

**Canadian Nuclear  
Safety Commission**

**Commission canadienne de  
sûreté nucléaire**

**Public meeting**

**Réunion publique**

**October 25<sup>th</sup>, 2012**

**Le 25 octobre 2012**

Public Hearing Room  
14<sup>th</sup> floor  
280 Slater Street  
Ottawa, Ontario

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Mr. Dan Tolgyesi  
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Mr. André Harvey

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M. Jacques Lavoie

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Ottawa, Ontario

--- Upon commencing at 9:07 a.m.

**Opening Remarks**

**MR. LEBLANC:** Bonjour mesdames et messieurs. Bienvenue à la continuation de la réunion publique de la Commission canadienne de sûreté nucléaire qui a débutée hier en fin d'après-midi.

We have simultaneous translation. Please keep the pace of speech relatively slow so that the translators have a chance of keeping up.

Les appareils de traduction sont disponibles à la réception. La version française est au poste 2 and the English version is on channel 1. Please identify yourself before speaking so that the transcripts are as complete as possible.

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

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

Please silence your cell phones and other

electronic devices. M. Binder, président et premier dirigeant de la CCSN va présider la reunion publique d'aujourd'hui.

President Binder.

**THE CHAIRMAN:** Merci Marc. Good morning and welcome to the continuation of the meeting of the Canadian Nuclear Safety Commission.

Mon nom est Michael Binder, je suis le président de la Commission canadienne de sûreté nucléaire et je vous souhaite la bienvenue. And welcome to all of you who are joining us via a webcast or video conferencing.

I'd like to begin by introducing the Members of the Commission. On my right are Dr. Moyra McDill and Mr. Dan Tolgyesi. And on my left, Ms. Rumina Velshi and Mr. André Harvey. We have heard from our Secretary, Marc Leblanc. And we also have with us here today Mr. Jacques Lavoie, Senior General Counsel to the Commission. Marc.

**MR. LEBLANC:** As stated yesterday, the *Nuclear Safety and Control Act* authorizes the Commission to hold meetings for the conduct of its business. The agenda was approved yesterday.

Please refer to the agenda 12-M52.B for the complete list of items to be presented today. In addition

to the written documents that have been reviewed by the Commission for today's meeting, CNSC staff and licensees will have an opportunity to make presentations and Commission Members will be afforded an opportunity to ask questions on the items before us.

Mr. President.

## **7. Update on an item from a Previous Commission proceeding**

### **7.1 Status update on the CNSC Action Plan Lessons Learned From the Fukushima Accident**

**THE CHAIRMAN:** Okay. So the next item on the agenda is a Status Update on the CNSC Action Plan: Lessons Learned from the Fukushima Accident. Now this is outlined in CMD 12-M56.

We have in attendance also a representative from Health Canada, Public Safety. And I understand also there are people from Bruce Power who will tell us a little bit about their Huron Challenge and maybe other people that I maybe will introduce later on.

But first, let's hear from the CNSC and their presentation. And I understand that Mr. Jammal, you

will make the presentation. Please proceed.

**12-M56**

**Oral presentation by**

**CNSC Staff**

**MR. JAMMAL:** Thank you, M. le président et puis bonjour à tout le monde, surtout Membres de la Commission.

For the record, my name is Ramzi Jammal, Executive Vice-President and Chief Regulatory Operations Officer of the Canadian Nuclear Safety Commission.

The presentation today is in support of CMD 12-M56 which is before you. The CMD addresses the External Advisory Committee recommendations and the Commission's direction arising from the May 3<sup>rd</sup> Commission meeting.

The details of the review and their outcome will be presented in greater detail shortly by Mr. Peter Elder who is on my left, the Director General of Directorate of Nuclear Cycle and Facilities Regulation and Dr. Greg Rzentkowski, Director General, Directorate of Power Reactor Regulations and Chair of the CNSC Fukushima Task Force.

Also present with us this morning, the CNSC

team who contributed to the CMD. And I would like to commend then publicly, Ms. Nathalie Riendeau, Senior Project Officer at DNCFR who put this together.

Around us, Mr. Marc Dallaire, Director General, Regulatory Policy Directorate, Ms. Kathleen Heppell-Masys, Director General, Directorate of Safety Management, please put your hands up, and Ms. Sunni Locatelli, Director General, Strategic Communications Directorate. Some of my colleagues, probably it's the first time before the Commission.

So the presentation will conclude with viewing of a video simulation that postulates accident progression to address the Commission's directions to staff. And the intent of this video is to enhance communication and public education based on factual information.

I would like to start with a slide. With this slide is a brief review of the chronology arising from the March 2011 Daiichi Fukushima accident. On March 17<sup>th</sup>, 2011, the CNSC issued directives requiring all nuclear power plants and its licensees to review initial lessons learned from the accident in Japan and to re-examine the safety cases of the nuclear facilities.

A similar directive was issued a few days later to all major nuclear facilities in Canada. All

licensees were requested to report on implementation plans for the short-term and long-term measures to address any significant gaps that were identified.

Under my authority on April 19<sup>th</sup>, 2011, the CNSC Task Force was formed to evaluate operational, technical and regulatory implications of the accident. The Task Force also considered available international reports on lessons learned and developed safety review criteria.

On August 19<sup>th</sup>, 2011 the President of the CNSC formed an independent External Advisory Committee which reviewed the CNSC actions and response to the Fukushima event and reported its final findings in April 2012.

The Task Force report and the CNSC Action Plan were subject to three rounds of public comments. The CNSC to date is the only regulator in the world who has subjected its Action Plan to public comments. The CNSC Action Plan was revised in accordance with the comments received and was presented for the Commission acceptance on May 3<sup>rd</sup>, 2012. The Commission adopted on June 21<sup>st</sup> the Action Plan.

The CNSC management has accepted the conclusions and recommendations of the CNSC Task Force, took into consideration public stakeholders review and

comments, accepted the conclusion and recommendations arising from the IAEA IRRS review follow-up mission that was took place right after the event, in addition, other recommendations from the External Advisory Committee.

The External Advisory Committee recommendations are complementary to the Task Force recommendations. The CNSC management again accepted the EAC conclusions and recommendations and the CNSC Action Plan has been revised accordingly.

Alors maintenant, je cède la parole à M. Peter Elder.

**MR. ELDER:** Thank you and good morning Members of the Commission. The next part of the presentation will discuss three of the recommendations from the External Advisory Committee that did not map directly into the Task Force recommendations.

