Brunswick Power. And Bruce Power said they're

expecting authorization before the end of the year, but how long the process has been, which has been very helpful.

So over to you now.

MS THOMAS: Thank you. Jennifer Thomas here for Fisheries and Oceans Canada, manager, Regulatory Review.

Yes. So we've been working with Bruce Power as well as the Indigenous communities to finalize consultation on the Bruce Power *Fisheries Act* authorization. The authorization has been drafted. We've been working on some of the offsetting components of the project. There's been some concerns raised about some of the offsetting. So those discussions are continuing.

Definitely appreciate Bruce Power's patience with this. I think we've made some great headway, and yes, the goal is to try and get this wrapped up by the end of the year.

Thanks.

THE PRESIDENT: So Ms Thomas, one of the suggestions made by Bruce Power was that once this exercise is complete, there may be an opportunity to do kind of a review and lessons learned for future applications. Is that something you were planning on doing anyways?

MS THOMAS: Jennifer Thomas, Department of

Fisheries and Oceans, for the record.

I think that is a great suggestion. I think the Bruce Power application was one of the first to go through the MOU that we have with the Canadian Nuclear Safety Commission, and I think there have been some lessons learned. So I think a review of this process and looking for some efficiencies would be beneficial for all of us.

THE PRESIDENT: Thank you. It will make Point Lepreau's life easier, hopefully. Thank you.

Turning over to Dr. Lacroix.

MEMBER LACROIX: Thank you.

This question concerns the large break loss of coolant accidents. It seems that OPG, NB Power, and Bruce Power have come up with a new analytical approach that demonstrate that the safety margins are larger than the traditional safety analysis method. Could you translate this statement in plain language, please?

MR. FRAPPIER: Gerry Frappier, for the record.

You do like to delve into some of the complicated stuff, so I'll have Wade Grant perhaps provide some more information on this.

But you are correct, that large break LOCA of course is one of the most severe design-based accidents

that we force -- we force? -- we require the licensee to analyze for and ensure that the design of the nuclear power plant can handle that without severe consequences.

Over the years, that has been done in a deterministic way with -- in a very conservative way. And industry has developed some new approaches that could be used to demonstrate how much margin they have with respect to large break LOCA accidents. And we have been for several years now reviewing the approach with tight scrutiny, given the importance of the assessment.

And perhaps I could ask Wade Grant or perhaps Alex Viktorov to provide more detail as to where we are. And then perhaps industry would like to comment on it.

MR. TAVASOLI: For the record, this is Vali Tavasoli, director of Operational Engineering Assessment Division.

To understand the new methodology and its relation to the large LOCA safety margin, I have to give a bit of a background. The traditional methodology that Gerry Frappier mentioned is very bounding, very conservative. Under REGDOC 2.4.1 for analysis of accidents in design basis category, we accept either a bounding analysis, which is called limit of operating envelope, or a

best estimate plus uncertainty.

The problem is, is that the limit of operating envelope, the way it is done, it simulates a scenario which is extremely improbable. So the safety margin that it produces is extremely unlikely and it is very small, because of the boundness of the scenario they are modelling.

The other path is to do a best estimate plus uncertainty type of analysis for DB analysis. And that one, for certain portion of the analysis, the characterization of uncertainties are not well developed. And so it is difficult to accept that type of methodology.

But at the same time, REGDOC 2.4.1 allows use of more realistic methodologies when frequency of events goes below 10^{-5} . And that's where this composite analytical approach comes in. The composite analytical approach, the main component of it is development of a methodology that can demonstrate clearly that the frequency of a break in a large pipe is sufficiently low so more realistic methodologies could be used. And that one is done, and a threshold break size is defined, which is -- could be something like 10 per cent of an inlet header, and any break larger than that would have a very low frequency and therefore more realistic methodologies can be used.

This is basically the context around it.

MEMBER LACROIX: Thank you.

THE PRESIDENT: Dr. McKinnon?

MEMBER MCKINNON: Yes. Perhaps one question. The topic of the fracture toughness was brought up earlier, so I don't want to go too deeply into that. But it's in connection with I guess testing of the pressure tubes.

So I was just wondering, since it's such an important component and it says currently the life is estimated based on a model, is there any other property -- physical property that could be measured without having to rely on a model?

MR. FRAPPIER: Gerry Frappier, for the record.

I'll ask Glenn McDougall to come up and provide some context.

But there's certainly many aspects to the fitness for service of pressure tubes that are under review and that are being done, including research providing actual data. So it's not just the model. I think the fact is, is that the model brings all those components together, if you like, and provides some insights. But as Mr. McDougall mentioned earlier, we're also doing actual

testing and sampling of the pressure tubes, or at least getting scrapes with respect to some of the key components.

But maybe Mr. McDougall could explain that for us.

MR. McDOUGALL: Glenn McDougall, for the record.

Thank you for the question. When we speak of the model, I think we have to understand the different considerations that CNSC staff have when industry approaches us with any kind of a behavioural model for their components.

The first thing, first issue that we consider is the extent of industry's understanding of the phenomenon. So in the extreme, is the licensee simply providing us an empirical model without any sort of fundamental understanding of what is going on? Or are they relying exclusively on some theoretical treatment of the phenomenon?

In the present case, the models that we're talking about, there are two of them, are based on extensive research and development program that's been going on since 2010. Up until that point, there was a limited amount of research and development and OPEX that was used to develop industry's understanding of the

toughness. But up until that point, the toughness was not a life-limiting consideration for pressure tubes. So that's what changed in 2010.

The second thing that CNSC staff consider is the development of the model itself. And in the present case, once industry had developed the models, they selected two different panels of independent review experts. And these were both groups with extensive understanding of not just fracture properties of materials, but also the modelling of those properties. They were quite independent of each other. There was an American consortium and a Canadian group.

The third thing, and this is one of the most important from staff's perspective, is the validation of the model predictions. I can't think of any instance where we allow the fitness for service of a CANDU component to be assessed on the basis of a model in and of itself. One of the most important considerations for us is the extent to which industry can take the predictions of that model and compare that against actual test data.

A criticism of some models in the past has been that the test data that are used to examine or to validate the model are simply bench top tests in a lab. There's always question marks about the relevance to actual

operating systems.

But in the case of the fracture toughness modelling, industry has performed a significant number of tests on actual pressure tubes that they've deliberately removed from reactors and to test the bounds of the predictiveness of their model. And so the ability of their model to bound those measurements that they've taken on their pressure tubes has gone a significant way towards staff's recommendation for acceptance of those models.

MEMBER MCKINNON: Yes, thank you. That helps very much. Thank you.

THE PRESIDENT: Dr. Berube?

MEMBER BERUBE: It's more of a management question, but for CNSC, let's start there.