As we had presented in May and again in August, most of them did map directly into the Task Force recommendations and Mr. Rzentkwski will give you updates on the overall Task Force.

The first recommendation was that for the CNSC to explain to the public the approach taken for other nuclear facilities, not just the nuclear power plants. The Advisory Committee did note that these had been discussed on a case-by-case basis during licence renewals

and information updates to the Commission, but requested that an overview of the approach be given.

Therefore, I do not plan to go into the details on each facility, but rather review their approach for these facilities and also discuss some international benchmarking around them.

The second part will look at how human performance and organization performance lessons from Fukushima were being incorporated into the CNSC Action Plan. Again, this was another recommendation from the Advisory Committee.

And finally, there were recommendations about communications and public education that I will discuss.

So as Mr. Jammal has mentioned, directives were issued in March 2011 to fuel processing facilities, the major nuclear substance facilities, research reactors, accelerators, and uranium mines and mills to review the initial lessons learned from the Fukushima nuclear accident and to reassess the safety cases for their facilities in light of these lessons.

All licensees responded to the CNSC request. They addressed their respective nuclear facilities for a wide range of external hazards, including greater than previously assessed seismic flooding,

tornadoes, extreme weather and other transportation hazards, and these were submitted to the CNSC as well as their plan to enhance the safety of the relative facilities.

CNSC staff adapted the task force approach, taking into account the differences in the facilities, the licence activities and the nature of the hazards, while remaining consistent to the general approach of the task force.

To give you an example of what we mean in the different nature of hazards, most of the research reactors in Canada are of the Slowpoke design and operate at a maximum power of 20 kilowatts thermal. This is roughly equivalent to the power of one CANDU bundle after immediate discharge, so not while it's operating just after it's come out of the reactor. So it's many order of magnitude lower in power than a power reactor and therefore the radioactive inventory of these reactors is also much smaller.

Similarly, many other facilities only deal with natural uranium where there is no possibility of nuclear criticality or a nuclear related accident. Most of the -- in this case you're dealing with environmental effects of uranium, natural uranium in the environment.

Regardless of these differences, CNSC staff

followed the same defence in-depth approach for reviewing all facility safety cases. First, verifying that the safety cases adequately addressed external events, including the beyond design basis events, and second, considering measures to mitigate an accident at the facilities, such types of accidents at the facilities to ensure protection of the public and the environment.

This table shows how the task force approach was modified to fit the other major facilities. The first five task force recommendations, which deal with strengthening defence in-depth and enhancing emergency response, were approached as two review topics rather than five separate topics. However, you can see that we did consider more detail where warranted by the facility.

CNSC staff verified that the safety cases adequately address external events, again including beyond design basis. CNSC staff also considered that for each major facility the measures in place to prevent or mitigate the progression of an accident, if appropriate, as well as emergency response capabilities for extreme external events.

Four, you note that for the task force had many recommendations related to the regulatory framework and overall emergency management. For these other facilities CNSC staff did not reassess these types of

recommendations, rather we accepted that these recommendations and are applying them in a graded manner to all facilities through our improvements to the regulatory framework and the emergency management approach. So rather than recreate them we just accepted them and said yes we will apply them where it's appropriate.

So CNSC staff has been using these results of these reviews in our licensing process for the last year. The Fukushima lessons learned have been factored into licence renewals of Chalk River Nuclear Laboratories, Cameco's three fuel cycle facilities, the TRIMPF and Canadian Light Source Accelerator facilities, as well as in the 2011 mid-term reviews of uranium mines and mills. And, as well, we also discussed them again at Mclean Lake hearing yesterday.

Many improvements have already been put in place. For example, AECL, for Chalk River Laboratories, has already attained three additional portable diesel generators that can add as additional supply of emergency power to any facility on the Chalk River site. Cameco and AREVA have enhanced their emergency planning for uranium mines and mills to fully -- more fully cover multiple events. And then we again, this was discussed a bit yesterday.

But I'd also like to note that some of these improvements were put to the test this past summer where the emergency plans were able to -- were successfully able to deal with an off-site power outage in the middle of a whole site evacuation at the Rabbit Lake mine and mill due to a nearby forest fire and they were able to successfully evacuate the whole site within three hours, even with a power failure in the middle of that evacuation.

So the staff reviews have confirmed that there is no facility where extreme external event could cause a consequential severe nuclear accident, which is a possibility in the power reactors, with exception of the Chalk River -- the nuclear NRU reactor at Chalk River. In most cases, for example, the uranium mines and mills and the waste storage facilities, extreme external event would not result in any off-site consequences. There would be some on-site consequences but there is no predicted off-site consequences.

CNSC staff conclude that the safety cases for these facilities are valid and the facilities remain safe and do not pose a risk to health and safety of the environment or Canadians.

Nevertheless, like any such review, the licensees have identified improvements to the facilities

equipment and emergency response plans to augmentate or enhance the robustness of the respected facilities and to strengthen emergency response.

As I've mentioned, implementation of these improvements is already underway and they include revisions to emergency response plans, upgrades to equipment and additional analysis to make sure that beyond design bases are fully covered. Implementation is being tracked and verified by on-going CNSC compliance activities.

I did note that NRU is a special case, and in this case AECL is being required to develop severe accident management guidelines for NRU similar to those being developed for the NPPs. The approach for Chalk River was discussed in detail during the 2011 licence renewal and all improvement actions arising from the Fukushima reviews were incorporated into AECL's integrated invitation plan for improvement, a comprehensive improvement plan to address the findings of the integrated safety review of NRU.

This execution of this plan was included as a licence condition in Chalk River's licence and CNSC staff are providing -- will be providing annual updates on this plan and all of Chalk River at the annual Chalk River progress report due in early next year.

So in terms of international benchmarking, I'm going to cover quickly the international benchmarking for facilities other than nuclear power plants, and Mr. Rzentkowski will talk about the other ones later in the presentation.

CNSC staff have been conducting international benchmarking on these facilities as information has become available. To date the benchmarking is confirmed that the CNSC took a very broad approach to the lessons learned, included in its review facilities like uranium mines and very low power -- very low research -- very low power research reactors, like the Slowpokes, that were not included in reviews anywhere else in the world.

The benchmarking did not reveal any gaps in the CNSC approach, and while there were variations in approaches used the CNSC approach is in line with the world best practice.