Just looking at the enormity of work that's being done right now on the NPPs across the spectrum in terms of refit activity, could you explain to me how you're actually trapping the lessons learned from a lot of this, disseminating that, A, to your staff, and how that actually facilitates inspection, and also how that is actually being transferred to all the operators such that they can take advantage of that information? What is that process? There's got to be something formal.

MR. FRAPPIER: Gerry Frappier, for the

record.

So there's several different processes. So one is we do have an OPEX process, which would be quick and to the point, if you like, if something happened at one station, so that we can do an evaluation of that. There's a formal process by which we ensure that all the licensees, and they have their process for exchanging information on something that would be more like an event or something like that.

But I think you want to look at it a bit broader than that, so if you look at refurbishment being one of the key things going on, so what we have done is we put together a sort of a how are we going to do oversight of a major refurbishment like is happening at Darlington and about to start at Bruce. And from that, we put together a generic compliance oversight program. So that -- and that's a document, if you like, for lack of a better word. But it says, Okay, here's what we're going to be doing. So both the Darlington team and the Bruce team are given that as a starting point, if you like. But there's lots of discussion around is it working, what could be done better, lessons learned that then feed back into that.

Right now, Darlington, of course, is, you

know, quite down the path on that, having the refurbishment of Unit 2 ongoing. So there's lots of lessons coming. And we ensure that the Darlington team is talking to the Bruce team that's being set up that they're getting ready.

So there's both the informal sort of discussion that happens between individuals and also the more formal view where we're sort of saying, Okay, now we're getting ready for Unit 3. What are we going to do differently? What does that mean as far as how we should be doing overall compliance?

If you look at things other than refurbishment, we have Ms Campbell mentioned about our five-year compliance oversight program. And similarly it has a lessons learned component to come in, both with respect to every inspection that's done -- it's a required step that the inspectors must do is was there lessons learned on this inspection, and there's a place where they put those so that both next time somebody's doing that inspection they can find it -- but also for the overall program, so we can sort of take a look and say, Okay, whatever those lessons are, how are we going to incorporate them?

And we do the oversight program in sort of five-year blocks, if you like. And so right now, we are

just in the process of starting up a major review of that oversight program. And that will be applicable in April of 2021, right, so that will start up in 2021.

And as part of that, we're bringing in all the lessons learned that we've had, and we have some working teams of both inspectors and licensing officers and technical specialists that are feeding into how to improve those programs.

I don't know if that answers your question or if you want more detail, or...?

MEMBER BERUBE: Yeah. One of the primary concerns, of course, is that we start missing stuff, especially as we do -- these are long-term projects and we're going to have quite a bit of staff overturn in the next little while, as everybody in the room is well aware.

So the issue is to trap that knowledge someplace in a real way instead of in people's heads so that we can actually disseminate that to oncoming staff because the last thing we want to do is get to a point where we're doing the same thing again and again and again and making the same mistakes again and again and very, very expensive and very dangerous in some cases.

So I just want to make sure that there's some kind of formal process. I know the operators have an

operators' group that you try and share information with, but is -- is that process something that's really formalized?

MR. FRAPPIER: Gerry Frappier, for the record.

So I mentioned a few of those items where we're capturing -- certainly the turnover of people is a real problem and that has to be managed through knowledge management. Some of that knowledge management we do on a very specific individual and we sort of say we want to try to codify what it is you do, how you do your things.

But for the most part, we also have a lot of guidance in our procedures and in our processes that we're using with respect to how we provide the oversight of the nuclear power plants.

There is also the benefit of having several inspectors, obviously, lots of inspectors and licensing officers who can discuss with themselves, but I don't know -- am I missing anything more official?

Go ahead. Yeah.

Maybe I'll ask Kim Campbell to add input a little bit here.

MS CAMPBELL: Kim Campbell, for the record.

So exactly what Gerry Frappier said, so we do have a generic refurbishment plan. That's used as the starting point for each division to use when they're developing their site-specific refurb plan.

Darlington has completed a plan already, so the lessons learned from that were incorporated, captured and used for the Bruce refurbishment plan.

On top of that, we also do get the sites together. The site supervisors meet weekly via telecon and they do discuss what's happening at their sites, lessons learned from things that they've seen, watch-outs and actually share some operational experience.

That happens weekly every Wednesday, so that's a good example of how we do share experience.

THE PRESIDENT: Okay. Thank you.

Dr. Demeter, last round.

Dr. McKinnon?

Dr. Lacroix.

MEMBER LACROIX: Two snap questions?

THE PRESIDENT: Quick questions.

MEMBER LACROIX: Okay. Quick questions.

First question for Hydro-Québec.

Hydro-Québec is sitting on the --

M. LEBLANC : En français.

MEMBRE LACROIX : Ah, oui. D'accord.

Hydro-Québec, vous avez de l'eau lourde sur le site de Gentilly-2. J'aimerais savoir, est-ce qu'il y a une raison pour laquelle vous n'utilisez pas cette eau lourde -- y a-t-il une raison pour laquelle elle demeure sur le site même?

M. OLIVIER : Donald Olivier, pour le verbatim.

Peut-être juste préciser. Effectivement, il y a de l'eau lourde encore sur le site. On en a valorisé une partie en 2014. Donc, il y en a une partie qui a quitté. On est en train de regarder une autre portion qui serait valorisable. Et puis il y a une autre portion qu'on est en train de regarder pour l'entreposer chez un titulaire de permis. Donc, elle ne serait plus sur le site de Gentilly-2 probablement à la fin de l'année prochaine.

MEMBRE LACROIX : Merci.

And the last question is for Mr. Scongack.

This morning during your oral presentation, you mentioned something like Bruce Power is among the top CANDU operators in terms of the reactivity management. This is the term that you use, reactivity management.

Now, in my mind, reactivity management may mean the ability of the management team to react to a different situation, but it can also mean the ability to control the departure of nuclear criticality. So which one is it?

MR. SCONGACK: It's the latter. It's actually -- and I'll maybe leave the chief engineer to explain the reactivity management index in a little more detail, but James Scongack, for the record.

So really, what I was alluding to is we have the four pillars of safety, with reactor safety being our overarching pillar. And one of the metrics we use to -- among many, but a primary metric to look at the reactor safety pillar is our reactivity management index.

And when we report that quarterly, and obviously related to criticality and the reactor safety pillar, we compare ourselves to the CANDU Owners Group and our performance in the reactivity management index is in the top quartile of COG members.

I don't know if Mr. Newman or Mr. Cluett would like to expand on that.

MR. NEWMAN: For the record, Gary Newman, Bruce Power.