We also note, like as with all events like this one, there will be continued opportunity to enhance international benchmarking, and especially we feel efforts to enhance international guidance and make sure the international guidance and standards reflect these lessons learned and we feel that there's a very special role in enhancing the guidance on research reactors and we will be

working with the international community to make sure this happens.

I'd now like to turn to the second point I was going to discuss, and this is how human and organization performance considerations were taken into account. And we note that these factors are important to special implementation of many of the CNSC staff force recommendations. So rather than view this as a separate factor these factors were included into the other processes, and I'll give you some examples.

So we are -- so to address this recommendation and to ensure that human organization performance issues are considered and appropriately integrated, staff has explicitly stated that -- these criteria in three areas.

First, such considerations will -- are integrated into the closure criteria expectations for the site specific actions. For example, they will be -- when staff is reviewing training on -- when looking at enhances to emergency response and the use of new equipment, staff is reviewing the training and the performance considerations around procedures and use of the equipment to show that not only do you have the equipment but that it can be successfully used.

Second, as has been normal practice, when

CNSC staff review licensees programs and updated programs, the human factor and organizational factors will be considered in the review as appropriate and in evaluating measures proposed by the licensee.

Similarly, such factors are being integrated into several new CNSC regulatory documents. For example, there will be explicitly a human factor and organizational factor components to a new regulatory document on severe accident management programs for nuclear reactors.

For many years CNSC has been fostering a healthy safety culture in licensees' organizations. The recent publication of a discussion paper entitled "Safety Culture for Nuclear Licensees" presents the CNSC's proposed approach to continue to enhance the safety culture in the Canadian nuclear industry. With this paper, CNSC intends to clarify the safety culture requirements and language or definitions, set out explicit requirements and expectations for safety culture self-assessments, and clarify the role of both the CNSC and licensing in this regard.

When developing the final regulatory documents that we expect to come from the discussion paper, all lessons learned from Fukushima events will be included and focus on enhancing safety culture and in

reducing the likelihood of human errors in nuclear stations.

The third area I'd like to discuss is on communications and public information. There was a very broad recommendation to continue to enhance our public information efforts and some very specific ones. So I just note that CNSC strive to ensure that all of our material on our web is in clear and simple language. Our website is regularly updated to correct any misinformation circulating in the public domain. And finally in -- and there is also continuous improvement to this information. In 2013 the site will be redesigned and to -- with a focus on improved navigation and making sure that it follows the consistent Government of Canada approach to websites.

We've also, since the Fukushima, made better use of social media as a tool and, for example, our -- in February of this year we launched a Facebook page. And finally we have -- also going ahead with a YouTube channel and a CNSC YouTube channel will soon be launched.

We also -- in terms of preparing for a potential nuclear accident in Canada, the CNSC has developed a crisis site -- website which is a non-visible site that is prepopulated with as much basic information on such emergencies. And this -- such a site is activated only in the event of an emergency that would propose a

significant risk to Canadians or the environment. So there's a backup -- this is a backup site that is available to replace our normal site with information focused on an accident scenario. This site is available to be used if required.

With respect to other initiatives, we continue to work on educational resource pages. They're on our website, they are geared to students and we are also continuing to partnership with the universities like the Canadian Science and Technology Museum's, "Let's Talk about Energy Exhibition". And we continue also to look at exploring further partnerships in these areas, and one of them would be with the Science Media Centre of Canada to make sure that journalists -- that helps journalists report on science issues by connecting them with CNSC subject matter experts.

We also -- efforts have also been made to increase the number of trained media spokesmen. So we have identified media spokesmen for accidents and we are continuing to train them and also to expand the number that are available in these positions.

So one other thing we like to do, and as mentioned, in August CNSC staff had discussed with the Commission the potential projection of a severe accident for a CANDU reactor following an extreme event and the

enhancement made after Fukushima to stop such an accident projection. We initially thought that this is best to present to the public as a flow chart as a communication tool, however, as Mr. Jammal has mentioned, we have since developed a short video that we will show at the end of this presentation.

So I will now turn the presentation over to Mr. Rzentkowski.

**MR. RZENTKOWSKI:** Thank you, thank you very much Peter. Good morning Mr. President and members of the Commission.

You may recall from my previous presentation that the post Fukushima review has examined events more severe than those that have historically been regarded as credible and their impact on the nuclear power plants. Based on this review and extensive consultation with stakeholders and the public, the CNSC issued its action plan to further enhance the safety of nuclear facilities in Canada and reduce the associated risk to as low as reasonably practical.

My update today will focus on those elements of the CNSC action plan that relate directly to strengthening reactor defense, onsite and offsite emergency preparedness enhancements and regulatory framework improvements.

Additional consideration of note for this status update relates to international benchmarking of lessons learned from the Fukushima nuclear accident that were undertaken by CNSC staff to measure Canada's effectiveness and determine whether any gaps had been overlooked.

In my August update to the Commission, I describe a single bounding accident referenced scenario representative of the events at Fukushima which was selected by the task force to assess robustness of the CANDU NPP design through analysis of accident progression and timing and the likelihood of radiological consequences.

This referenced scenario postulates a total station blackout, leading to a total loss of heat sinks attributed to an external event such as earthquake or severe weather. The total station blackout occurs when all of the power sources used to cool the reactor, including grid power, standby generators, and emergency power generators are unavailable. The loss of heat sinks means the plant is no longer able to remove heat from the reactor fuel which remains hot even after the reactor has been shut down.

It is important to stress that the likelihood of occurrence of this postulated scenario is

extremely low given the redundancy, separation and diversity of special safety systems and their power supplies that are already part of the design of CANDU nuclear power plants and which ensure that there would be no radiological consequences for all credible events.

Nevertheless, to further minimize the risk of extremely unlikely events, examination of unmitigated accident progression for the bounding accident scenario reveals that there are multiple means of enhancing reactor capability to cope with the prolonged station blackout.

Here I will briefly describe the additional measures which will add to the operator's ability to prevent, slow down, or arrest the progression of the accident and thus enhance the effectiveness of the fundamental safety functions of the reactor.

First, control of the reactivity is achieved automatically by two independent shutdown systems that terminate the fission process and safely shutdown the reactor. Both systems are fast-acting and do not require power supplies. Assessment confirmed that no further improvements are required.

Second, cool or remove heat from the core is enhanced by providing additional sources of water, such as make up water to steam generators to prevent fuel failure by maintaining the heat removal capability of the

steam generators which in turn maintains natural circulation of coolant through the reactor core. Make up water to calandria vessel to prevent fuel channel failure and consequential core damage by keeping the fuel channel submerged to maintain heat removal. And also, make up water to calandria vault or shield tank to prevent calandria vessel failure by keeping its bottom submerged to maintain heat removal.

Third, contain or confine radioactivity is enhanced by preventing containment failure by the installation of a filter containment vent system to reduce pressure build up in containment and prevent uncontrolled release of radioactivity, and also the installation of passive hydrogen recombiners to reduce hydrogen concentration in containment.

Progress on the implementation of this preventive measures by licensees is on track. Once implemented, a multitude of additional accident prevention and mitigation systems would need to fail for serious radiological consequences to occur following a beyond design basis accident.

In the postulated accident video to be shown at the conclusion of this presentation you will see how automatic or manual intervention at any stage of the accident will arrest its progression.

I hope that this video will help the Commission to visualize the progression of events.

However, before I leave this slide I would like to describe, very briefly, the scenario, I hope, in simple terms.

It takes a natural disaster of an extreme magnitude to disable all safety systems of the reactor. However, the reactor will safely shut down two seconds after loss of power.

About two minutes into the accident the water in the pressure tubes or fuel channels will start to boil. This, in turn, will trigger natural circulation in the primary heat transport system.

This natural circulation can be maintained for approximately five to seven hours. In the meantime, however, the operators will depressurize the secondary system in order to allow for the gravity feed from derators. This gravity feed can extend natural circulation to approximately four days.

Nevertheless, there is also an emergency crew which will install hoses and connect the hoses to portable pumpers. This can provide the makeup water to the steam generator for as long as required to restore -- to restore the electricity at the site.

So this is a very important point to

remember when we watch the video.

And the effectiveness of emergency crew was demonstrated last week and it was demonstrated by Bruce Power that portable hoses and pumpers can be put in place in approximately one hour.

The effectiveness of natural circulation has been already demonstrated also under accident condition. A few years ago -- a few years ago in India there was an accident and natural circulation was maintained by providing make up water to the steam generator for approximately 17 hours.

Let me move to the next slide.

Notwithstanding the preventive measures discussed in previous slides we have to be prepared to expect the unexpected. Therefore, nuclear power plant licensees are also taking measures to enhance onsite emergency preparedness and response as part of the Fukushima follow-up activities to protect the public from potential release of radioactive materials.

I will now describe briefly the measure being undertaken by all licensees who remain on track to meet all actions by December 2012.

First, the incorporation of beyond design basis accidents consideration and severe accident management guidelines in onsite emergency plans that take

into consideration specific provision for multi-unit events and spent fuel bays is well advanced.

Second, comprehensive assessments of back-up power and telecommunications requirements are completed by all utilities. The implementation of enhancements includes the following: provision of portable back-up cooling to critical loads; power to emergency response equipment and interim or permanent storage of emergency mitigating equipment.

Third, activities to address requirements for formalizing arrangements and agreements for external support including; a formal mutual aid agreement signed by all Canadian utilities which is fully enforced; a formal memorandum of understanding or agreements with municipal and provincial authorities; and the creation of an Ontario-based regional emergency response support centre by OPG and Bruce Power that would be available to every Canadian utility.

The main goal of the support centre is to have emergency mitigating equipment that can be safely stored offsite and readily available if needed.

Fourth, the licensees are proceeding with the installation of automated realtime station boundary radiation monitoring systems with appropriate back-up power and communication systems.

The status of deployment of real-time station boundary monitoring can be summarized as follows: OPG has completed the installation of automated realtime gamma radiation monitoring systems; New Brunswick Power is implementing fast realtime monitoring system and realtime gamma radiation monitoring systems at site boundary; and Bruce Power is scoping specification for realtime gamma radiation monitoring system at site boundary.

Lastly, licensees are also developing source time estimation capability, including dose modelling tools for decision making purposes.

In the area of enhancing offsite emergency preparedness close collaboration between emergency management organizations at the municipal, provincial and federal level is essential.

Several initiatives have been undertaken and progress is being made towards completion the task force recommendation by December 2013.

First, national level oversight of offsite processes are being reviewed to ensure good coordination of response efforts at all levels of government, particularly in regard to Health Canada and Public Safety Canada.

Second, revisions to national nuclear emergency plans, programs and performance are being

undertaken to consider the integration of federal nuclear emergency plan and federal emergency response plan and also to improve the coordination of stakeholder planning and response organization to provide high-level guidance.

Third, full-scale provincial exercises were held in New Brunswick, involving Point Lepreau, and in Ontario, involving Emergency Management Ontario, Bruce Power and non-governmental organizations.

Representatives from Bruce Power may elaborate further on this exercise during the question period.

A full-scale federal exercise is being planned for 2013. The CNSC is committed to provide assistance to Health Canada in all phases of planning for this exercise.

In the area of improving regulatory framework and processes, CNSC staff are advancing well on our commitments in the action plan to address the recommendations of the Fukushima task force. We remain on track to meet all actions by December 2013.

First, in respect to updating regulatory documents CNSC Staff has made significant progress through the omnibus amendments to cover a wide variety of existing documents to incorporate Fukushima's specific concerns identified by the task force.

They include the deterministic and probabilistic safety assessments, severe accident management and environment and monitoring. The draft amendments were released for an extended public consultation this past summer, taking the unique approach of providing rationales for the proposed changes linked to the Fukushima task force.

It is expected that we'll present the revised documents to the Commission for approval in mid-2013. In addition proposed revision to RD-337 for design of nuclear power plants and its guidance were also released for public comments this summer and are on a similar schedule.

Moreover, proposed amendments to Class 1 regulations to include the submission of off-site emergency plans, and radiation protection regulations to address dose limits during emergency have been initiated by CNSC staff already.

Second, as the CNSC continues to modernize the regulatory framework it has become standard practice to review lessons learned from the event at Fukushima Daiichi to ensure they are taken into account.

New documents that have been published by the CNSC include guidance and safety analysis for nuclear power plants as well as requirements and guidance for

public information and disclosure.

In addition, the development of new emergency preparedness and accident management documents are ongoing and expected to be issued for public consultation later this fall.

Third, the CNSC is supporting the Canadian Standard Association's initiative to review current standards, and to develop a new standard for emergency management for the nuclear sector.

Fourth, new licence conditions have been developed for inclusion in power reactor operating licences, addressing our commitments to develop conditions for accident management programs and public information programs.