I think Mr. Scongack's done a good job of

explaining that. I mean, we can get into the detail of what the sub-indices are, but basically it's all items that are related to some form of reactivity control so, for example, like your DCCs or how your zonal kit is working and so on.

So we track that pretty carefully because it -- it's synonymous with reactor safety pillar.

MEMBER LACROIX: Thank you, gentlemen.
You pass the exam with flying colours.

--- Laughter / Rires

THE PRESIDENT: The professor at work.

Thank you.

Last question, Mr. Frappier. When is the whole site PSA submission coming in front of the Commission?

MR. FRAPPIER: Gerry Frappier, for the record.

I'll have to ask Smain Yalaoui to come and give us a status on where we are with the scheduling of both, I guess, the international view of where we should go with the multi-unit PSA and also our own facilities.

MR. YALAOUI: For the record, my name is Smain Yalaoui.

Regarding the whole site PSA, we know that

Pickering has submitted in 2017 the whole site PSA. For the Bruce Power, it just came up in April with the aggregate -- the results for the site.

And for Darlington, we are expecting to see something in 2020 because they wanted to use the experience -- what is learned from the -- from the Pickering project and they would -- and they would also to like use the most up-to-date PSA results that they are coming to submit in 2020.

So this is the whole site PSA plan for the time being.

THE PRESIDENT: When is it going to come in front of the Commission?

MR. FRAPPIER: Gerry Frappier, for the record.

So I've just been handed a little note here. So something to be determined yet, so it is --

HE PRESIDENT: So no earlier than 2020.

MR. FRAPPIER: Correct. It will not be before 2020.

THE PRESIDENT: Okay. Well, thank you very much, staff, licensees and intervenors. That completes our agenda item on the regulatory oversight report.

We'll take a 10-minute break and be back
at 3:05.

--- Upon recessing at 2:56 p.m. /
Suspension à 14 h 56

--- Upon resuming at 3:05 p.m. /
Reprise à 15 h 05

MR. LEBLANC: We will be resuming, so for those who have business in this room, please stay, and for others, please leave the hearing room. Thank you.

THE PRESIDENT: Okay. The next item on the agenda is the 2019 Annual Program Report for the Regulatory Framework Program as outlined in CMD 19-M39.

I'll turn the floor to the CNSC Staff for their presentation.

Mr. Torrie, the floor is yours.

CMD 19-M39

Oral presentation by CNSC staff

MR. TORRIE: Thank you.

Bonjour Madame la Présidente, membres de la Commission. My name is Brian Torrie, I'm the

Director-General of the Regulatory Policy Directorate. With me today are Mr. Wayne Gratton, Senior Regulatory Framework Officer of the Regulatory Framework Division, and Mr. Gavin Lemieux, Director of the Regulatory Policy Analysis Division.

As well, we have other staff available here to answer any of your questions.

We are pleased to be here today to present our regular update on the CNSC's Regulatory Framework Program. The last annual update to the Commission was provided in October 2018.

Our presentation today will cover three areas.

First, an overview of our regulatory framework program, noting a few highlights from the past year, and how the program is evolving. Second, we'll look at how regulatory framework activities are supporting CNSC's strategic objectives of becoming a modern regulator. And finally, our involvement in the Government of Canada's reform initiatives, both legislative and regulatory.

First we'll have a look at our regulatory framework. I will explain briefly what it is, discuss the status of the program, and how it's evolving.

This slide is an overview of the CNSC's

regulatory framework program showing several elements that can be grouped into two broad areas.

In blue, we have our regulatory framework processes and outreach work.

The structured collection of documents we see here such as the regulations, regulatory documents or REGDOCs, the Act, discussion papers and nuclear standards, is collectively known as the CNSC's regulatory framework and supporting documents.

Their review cycles are managed by our group through the use of the Regulatory Framework Plan and involve all parts of the organization in their development.

Through the review and development of those documents, we are engaged in a variety of consultation and outreach work. Our team is also responsible for "Meet the Nuclear Regulator", which is an outreach program that allows us to explain our regulatory context to various stakeholders like "host" communities, communities near facilities, indigenous communities, unions, civil society or new CNSC employees.

In yellow, we have another key part of our framework, which is to coordinate the CNSC's participation in the Government of Canada's agenda for legislative and regulatory reform. This means taking part in cross-cutting

initiatives like providing the CNSC's position on impact assessment under the new *Impact Assessment Act* through the Major Projects Management Office.

The overall goal of the regulatory framework program is to have regulatory instruments that make requirements clear for licensees, the public, indigenous people and other stakeholders.

This slide is a quick view of our Regulatory Framework at the CNSC. It starts at the top with the *Nuclear Safety and Control Act* or the NSCA.

The NSCA is our enabling legislation. It establishes the Commission, its mandate and authorities.

The NSCA also authorizes the Commission to make regulations, subject to Governor in Council approval.

In the second tier, we have 13 regulations in total which set out the high-level requirements that licensees or applicants must meet in order to obtain or retain a licence.

The Commission makes all regulations and regulatory amendments before the Governor in Council approves them for release. Additional information on the process is found in Annex C.

In the third tier, we have licences and certificates issued by the Commission or its staff

delegates. They set out specific requirements for each of our various licensees and facilities.

The largest segment in red is where we do most of our work. Regulatory documents -- or REGDOCs -- provide greater detail than regulations in terms of what licensees or applicants have to do to meet our requirements. They also provide practical guidance on how to meet our requirements and regulatory objectives. They are all approved by the Commission and can be referenced in the licensing basis.

Now let's turn our attention, in the next few slides, to activities to modernize CNSC's regulatory framework.

In 2013, an improvement initiative began within the CNSC to clarify our regulatory requirements in various areas of the framework. The objective was to ensure that regulatory requirements were modern, clear and supported by guidance.

Prior to the initiative, a variety of regulatory instruments were used to provide requirements and guidance.

At one time, there were over 120 regulatory documents in the CNSC's framework library under different nomenclatures, ranging from policies to

standards, guides and requirements. The next slide highlights the status of existing legacy documents, so we'll touch on that shortly.

Since the last update to the Commission in 2018, we have continued to clarify our regulatory expectations through the publication of REGDOCs. To date, 48 REGDOCs have been published.

The CNSC's regulatory framework plan outlines a long-term plan for our regulatory framework. The plan is flexible and adaptable to the latest developments in federal regulation. This helps us to manage resources, to be flexible and responsive to new priorities, industry challenges like new technologies, or to federal reform initiatives.

This slide is a quick look at where we stand and what we've accomplished so far related to archiving our legacy documents.

The graph on the left shows progress since 2013-014 to review CNSC legacy documents. Out of the more than 120 legacy documents referred to earlier, only 26 remain to be reviewed and converted into the new document framework.