These are planned to be discussed during the Darlington licence renewal and will be included in the new operating licence, following approval by the Commission. The exact wording for this licence condition is being finalized by CNSC staff.

Lastly, discussion within the industry to implement periodic safety reviews, identified by the task force as a means to enhance regulatory oversight, have been initiated by CNSC staff.

A high level periodic safety review working group has been formed to establish strategy for periodic

safety review integration into the current licensing regime for nuclear power plants.

International benchmarking activities were conducted in parallel to the task force review of the lessons learned from the Fukushima nuclear accident. This was to ensure gaps were not overlooked and efforts are being made -- were consistent with ongoing international initiatives.

This slide briefly highlights some of these activities which focus on the outcomes of international meetings in which the CNSC took a leading role to enhance international cooperation.

Of special note, Canada participated in the second extraordinary meeting of the convention on nuclear safety in August 2012, to discuss with international peers lessons learned from the Fukushima Daiichi accident.

The objectives of the meeting were to enhance safety through the reviewing and sharing of lessons, and actions taken in response to the accident.

The CNSC led a strong Canadian delegation made up of representatives from industry, Health Canada and Natural Resources Canada.

One of the main conclusion of the extraordinary meeting was that the international approach was consistent, that is, the review methods differed, but

the results were similar.

The CNSC will continue supporting international initiatives and is providing a CNSC expert beginning in January 2013 to support the IAEA Director General's action plan on Fukushima.

Furthermore, the CNSC will be taking part in a ministerial conference in Japan in December 2012, and Canada will be hosting an IAEA conference in April 2013 in Ottawa on effective nuclear regulatory systems.

As more lessons continue to emerge from analysis of the Fukushima accident, the CNSC will assess their impact on the action plan and where practicable build on its existing initiatives to strengthen any measures that will lead to improve best practices and enhance global nuclear safety.

I will now turn the presentation over to Mr. Ramzi Jammal.

**MR. JAMMAL:** I would just like to conclude with conclusion recommendations.

The CNSC staff concludes that no new recommendations result from the safety reviews conducted for the major facilities, other than NPPs, and so, our review is on the international benchmarking undertaken by Staff.

So hence we conclude again that the

amendments to the Fukushima task force recommendations are not required, however we recommend for the sake of completeness of the documentation that the measures and action items described in this presentation, in the CMD, to be included as a separate annex to the CNSC action plan.

Again, the action items pertaining to major facilities other than NPPs, we're requesting your approval to be appended to the action plan in order to have a full overview.

Through these actions, all recommendations raised by the external advisory committee are now fully addressed, in our opinion. So we believe the CNSC in Canada is be amongst international leaders in its response to the lessons learned at Fukushima. We are the most transparent.

In addition, that the implementation of measures to strengthen defence in depth, enhance emergency preparedness and improve the regulatory framework and processes.

As we learn, and lessons continue to emerge from nuclear accidents the CNSC will assess their impacts and where applicable will build on these initiatives and will lead and continue our enhancement and our oversight.

Again, I would like to stress that we are

to-date on track to meet all of the actions set out in the action plan, and Staff, we will continue to provide the Commission annual updates in August of each year on the progress by both licensees and the CNSC on the implementation of the action plan.

So in other words, in August of each year you will have a collective update with respect to the overall action plan encompassing both nuclear power plants and all the other major facilities.

Before the final conclusions I would like to pass it on to Ms. Sunni Locatelli, she is the Director General Communications Directorate, who will provide the context for the video simulation of postulated accident progression.

Sunni, over to you.

**MS. LOCATELLI:** Thank you, Mr. Jammal.

Good morning Mr. President and Members of the Commission. My name is Sunny Locatelli, I am Director General of the Strategic Communications Directorate.

I now have the honour of introducing the video you've heard so much today. At the May Commission meeting it was recommended that we develop a flowchart to illustrate the sequence of potential events during and immediately following an extreme accident scenario at a Canadian nuclear power plant.

In August you will recall we discussed an accident progression timeline and safety systems. Since then Staff have developed a video and I would like to thank everyone involved who contributed the many hours in making this happen.

The video will show a sequence of a potential blackout at a generic CANDU nuclear power plant, and how the mitigation measures from each of the safety functions would be invoked. It is important to note that the progression of events described in the video is highly unlikely. I cannot stress that enough. CANDU reactors have engineering features to bring the situation under control at each stage -- at each individual stage of the event.

Because the video is generic to all CANDU reactors, it does not include specific time indicators, but viewers can be assured that it would take many days for an unlikely scenario such as this to take place.

The video would be posted on our website and our soon to be launched YouTube channel in the weeks to come. The video is approximately 11 minutes long and I'll ask that the video run now. Thank you.

**(Video presentation/Présentation vidéo)**

All nuclear power plants in Canada use CANDU reactors, a safe, reliable reactor design that has

multiple safety systems to minimize the likelihood of an accident, and in the unlikely event that an accident occurs, minimize its consequences.

To do this, nuclear power plants have several safety systems that act as backups to each other. These systems perform three fundamental safety functions: controlling the reactor and shutting it down, cooling the reactor and containing radiation.

But first let's look at how a nuclear power plant works. Nuclear reactors produce heat by splitting uranium atoms. This produces heat to convert water into steam which spins a turbine or generator to make electricity.

To help you understand the safety systems, let's look at an extremely unlikely accident scenario where there is a total station blackout.

A total station blackout is when there are no longer any power sources available. It's important to note that this type of accident would take several days to develop and is extremely unlikely given the safety systems in place.

When offsite or a grid power is lost, the station itself produces enough electricity to maintain all of its systems. At a multi-unit nuclear power plant, one reactor can provide enough power to maintain all of the

other units.

If onsite power is also lost for some reason, the shutdown systems are activated automatically and the reactor stops within two to three seconds.

CANDU reactors have two independent fast-acting shutdown systems that work without requiring power or worker intervention.

Natural circulation takes over when the pumps that normally push the coolant through the heat transport system lose power and stop working. For natural circulation to continue over time, the steam generators need to be filled with cool water.

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The standby power generators operate pumps that provide this cool water to the steam generators. All plants have three or four standby power generators. Only one or two are actually needed, depending on the size of the nuclear power plant.

If for some reason standby power generators stop working, emergency power generators are then used. All nuclear power plants have at least two emergency power

generators onsite but only one is required to provide enough electricity to power all of the important safety systems.