The graph on the right notes progress made to modernize the framework. Overall, CNSC Staff have

continued to make steady progress on populating our regulatory document framework.

We now have a framework that is clearer, more transparent and more responsive to emerging issues.

In the next few slides, I will highlight some of our key work and accomplishments over the past year.

First we'll start with the Regulations.

For the *Radiation Protection Regulations*, given changes to international benchmarks and the adoption of new radiation protection guidance worldwide, CNSC Staff determined they should be modernized.

Earlier this year, improvements to the Regulations were pre-published in the *Canada Gazette*, Part I.

CNSC is currently reviewing the feedback received and will be working with the Department of Justice on finalizing the Regulations. We are targeting final regulations in June 2020, subject to the Commission and Governor in Council approvals.

CNSC Staff is working on amendments to the *Nuclear Non-proliferation Import and Export Control Regulations*, or NNIECR.

The proposed amendments to these

regulations aim to modernize the regulations and align with current international guidelines for the control of nuclear and nuclear-related imports and exports. Public consultation in *Canada Gazette*, Part I is targeted for June 2020.

Staff is also exploring options to amend the *General Nuclear Safety and Control Regulations* to reflect best practices for the safeguarding of nuclear material.

The goal is to ensure the continued effective reporting and monitoring of nuclear materials and activities in Canada.

For this project, the CNSC is also targeting public consultation in *Canada Gazette*, Part I in June 2020.

Finally, the Nuclear Security Regulations are also being reviewed to reflect modern regulatory practices and take into account new evolving security threats and technological advances such as small modular reactors.

While we have set timeline objectives here, the timing of these regulations is dependent on ensuring proper consultation with stakeholders and the availability of Department of Justice drafters to support

us getting through the drafting phases. We are looking at ways to effectively manage these challenges.

The next two slides provide a list of REGDOCs published since our last update to the Commission.

Of these documents on this slide, I would like to highlight a couple.

REGDOC-1.1.5, *Supplemental Information for Small Modular Reactor Proponents* demonstrates CNSC's readiness to deal with these applications, and REGDOC-2.2.3, *Personnel Certification, Volume III: Certification of Persons working at Nuclear Power Plants*, where the validity period for knowledge-based certification examinations was increased from one year to three years to take into account parental leaves.

On the next slide, again I'd like to highlight a couple of documents here.

REGDOC-2.11, *Framework for Radioactive Waste Management and Decommissioning in Canada*, which provides an overview of the governance and regulatory framework for radioactive waste management and decommissioning in Canada. This overview document provides the basis for other CNSC documents in the CNSC's waste management series of regulatory documents.

As well, REGDOC-3.5.4, *Pre-licensing*

Review of Vendor's Reactor Design, describing the pre-licensing review process for assessing a vendor's reactor design is another example of CNSC's readiness to regulate new technologies.

A complete list of the REGDOCs published to date can be found in the Annex A.

In terms of what to expect from the regulatory document framework over the coming months, here are the REGDOCs that we currently plan to bring to the Commission meetings for the remainder of this fiscal year.

There is one REGDOC planned for the meeting in December 2019 related to reporting requirements, four are planned for April 2020 on Waste Management, and two REGDOCs are targeted for May 2020 on Radiation Protection, but this is dependent on the regulations being approved first.

Finally, in addition to regulations and REGDOCs, there are other instruments available to the CNSC when considering how to address a regulatory issue. In this respect, the CNSC often leverages domestic and international standards to help support CNSC's regulatory framework.

Standards reflect state-of-the-art knowledge, account for operational experience and best

practices. CNSC Staff actively participate and input into standard development, including the CSA Group or International Atomic Energy Agency (IAEA) standards.

Nuclear standards produced by the CSA Group are a particularly important component of CNSC's regulatory document framework.

Staff from the CSA Group are here today to present on that program, including the value that program brings to the CNSC regulatory framework and steps we have taken with them to improve accessibility to the standards.

I'd now like to say a few words about how our work is evolving.

Since CNSC's improvement initiative began in 2013 to clarify our regulatory expectation, the CNSC's Regulatory Framework Program has focused on building a cohesive and modern framework by developing clear, documented and accessible regulatory expectations in support of the CNSC's licensing and compliance activities, developing licence application guides reviewing and eliminating legacy documents, and effective and timely communication with stakeholders.

Moving forward, these objectives are still important, but focus is shifting to making the regulatory framework more agile and responsive.

A more agile and responsive regulatory framework will focus on improving areas we can do better such as engaging more stakeholders, considering impacts, and using technology to do more.

In short, this is about continuing to be a modern regulator.

So over the next part of the presentation, we'll look at the activities supporting our goal of being a modern regulator.

An important part of our work over the next few years will be about ensuring our regulations are modern.

In reviewing CNSC's regulations, the goal is to ensure there is a balance of prescriptiveness versus performance-based regulatory approaches focused on objectives while understanding impacts. Our regulations need to allow for flexibility and use of novel approaches to address new emerging technologies and written to mitigate unexpected impacts and challenges that may be barriers to innovation.

This also aligns with the Government of Canada's expectations in the development, management and review of federal regulations.

Having modern regulatory practices and

tools allow us to respond to an evolving industry.

As CNSC continues to modernize its framework, it's important that the CNSC's strengthen its program effectiveness through peer reviews, lessons learned and best practices.

Canada recently hosted an 11-day Integrated Regulatory Review Service, IRRS, from the IAEA to review the regulatory safety framework in Canada. Overall, the IRRS team noted that the CNSC framework is comprehensive and ready to address new challenges and technologies, while providing recommendations and suggestions aimed at enhancing Canada's regulatory framework.

It's important as we move forward to continue to benchmark and adopt best practices. As a federal regulator, the CNSC is an active participant in the Community of Federal Regulators.

The CFR, as it is known, is a partnership of federal departments and agencies that facilitates collaboration and the professional development of employees involved in regulations across the federal government. The CFR helps foster collaboration, share regulatory expertise and increase community understanding of innovative regulatory concepts and enabling their application.

Furthermore, the CNSC's framework needs to continue to reflect the latest developments in a rapidly evolving industry. A working group of staff is studying the use of Disruptive, Innovative and Emerging Technologies, or DIET, and consulting with stakeholders and industry to learn more. Licensees are exploring the use of DIET, new technologies such as 3D printing, drones, artificial intelligence, and regulators need to respond to the impact of these initiatives on how we regulate.

As a responsible federal regulator, consultation with the public, licensees and interested organizations is an important part of the process the CNSC uses to develop the regulatory tools within its regulatory framework.

Stakeholder engagement underlines CNSC's commitment to be open and transparent and build trust. With respect to our regulatory framework, it's an area we can do better.

More and more stakeholder meetings are now being held during and after the formal consultation periods, on a case-by-case basis, to enable the CNSC to better understand impacts. The CNSC is planning to engage more directly with civil society groups on regulatory program activities and is exploring how we can use modern

communication technologies such as e-consultation and webinars, and the use of other digital platforms and software to collect comments and provide feedback on initiatives.

As well, the CNSC Meet-the-Nuclear-Regulator program continues to enhance awareness of CNSC's role and responsibilities with information sessions across Canada.

Finally, in the next few slides I'll touch on the legislative and regulatory reform prior to concluding the presentation.

Regulatory reform has been an important part of the Government of Canada's agenda over the last several years and CNSC has been, and continues to be, involved.

The *Impact Assessment Act* come into force in August 2019 and overhauled the current federal assessment approach. The former Canadian Environmental Assessment Agency, or CEAA, became the Impact Assessment Agency and now lead all federal assessments for major or "designated" projects. Assessments are broadened beyond environmental factors to include economic, health and social impacts.

While the Commission is no longer

responsible for environmental assessment decisions, under CEAA the CNSC continues to be responsible for all aspects of licensing and supporting project reviews for those falling under the new Act. An MOU has been signed between the CNSC and the Impact Assessment Agency of Canada to ensure an integrated review process.

The Government of Canada is also implementing a broader regulatory modernization agenda intended to facilitate competitiveness, agility and innovation in the Canadian regulatory system. Areas include review of the *Red Tape Reduction Act* that is focused on regulatory burden and the regulatory modernization Bill that is focused on legislative amendments to enable innovation.

Another government-wide initiative that CNSC is working to implement is the Cabinet Directive on Regulation. It sets out the government's expectations and requirements for the development, management and review of federal regulations.

The Directive includes several key elements, including an increased emphasis on indigenous engagement and consultation, more specifically early consultation and more stakeholder consultation, and greater scrutiny on gender-based analysis.

As well, CNSC continues to be involved with the Regulatory Cooperation Council, an initiative first launched in 2011 between the U.S. and Canada, with the main goal of further enhancing areas of cooperation between regulatory bodies. The CNSC has a well-established relationship with the U.S. NRC and is leveraging this relationship for further cooperation in such areas as SMRs.

Overall, the CNSC continues to explore best practices of other regulators and remains focused to reflect the latest developments, both domestically and internationally.

In summary here, the CNSC is making steady progress in relation to our regulatory framework goals.

First, we are working to finish populating the document framework to retire the rest of our legacy documents by 2021.

Second, we are demonstrating our readiness and agility for an evolving industry by ensuring our regulatory framework is responsive, aligned and trusted by fully engaging all stakeholders.

And thirdly, exchanging information and lessons learned for continuous learning and improvement.

Thank you for your attention, and we are now available to answer your questions.

THE PRESIDENT: Thank you, Mr. Torrie.

We'll open the floor up for questions and start with Dr. Berube.

MEMBER BERUBE: Just during your presentation you were discussing getting regulations approved. You mentioned that you had to get the DOJ involved. What exactly is that all about? I'm not familiar with that process.

MR. TORRIE: Brian Torrie, for the record.

DOJ, Department of Justice, is responsible for the drafting of the regulations, so we provide them the drafting instructions and then they draft the language.

The issue in terms of their involvement is, there's a number of priorities within government, so there's quite a line-up to get through the drafters -- that process. And it depends on the availability of the drafters. So, in the government over the past four years they have been very focussed on impact assessment and the cannabis legislation, so that was quite a stress, I guess, on the availability of the DOJ drafters, and so you saw a slow-down in a number of regulations that we had in terms of getting their involvement.

So in terms of strategies that we're looking at is, moving forward maybe we want to bundle

regulations together instead of going individually and that way we make the best use of their time.

THE PRESIDENT: Doctor Demeter?

MEMBER DEMETER: Thank you for the presentation.

I was curious about some international benchmarks and trends. The pendulum tends to swing both ways, but is there a current sort of international trend to moving from more prescriptive to performance-based regulations and oversight, or are different jurisdictions in different parts of that pendulum swing?

MR. TORRIE: Brian Torrie, for the record.

Certainly, domestically there's a trend towards performance-based regulation. And then internationally I think largely driven by the advance reactor technologies there's a move towards performance-based regulation. So, in the case of, say, the United States they are fairly prescriptive in their approach. And then you have the British system that's quite performance-based, much more than we are.

I think they both kind of look at our system as a good balance between the two, and the best way to sort of mix that prescriptiveness in the areas where it's needed such as, say, someone's security issues, and

then having performance-based approaches where it works more effectively in allowing innovation.

MEMBER MCKINNON: Yes, thank you for that presentation. I'm looking at slide number 16 which is on innovation and continuous improvement, and in particular the point of understanding disruptive innovative and emerging technologies. So this is a very desirable goal, it's -- but it's something that I imagine is very difficult to do because you need to have the management structure and skilled people to do that. So has CNSC got a specific management strategy to be able to do that -- to change management and so on and --

MR. TORRIE: Yeah, Brian Torrie, for the record.

I'm going to pass the question to Mr. Lemieux to answer. But, first, I'd just say we're really in the early stages of it. The working group comes out of the Regulatory Framework Steering Committee which is a management group here that oversees our reg. framework. And the working group was established about six months ago and they've had one stakeholder meeting.

But, I will pass it over to Mr. Lemieux to fill in the rest of your question.

MR. LEMIEUX: Gavin Lemieux, for the

record.

I have only a little bit to add to Mr. Torrie's comments. As he mentioned, we have an existing management structure that oversees the regulatory framework that's composed of all the implicated director generals of each of the operations and our technical service branches.

The working group which is composed of really senior personnel in the organization is taking a first cut at looking at the regulatory framework as it stands, looking at both, so reactor technology and advanced technology on that side, which is somewhat known, but you know clearly there's areas that are still expanding.

And, also, as well as technologies that would impact the way work is done in a plant, so 3D printing, artificial intelligence, other areas like that.

So we would report back to that committee in terms of our findings and from there really it would be a process to determine how best to move forward, both in terms of those areas of the regulatory framework that need reform, and those areas that we're quite comfortable that we can maintain a policy objective of being technology neutral in our regulatory framework. But it is still fairly early days. And it's one of several pieces of work that, as an organization, we're doing to look at this. So,

we're - this work, this project is really focussed on the framework itself to make sure it's ready to adapt, as needed.

THE PRESIDENT: Doctor Lacroix?

MEMBER LACROIX: Thank you very much for your presentation. I have two comments and then one question.

The first comment, I really appreciate the fact that you provide Annexes A and B, that is the published REGDOCs and the REGDOCs in Development, it has got to be very useful.