At this point to maintain natural circulation, pressure relief valves on the steam generator system are kept open to remove heat. The steam that is vented into the environment is clean and not radioactive. Water continues to be added in the steam generators by pumps powered by the emergency power generators. Together, the pressure relief valves and the added water maintain natural circulation to safely cool the reactor.

Though unlikely, let's keep going and assume the emergency power generators stop working. We now have a total station blackout. This means all power sources used to cool the reactor, including offsite power, onsite power, and the standby and emergency power generators are all unavailable.

Water is now being added to the steam generators by a gravity-driven system connected to a reserve water storage tank. This keeps enough water in the steam generator to maintain natural circulation. This also gives time for emergency mitigation equipment to be put in place.

Emergency mitigation equipment includes portable pumps and power generators. These are used to

add water directly into the steam generators and ensure vital monitoring equipment is available. This is a new layer of protection that was added to Canadian nuclear power plants as part of Canada's response to the 2011 accident at Tepco's Fukushima Daiichi Nuclear Power Plant.

It is important to remember that up to this point there has been no damage to the reactor and there have been no releases of radiation into the environment. With the situation under control, the reactor can return to normal operation after a number of safety checks are performed.

Though extremely unlikely, let's say that all of these systems fail; the emergency mitigation equipment stops working and the water in the steam generators evaporates. The heavy water in the heat transport system starts to boil and radioactive steam is released and contained in the reactor building. Once the water in that system boils away, there is limited fuel damage.

If nothing is done at this point, the 250,000 litres of heavy water inside the calandria starts to heat up. The calandria is what holds the fuel.

Supplying water to the calandria using emergency mitigation equipment or fire trucks would stop the accident.

Assuming the accident is not stopped, the reactor begins to overheat and the heavy water boils away. Radioactive steam is released automatically into the reactor building. The fuel continues to overheat and the reactor is significantly damaged.

At this point internal pressure inside the reactor building must be lowered. In a single-unit station internal pressure is lowered by spraying water from the dousing tank. In a multi-unit station pressure is lowered by releasing steam and hot gases from the reactor building to the vacuum building. The vacuum building is a structure specifically designed to quickly and safely lower pressure inside the reactor buildings. Both systems work without power.

Supplying water to the calandria using emergency mitigation equipment or fire trucks would stop the accident.

Assuming the accident is not stopped, all remaining heavy water evaporates. The exposed fuel begins to melt and the reactor core starts to collapse inside the calandria. The vault that holds the calandria also holds about 500,000 litres of additional water. That water now starts to heat up.

When nuclear fuel melts it creates hydrogen, an explosive gas. Hydrogen is converted to

water to reduce the risk of explosions.

At this point, to protect the public, health officials have evacuated the area to prepare for control venting of either the vacuum building or reactor building. Controlled filtered venting lowers the internal pressure and reduces the amount of radiation being let out into the environment.

Again, supplying water to the calandria and vault using emergency mitigation equipment or fire trucks would stop the accident.

After the accident, recovery operations would begin to secure the site for its eventual cleanup and decontamination. The damaged reactor building continues to isolate and contain the reactor from the environment until the site is decommissioned.

The Canadian Nuclear Safety Commission regulates the use of nuclear energy and materials in Canada to protect the health and safety of Canadians and the environment.

We ensure every nuclear power plant meets rigorous safety and operations standards to prevent accidents in the first place, and should one occur, minimize its consequences.

**MR. JAMMAL:** So now staff are available to answer any questions you might have. Just one comment

that I would like to make; that the work to date, such updates -- it's been 18 months, work by CNSC staff and the licensee and -- so we're available to answer any questions.

**THE CHAIRMAN:** Well I like the video, just to let you know. For the first time I'm starting to understand how things really works.

But before we get into the detailed questioning, I think it's a good time for us to hear from Bruce Power about the Huron Challenge Emergency Planning Exercise. And I understand Mr. Saunders is here to share with us some of the preliminary results I guess.

**MR. SAUNDERS:** Good morning. Frank Saunders, for the record.

I have with me Wade Lacroix who's our -- the Chief of our Emergency and Protective Services Division, and Steve Cannon, who is a Lead in the Huron Challenge Exercise, in case you have questions.

We did bring a short video with us, what I think kind of captures it. The video was obviously put together fairly quickly since the exercise was only last week so, but I think it does capture it fairly well.

But if I can, I just have a little context for you before you get into the video.

The -- you know we've heard a lot about the

nuclear plants and obviously the mandate of this Commission to look at it and certainly in the press, a lot about the nuclear plants. But the event itself was a very significant compounding issue in terms of the plant.

So first I'll sort of take you back to March of last year, about 3 o'clock on a Friday afternoon, quarter to three to be precise I think, when the earthquake occurred and had a pretty major impact on that northeastern area of Japan.

Three minutes later their tsunami warning sounded; 20 minutes later they had their emergency centre staffed, so they were very quick, and not just the nuclear centres but just the general emergency centres.

About 18 minutes later when the seven waves rolled ashore -- several of those waves are in the 40 to 50-foot height range which I think you can imagine in any town or city what a 40 or 50-foot wave washing through it would do to it.

It was along a length of coastline about 200 kilometres long and these things penetrated up to 10 kilometres inland along the coast.

So the impact was devastating; there was approximately 20,000 people who were either dead or missing within minutes; several thousand more injured; about 130,000, 150,000 structures were pretty much just

disappeared. There was another almost million -- 950,000 structures which were damaged to some degree; roads were gone; a dam had collapsed; oil refineries were burning; fires and explosions in a number of places; communication towers were gone.

All those things which you normally count on to support what you're doing.

And right in the heart of this, in the middle of it were 10 nuclear units. Six of them at Daiichi, which we talk about a lot, four more which were just a few kilometres down the road, at Daaini actually, which you don't hear so much about, but were also in the middle of this.

So when we looked at what we needed to do in terms of demonstrating the response to Fukushima we also considered the external events that were going on at the plant at the same time.

I do want to commend Ontario and Emergency Management Ontario for the foresight, I think to look at - - look at that broader context, not just at the nuclear plants themselves but at the broader community context.

So Huron Challenge or Trillion Resolve -- another name we use for it -- covered about 10,000 square kilometres, involved about 1,000 participants. Well, over 1,000, we tried to do a count by there were so many

involved we couldn't quite get all the numbers.

In the end of the day we ended up with about 73 different municipalities, agencies, government agencies and others. It was a very large undertaking over four days, played out in realtime.

The video, because we were sort of short on time, focused on the Bruce Power stuff and also of course that's primarily the mandate of the Commission, but we will be doing a longer video which looks at the overall context.