And the second comment, slide 19 concerning the alignment and reform, again the *Impact Assessment Act* comes back. So, I don't want to ramble on but providing us, that is the Members of this Commission, with a briefing note on the effects or the impact of the *Impact Assessment Act* on nuclear activities in Canada would be very useful to us.

And my question concerns is there such a regulatory document on knowledge management? If not, would it be useful considering the fact that over the next decades or so there will be many refurbishment projects in Canada?

THE PRESIDENT: I'll ask Mr. Leblanc to

respond to the first comment and you can take the second one.

MR. LEBLANC: Yes. So on the question of representation to the Commission on the impact of the new environmental legislation, it is something that we had considered on our forward agenda for 2020, probably around June, so we should aim for that period.

Thank you.

MR. TORRIE: Okay. Thank you. Brian Torrie, for the record.

On the question about knowledge management, I'm going to ask Gerry Frappier to respond to that issue. But, just initially, if you look at how our framework is set up, in the three sections, the third section has provided documents related to some of them are more -- don't quite fit in with the safety control areas, so that's probably where that kind of document would fit. So we have 3.5.3 which is CNSC's regulatory philosophy document, you could say. So, within that structure it may fit in there.

But there's no specific document for that right now, but I'll ask Mr. Frappier to discuss it further.

MR. FRAPPIER: Thank you. Gerry Frappier, for the record. I'm the Director General of the Regulatory

Power Reactor Program.

I don't - there's not a REGDOC that has the title Knowledge Management on it. There's several REGDOCs that force industry to be in a position where that can happen, so we have both REGDOCs requiring management systems, actually a CSA Standard on Management Systems that talks about that. And there's also training requirements for positions, both safety significant positions, but in fact for all the positions that are required at the nuclear power plants.

I think it is also something that's coming out of our work around safety culture and ability to be responsive to people's questions.

For the other facilities outside of nuclear power plants certainly the management system is a structured approach that is required, and for facilities that have safety significant issues there's always a requirement for training and/or certification which would require that there be knowledge that's institutionalized somehow that can be handed off to somebody else.

MEMBER LACROIX: So from what I understand there's no need to have a knowledge management program similar to the IAEA for instance?

MR. FRAPPIER: Gerry Frappier, for the

record.

So we don't have one right now, and whether that's something that is needed or not, that would be something we might have to do a little bit of digging on. But from my position, I have not heard or seen any evidence that would suggest that's a big problem.

Having said that, industry has been very clear, they have lots of concerns with respect to the turnover of employees and knowledge management in general.

MEMBER LACROIX: Thank you.

THE PRESIDENT: Dr. Berube? Dr. Demeter?
Dr. McKinnon? No.

Thank you very much for the presentation.

Thank you.

--- Pause

CMD 19-M40

Oral presentation by CSA Group

THE PRESIDENT: Good afternoon. So the next and final item on the agenda is a presentation by the CSA Group on the nuclear program as outlined in CMD 19-M.40. Thank you for accepting our invitation to present today.

Ms Oh, I believe you're making the presentation. Over to you.

MS OH: Great. And thank you so much for having us, and good afternoon.

For the record, my name is Susan Oh, and I am the Standards Director at the Canadian Standards Association or CAS Group Responsible for the Nuclear Sector.

Joining me today is Larissa Logan, Program Manager for the Nuclear Portfolio of CSA, along with Collette Taylor who is the Chair of the Nuclear Strategic Steering Committee. They are here to support me and answer any questions following my presentation.

So, CSA was invited to present to the Commission to provide high level information on CSA Group, to introduce who we are, provide an overview of the CSA Nuclear Standards Program, and highlight key aspects of our standards development process.

For the past century CSA has helped enhance the lives of Canadians and people around the world through the advancement of standards in the public and private sectors.

We are an independent, not-for-profit membership based association and the largest standards

development organization in Canada. We have over 10,000 volunteer members who contribute their knowledge and expertise to develop standards that improve safety, health and the environment. These standards cover a wide range of focus areas including occupational health and safety, sustainability, nuclear and more.

Next, some fundamental information about our standards development process. First, in Canada our standards are developed through a process defined by the *Standards Council of Canada*, a federal Crown corporation that promotes standardization and accredits standards development organizations. CSA's accreditation requires us to adhere to key principles that include ensuring respect for diverse interests, enabling effective participation by concerned parties, having a clear development process, and providing openness and transparency. These principles will be touched on subsequent slides.

Second, technical content of CSA standards is developed by our members who are our expert volunteers. CSA staff act as a neutral third party facilitating the accredited standards development process.

Third, decision by committees are made by consensus, which we define as substantial agreements, and which includes a process that is transparent and ensures

all viewpoints are considered and addressed.

And, fourth, we develop standards for a purpose. Standards which are voluntary documents have greater impact when they are incorporated by reference for regulatory use or in other government directives. Through Cabinet Directives on Regulation in the *Statutory Instruments Act* standards continue to be recognized as an effective tool in achieving regulatory outcomes.

According to the *Standards Council of Canada* there are over 5000 references to standards in federal, provincial, and territorial regulations in Canada. For example, one of our key codes that support Canadian infrastructure such as the *Canadian Highway Bridge Design Code* and the *Canadian Electrical Code* are referenced by every jurisdiction in Canada. The same can be said for standards addressing occupational health and safety management systems, and personal protective equipment. These are referenced in *Occupational Health and Safety* legislations and guidance documents across Canada.

The CSA Nuclear Program was established over 45 years ago in response to the needs of the Canadian Nuclear Industry and its regulators for a consistent process to develop standards that support the safe and reliable operation of the nuclear sector. Out of CSA's

total, 10,000 members, more than 600 participate in the nuclear program and serve on 55 committees. This includes technical committees who are responsible for the technical content of the standards as well as the Nuclear Strategic Steering Committee which provides leadership via strategic and operational oversight of the program.

Their responsibilities include status review of active projects; providing directions on issues raised by committees; approval of new projects; and, strategic discussions around future sector needs.

We also have a planning working group which reviews the program's 10-year publication plan against the regulatory framework to ensure alignments and make recommendations on project prioritization to the Strategic Steering Committee.

With more than 63 standards published and more in development, the nuclear standards cover the lifecycle of nuclear facilities from design, construction and operation to maintenance and decommissioning. Some areas covered by the technical committees include management systems; pressure retaining systems and components; environmental management; fire protection; and, more.

A key distinction in our standards

development process is our multi-stakeholder balance metrics approach. Membership on nuclear committees consists of those most impacted by the standards. This can include various interest groups such as government, regulators, operators, suppliers, manufacturers, researchers and academics.