So the voice on the video is really just the voice from the exercise, there's no commentator, so where appropriate I'll stick in the odd comment if I think it's not clear where they're at.

**MR. SAUNDERS:** This trailer with the sign, by the way, is actually a mobile AM broadcast facility and it was broadcasting the signal at the time.

These are municipal fire fighters at Bruce Power.

The sequence is about 10 minutes in realtime and it's Bruce A.

The things on the left are the dry hydrants that we sometimes talk about.

This is suction for the water from the lake.

These are the hoses that are being laid.

While we're doing this, the plant operations are aligning the plant to accept this water.

These are security personnel bringing the generators into place, 400 kilowatt at Bruce A. You probably note the hoses are colour-coded; black is going to the steam generators.

This is the power cable running down to the secondary control area.

We did pressurize the hoses but of course we really didn't want to put water in the reactor so even though the hoses are pressurized for putting the water back out to the lake.

On an exercise this large you have to control the exercise itself and this is the exercise control cell. And we use a company called Calian to do a lot of this work for us, to help us.

It took about 50 people just to do that, just to run the exercise.

For the first time in this exercise, we move the emergency worker centre in the middle of the exercise to test our ability to do that; moved it from Kincardine to Port Elgin. This is Port Elgin.

**(VIDEO PRESENTATION, Continued/Suite)**

Emergency respondent from a computer

screen, from a smartphone, from almost any device possible, can send a message to a national alerting system which is already in place. It's been set up, the CRTC has approved it and it's operational.

That message goes there and then the idea is to instantaneously send that message to all that infrastructure and have that message transmitted to people in the affected area immediately.

The exercise is really about how do we coordinate amongst not only us in the nuclear plants, but the communities and other things in the province and bring the resources to bear that we need.

**(END OF VIDEO PRESENTATION)**

**MR. SAUNDERS:** So as Bruce A or Bruce B fade into the sunset there, but -- so a couple of points. I think we learned a lot from the exercise, even though we'd obviously done these deployments many times before we did the exercise to get our -- I mean that hose trailer you've seen was actually about the third evolution to get the human factors right.

The hose is heavy and there's a couple thousand feet of it so part of the issue there was how do you do it safety without -- you know, and physically possible under a variety -- you know, it might be winter, it might be whatever. And so the trailer became the final

solution.

But integrating it all into an overall exercise was actually a very useful thing to do. And we will of course provide a detailed report on that, which you will see, and I won't go into all of that at the moment.

The one bit I thought would be worth mentioning a little is the public communications. We did trial, as you've seen there, just at the end, a number of different ways of talking to the public including our own AM/FM transmitter that we were broadcasting on. We did use Pelmorex as well, FM Alert and other things.

We found a number of technical issues there so we've -- with a number of other people in the industry and Industry Canada, we proposed a research project to look at those.

We also found some policy issues, which of course we'll bring up -- in a number of areas actually, not just here -- which we'll bring up and look for CSNC support to move them forward.

Simple things like in Canada, it appears that broadcasters are not mandated to carry emergency signals, they do so at their discretion. Some of them actually want to charge you for that. And I think if you're going to do it on a commercially-funded operation

across the country, it's going to be pretty patchwork.

So I think some of those kind of issues which showed up, also some of the issues around pollution control, one on large motors and stuff and how it works. So there's conflict between emergency rigs and some of the MTO rigs and other things, which I think we need to surface in -- part of the work we're trying to do through the CSA standard is to identify how you make those kind of decisions in an emergency so that you don't get hamstrung at the time.

So that ends the discussion. And if you have any questions, we're certainly willing to answer them.

**THE CHAIRMAN:** Okay, thank you.

I think we can jump right into a discussion session. And we do still have people from Health Canada here with us that will like to join into this conversation.

I understand that the people from Public Safety are no longer here, available, that's too bad. And we also have some people from OPG who can get into this discussion.

So let me start by asking Ms. Velshi to get us going.

**MEMBER VELSHI:** Thank you, Mr. Chairman.

So that was a whole lot of stuff and I'd like to start off by complimenting all of you. I found the Fukushima lesson status action report to be an excellent report. It was not only a really good read, but it was thorough, very clear, and extremely informative.

So compliments, Mr. Jammal, to you and your team for that. And I echo the President's sentiments on the video; I thought that was really good. And thank you Bruce Power for sharing that video with us.

I'll start off with my first round of questions and then come back and focus mostly on the Fukushima lessons learned plan.

And I know one of your recommendations is that we integrate the actions from the non-NPPs, and I think again for completeness sake, I think even if you added the EAC actions and show them as complete, it's nice to have one comprehensive document on all the actions taken as a result of the lessons learned in a dashboard that at any one time shows what the status is. I think that would be helpful.

My first question -- and I think it's an area that we discussed when we saw this action plan last -- is that we call it a four-year action plan and show all actions ending by 2015, I think. So if we looked at page 23 of CMD 12-M56, so this is for the NPPs and it's got the

13 recommendations and the long-term ending by December 2015. And then when we look at the table that shows each of the actions, again we see that many of the actions are -- you know, submit a plan and a schedule for completing the actions but the action itself may not be completed until much later than that.

So if I look at -- and maybe you can confirm that. But, you know, even if it's updating emergency facilities and equipment, by the end of 2013 is when the plan and schedule is due, not necessarily that the equipment is running and that you've tested and have verified that.

So I find this does not give a full picture of when is all of this going to be in place. So maybe I can start off with that. And maybe I've just not read it right, but if you can help me understand that.

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

Very much appreciate your comment, Ms. Velchi. Fully agree that we need to put one comprehensive document and it's a great idea to put the dashboard in order to provide you with a status update.

On the four-year action plan, 2015, as you correctly mentioned, at times the plans must be developed by a certain period of time and executions at multiple

levels, short-term, mid-term and long-term. And some of the long-term aspects -- some of the elements will require research activity in order to come to a conclusion with respect to what is the best way of putting in place the enhancements.

So, at a global level, that's where we are and that's what the table intended to present.

And I will pass it on to my colleagues, Dr. Rzentkowski, with respect to the specific action items per site, because each site has its -- of executing or implementing at a different rate.

**DR. RZENTKOWSKI:** Thank you very much, Mr. Jammal.

This interpretation is correct. In many instances we have to receive the plans for implementation of specific improvements. Those plans have to be developed mostly by the end of 2012. So it means at the beginning of 2013 we will be in a better position to provide the schedule for every single action.