CSA provides a forum for these experts to sit together, discuss issues, define requirements and best practices and ultimately capitalize on the combined strength of the committee as a whole. As an example, although an organization such as CNSC may be represented by a single technical specialist on a pressure boundary committee, they can collaborate and leverage the depth of expertise of ten or more other specialists that sit on that committee.

Knowledge gained by the members also extends to their organizations as members bring back insights and lessons learned.

As part of the standards development work the CSA also facilitates committees' access to relevant reports, papers, and other codes and standards to ensure that CSA standards benchmark and build on current best practices locally and abroad.

We also have liaison members who sit on

committees with other standards organizations and industry groups to bring input and facilitate further alignment.

The collaboration of the committee and the participation of its members result in an end product that addresses the needs and interests of the various stakeholders, making the final standard practical, usable, and acceptable.

For the nuclear sector the Commission makes independent and transparent decisions on licensing nuclear-related activities including the use or reference of voluntary standards under its national regulatory framework.

Out of the 63 published standards in our nuclear program 92 percent are referenced in license condition handbooks of Canadian nuclear powerplants and Chalk River Laboratories. 83 percent are mentioned in the CNSC's safety and control areas of their regulatory document structure. And 79 percent are referenced in published REGDOCs.

A key benefit of using standards as a regulatory tool is that they are maintained by CSA and undergo regular systematic review. Standards must be reviewed by the responsible technical committee at least every five years with the objective of keeping them

up-to-date and technically valid.

As a result of the review, standards can be reaffirmed, amended if urgent updates are needed, or revised as new editions to ensure advancement in technologies, new methodologies, and lessons learned are incorporated. So, regardless of whether a standard is developed in our nuclear program or another CSA program, the same open and transparent standards development process is used. The process is consistent and predictable for anyone interested in engaging in the process and using the standards.

Prior to the start of a project a public notice is posted on our website indicating intent to start work. Any person who would like to participate in a committee can express interest. Membership is approved based on various criteria, most importantly relevant expertise, a commitment to work within the consensus process.

Within the nuclear program we are also exploring other ways of engaging the broader public and users of the standard who may not have the resources to directly participate in a committee, for example through focus groups.

An important stage in our standards

development process is a public review period, typically 60 day. All draft standards are made available online to allow anyone interested to review and provide comments. For our nuclear standards drafts are posted in both English and French. All comments must be considered by the responsible technical committees.

Prior to publication all standards are formally approved by the balanced technical committee. Published standards are available for free view access through our communities platform. Once published, standards are reviewed and maintained to ensure that they are technically valid and up-to-date. At any time users can submit a request for interpretation, to get clarification on a specific clause, submit proposals for change, or submit any general enquiry on a published standard.

This slide highlights several initiatives that demonstrate our responsiveness and agility to evolving an emerging need. Since 2007 based on input from stakeholders we made efforts to review our standards development process and implement lean improvements. Today, we are able to publish our standards in approximately 12 to 24 months, including new standards in 22 months, new editions in 19 months, and amendments in 12

months based on a five-year average.

Shortly after the Fukushima event in 2011 the program completed an in-depth review of the existing suite of CSA Nuclear Standards and confirmed that the set was robust, but opportunities for enhancement existed.

In 2012 CSA presented the program's approach to the CNSC Commission and in 2014 presented the outcome of the full review, which included plans to develop five new standards, including topics on emergency management, and beyond design basis accidents, and updates of seven existing standards.

In 2017 CSA completed all actions.

In 2013, upon request from the CNSC we investigated options to provide better public access of our published standards. This resulted in providing view access of all nuclear standards through our communities platform supported by CNSC.

As mentioned earlier, in 2014 we established an internal process to review project priorities and planned publications based on emerging needs. This included creating a planning working group to review the program's 10-year publication plan against the regulatory framework and to make recommendations to the Strategic Steering Committee.

Last year, in response of feedback provided to the CNSC we were requested to make available French translated drafts for public review.

Since October 2018 we have posted 14 draft documents in both English and in French for public consultation and commenting.

In recent months we have been communicating with CNSC regarding a need to make information about the view access of nuclear standards and public review drafts more visible to the general public.

In a few slides I'll be demonstrating two videos to highlight CSA communities' steps to access this platform, and improvements to be made to allow for more public visibility.

So CSA Communities is an online platform that provides an open and collaborative forum to engage members, users of standards, and interested stakeholders. It is a hub to facilitate the exchange of ideas, promote standards of element activities and connect those who share a common interest for standardization.

Access to Communities is free with registration and today we have nearly 100,000 registered users. Communities also provides visitors with overviews of the many standard sectors within CSA, including the

nuclear program.

The nuclear community sites include a list of all active projects in development and dates for public review and publication. Links to access public review drafts, links to information related to requests for interpretation and proposal for change, and links to view access of all nuclear published standards.

So this slide will demonstrate how a public user can access CSA Communities as a first-time user. The internet address of CSA Communities is community.csagroup.org. For returning users, they can sign-in with their user name and password. For new users who do not have an account, they can create one by providing their email address.

A direct email will then be sent requesting validation, along with a link to complete a short registration. Once this link is followed the users will be taken to an online form where they will need to provide their first name, last name, user name, email, password, and language preference. To prevent automated registration, users are also asked to enter displayed letters.

Once signed into CSA Communities users will be taken to the main landing page where they can

browse through information on how to get started, how to get involved, access/view online standards, or for member's access community workspace.

To get to the nuclear public page users can go to the top tab and, under standards, click nuclear. The nuclear site provides information related to the program, including an overview of what we do. There are links to how users can participate, find context, access public review drafts, and provide input.

Under the tab project milestones users can also find information on all of our active projects with dates for public review and expected publication dates as shown.

In the next demonstration we will highlight the process for a user to access and view the online published CSA Nuclear Standards. A public user can go to any internet search site, like Google, and type in, for example, view CSA Standards. One of the first few results will lead the user to our CSA corporate site for nuclear. This site does not require login.

Scrolling down this page there is a section which highlights access draft and published standards. This link will provide users with more detail on how to access public review drafts as well as view

access of published nuclear standards. Instructions on how to create an account for new users and login for registered user is provided.

Assuming the user has registered, for the previous demonstration the main page for the nuclear view access site is shown. In the middle of the screen the standards are categorized via the technical committee areas.

The user can, for example, click on decommissioning, which leads to the published standards, in this case both English and French. Clicking on, for example, the English version will provide the user with a window that displays the entire standard page by page. Users can scroll through pages, increase font size, and follow embedded links as shown.

Going back to the main site, users can access links to get information on copyright permission, provide input on published standards through a request for interpretation. This leads to an online form where users can provide information on specific clauses where clarification may be needed, or users can propose a change in a published standard, which again leads to an online form where further detail can be provided and submitted.

Since 1919 CSA has led the way in

standards development to promote a better, safer and more sustainable world. We do this through the technical knowledge, experience and expertise of our 10,000 members who contribute to Standards Committee over a broad array of topics and sectors.

To summarize our presentation, I would like to state that through our CSA program we provide a predictable standards development process that is open and transparent. Second, we provide a forum that encourages collaboration and brings together various experts with a common goal of developing standards. Third, we publish voluntary standards that support the national regulatory framework.

On a final note, I would like to express that in the same way that our committees maintain and update our standards we strive to continuously improve our process and practices and respond to the needs of the sector.

We welcome feedback at anytime. Thank you very much.

THE PRESIDENT: Thank you. Thanks for an excellent presentation. I'll open the floor for questions, and we'll start with Dr. Demeter please.

MEMBER DEMETER: Thank you very much for

your presentation, very informative. I have to say, when I first saw the agenda item I thought CSA was a Canadian group solely, and then I did some internet research and found that you're truly an international group with a large stake in Europe and the U.S.A.

So my question is, do you have competitors? Are there other groups that are like CSA that provide similar types of standards or is the Canadian Standards Association the international guideline standard setter?

MS OH: So, yes, we are the largest standards development organization in Canada, but there are other standards development organizations that are overseen by the Standards Council of Canada. So one other example would be UL, Underwriters Laboratories, but there are several others as well.

MEMBER DEMETER: Actually, I was quite impressed with the website and the reach you have internationally.

THE PRESIDENT: So on a similar note, who would be other nuclear standard developers, big standard developers around the world?

MS OH: I'd like to defer that question to Larisa Logan, our Program Manager.

MS LOGAN: Thank you. Larisa Logan, for the record. So within Canada, to the best of my knowledge, CSA is the only standards development organization developing standards for the nuclear sector. But internationally, there are ASME, American Society of Mechanical Engineers, develops quite a few standards that are used internationally and that we also reference within our standards.

We also rely on IEA standards, obviously they're -- set-up differently than CSA is strictly as a standards development organization.

THE PRESIDENT: So if I were to ask you how harmonized are the CSA standards compared to the ASME or the IAEA standards, what would your response be?

MS LOGAN: Again, Larisa Logan, for the record. Just to clarify, do you mean harmonized internationally?

THE PRESIDENT: Internationally.

MS LOGAN: So we do develop standards primarily for the needs of the Canadian nuclear sector. But when we're developing new standards we do identify relevant existing Canadian and international regulatory requirements, other standards and practices, to confirm if there is a gap or a need to develop a Canadian-specific

standard in the sector.

This is a critical step to make sure that we're not duplicating any efforts in terms of other standards that already exist. You know, I can provide an example. When we recently developed a standard on probabilistic safety assessment for nuclear power plants and the committee extensively reviewed international standards and regulatory documents, including ASME ANS, American Nuclear Society, standards, US NRC regulatory guides, and IAEA standards.

They also did directly liaise with the ASME/ANS Joint Committee on Nuclear Risk Management throughout development and had some members from that committee review the draft at public review as well. They looked at specific opportunities to harmonize or adopt the standard, but the decision was ultimately that a Canadian-specific standard was needed.

As well, when updating and developing the content of any of our standards committees do benchmark and build upon current requirements and best practices both within Canada and internationally. So this is achieved by the committees reviewing relevant international standards, industry practices, academic research, and regulatory reports.

So, where applicable, our standards do reference other documents and supplement with specific guidance or requirements, as needed.

As Susan mentioned in the presentation, we do also have some committee members who act as direct liaisons to relevant groups. So, for example, relevant committees within IAEA or ASME, even within Canada to the Canadian General Standards Board, and these individuals bring valuable input to our standards development process to make sure that we're consistent and not duplicating efforts as well.

THE PRESIDENT: Excellent. Thanks very much. Dr. McKinnon.

MEMBER MCKINNON: I have no questions.

THE PRESIDENT: Dr. Lacroix.

MEMBER LACROIX: I do have a question. You've mentioned that there are 10,000 volunteers, 1,300 technical committees, and in order to participate in your committee you have to have an interest, and if you have an interest how do you make sure that there's no such thing as conflict of interest?

MS OH: Susan Oh, for the record. So we do have criteria on membership, which I'll defer to Larisa to provide information on, and we do also have guidelines

internally on conflict of interest so that if there is, members are asked to disclose it prior to joining the committee.

MS LOGAN: Yeah, I can provide some additional information on the criteria of membership, if that's helpful. So anyone who's interested in joining one of our committees -- sorry, again, Larisa Logan, for the record -- new member applications are reviewed by the Chair of the Committee and the CSA Staff Project Manager, and decisions are made based on the applicant's expertise and the needs of the committee.

Various criteria are used to make these decisions so, as Susan mentioned, this includes primarily their relevant technical expertise, history of their participation or contributions, their availability and interest, having the time, being willing to commit the time and the effort required to participate actively in the committee.

As I mentioned, the needs of the committee, so the current size and membership if there's any, you know, specific needs in terms of expertise that's not currently represented on the committee.

We also consider geographic representation, as well as making sure that there is

opportunities for liaison with other committees, as I mentioned in my previous response.

THE PRESIDENT: Dr. Berube.

MEMBER BERUBE: Just a point of curiosity actually. Do you monitor your web stats at all? You must, eh? Right.

Just the nuclear side of this, the CSA Standards, how much of your download volume is actually international versus domestic, any idea?

MS OH: No, I don't think we have the information on that right now. We do have some stats around the view access of our standards. So I think based on the last several years we can say that there has been approximately 8,000 views to our view online standards.

MEMBER BERUBE: So what I'm curious about is is Canada right now leading agent in standards in nuclear at this point? Would you say that's true or where would you say you sit?

MS OH: Susan Oh, for the record. I would say our standards that we develop within our nuclear program really has more of the context of the CANDU technology. So we do know that there are other users internationally who do have CANDU technology or CANDU nuclear power plants that do use and reference our

standard.

But we also note that there are other types of nuclear power plants that are used internationally.

THE PRESIDENT: Dr. Demeter.

Okay. Well, thank you very much for that presentation.

This concludes the public meeting of the Commission for today. The meeting will resume at 9:00 a.m. tomorrow.

So thank you all for your participation.
Bonne fin de journée.

MR. LEBLANC: If anybody borrowed some interpretation devices, please don't forget to bring them back and get your ID card.

Thank you.

--- Whereupon the hearing adjourned at 4:03 p.m., to resume on Thursday, November 7, 2019 at 9:00 a.m. /
L'audience est ajournée à 16 h 03 pour reprendre le jeudi 7 novembre 2019 à 9 h 00