However, based on discussions we presently have with the industry, I don't anticipate that any of the actions will extend beyond the end of 2016. However, it has to be understood that a lot of analysis is going into developing those action plans, and also some of the engineering will be extremely complex and because of that

the station will have to be shut down for a prolonged period of time. Of course, we don't want to shut down the station specifically for the installation of Fukushima enhancement; it should be combined with a planned maintenance of the facility as well.

So there's a lot of scheduling happening right now at the licensees sites. And how I mentioned in my response already, at the beginning of 2013 we'll be in a better position to define the schedule.

**MEMBER VELSHI:** Thank you. And I guess then what that leads to is that when we see the revised action plan it will bench all the subsequent actions and the timeline for those.

**DR. RZENTKOWSKI:** Yes, we will amend the action plan depending on the development, and I think we'll be in this position by mid of 2013.

**THE CHAIRMAN:** You did mention -- you did say December 2016. Where it says here December 2015 ---

**DR. RZENTKOWSKI:** It's ---

**THE CHAIRMAN:** --- in the plan.

**DR. RZENTKOWSKI:** Yes, the end of 2015 is to define all the actions and provide information in accordance with the acceptance criteria. Some of the acceptance criteria call for preparation or specific implementation plans. So only the implementation aspect

may eventually extend until the end of 2016. But it's really premature for me to say that as long as we don't have those detailed implementation plans from the licensees. We will have them early next year.

**MR. JAMMAL:** For the record, Ramzi Jammal.

Just to add -- to clarify what Dr. Rzentkowski is he's -- he's providing a forecast with respect to what's going to be done. However, I think it's very premature to really put the dates on. The intent out of the dates here is the take-off point. And we're going to amend them according to what we get, as we get more information. So it could be 2016 or it could be 2015, depending on the results and the assessment that staff is putting in place.

Even though the question's very, very valid, the intent of these dates is the take-off point, and then as we come before you with the updates we will inform you of the action items and the changes with respect to the timelines.

**MEMBER VELSHI:** In the international benchmarking there was discussion made on the EU stress test, and I think I heard it said that our approaches though different, the results were very similar. And we got an update yesterday on the EU stress test and I gather the conclusion was that there were hundreds of problems

found and it's going to cost billions of dollars to fix. And so if the results were similar, can you comment on what the Canadian picture is like and perhaps even give some indication of what it's going to take us to meet all our new requirements?

**MR. JAMMAL:** For the record, it's Ramzi Jammal.

There are a couple of things I would like to highlight on the EU stress test itself, and the report came out in the media unfairly stating that millions and billions is required in order to render the nuclear power plants in Europe safe. Everybody is missing the fact that we in our basis in Canada, we reviewed the safety case and the original safety case and we confirmed that the safety case is solid and robust in Canada and it's adequate for the existing facility. And we've taken what we considered as design basis and expanded this bubble to encompass some of the elements that we considered before "beyond design basis".

Now, that does not mean the existing reactors and the international benchmarking has indicated, there is enough adequate safety measures in place. Now the whole world and the nuclear industry is expanding with respect to the enhancement of safety. So that's what it means from safety enhancement.

Now, in Canada and specific, our licensees and, as a matter of fact, Canada, is leading in the execution in the implementation of the enhancement of the safety equipments if we can start on the short-term that can speak -- I shouldn't speak on behalf of the licensees, but we have the information that it's not cheap, it's costing in the tens of millions of dollars, and we can ask the licensee to confirm, not the number itself but if I am in the right ballpark.

So the issue here is in the messaging. It's -- we have a robust solid safety case; we are enhancing our safety case to encompass elements that we considered before "beyond design basis". In addition to it, it's continuation for the enhancement as we go along and learn from the lessons learned, from exercises, from emergency management, or even the venting of the power reactors, because in Canada again we -- in the Point Lepreau refurbishment, one of the filtered venting implementation has caused a lot of the international colleagues from the U.S. NRC to come and visit and learn about the retrofit aspect of an existing reactor for filtered venting. So we are executing at multiple levels and enhancing the safety, and that's where the messaging has to be all the time, it's safe, we're making it safer.

If I didn't answer your question I'll

expand more.

**MEMBER VELSHI:** No, it does answer my question, it's just that the reaction that I have seen, and perhaps it's just been the one sided on the EU, is problems found, but really what it is, is there opportunities for enhancement, and perhaps those opportunities is going to cost hundreds of millions of dollars.

**MR. JAMMAL:** For the record, it's Ramzi Jammal.

That's correct. And, as a matter of fact, on the EU stress test we have one of our colleagues, Mr. Garry Schwarz, who heavily was involved in the Romanian review of the EU stress test, and again in the reports itself it is not really mentioning the basis by which the industry took off from, its review and never -- you know, again it's all in the messaging, never said it was safe and we're making it safer. Just capitalizing on the fact you need to add things, hence it's not safe.

**MEMBER VELSHI:** My last question for this round is on your second recommendation that you come in front of the Commission every August to give an update. And given the timeline of the actions where end of the year seems to be when a lot of the actions are expected to be completed, I personally think it would be more

appropriate to come in the first quarter or before the end of the second quarter to give an update so that the information is more current.

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

I'll answer at two levels; first is the administrative aspect. The reason we're calling it for an August for -- to consolidate the efforts for the update and time it at the same time, we are providing the NPP annual report updates and that's what is occurring in August because -- when we provide the updates.

In addition to it, as the information comes in and the implementation is taking place, we as -- as we committed to the Commission and we carry out site verification inspections and we need that time in order to verify that the implementation is adequate because we do desktop reviews and onsite inspections. So we want to compare and make sure that, what's been proposed on paper is being implemented.

So we're aiming for August. We try it in August. If we can't have the proper information or it's too late, we can always adjust. Again, it's the time -- here is just a timeline an indicator, regrouping points. We can always adjust it.

**THE CHAIRMAN:** Thank you. Mr. Harvey?

**MEMBER HARVEY:** Merci, Monsieur President.

Two years ago, before Fukushima, I could have had the impression that nuclear was safe. I mean that the regulators uptake on the measure -- appropriate measures. After Chernobyl, that would take care of similar events but in fact that wasn't the case.

And today I recognize, as my colleague did, the huge work done by the staff. I congratulate the staff for that.

And -- but I'm trying to -- is it sufficient -- I mean, I will say it like this. How can we compare what was done after Chernobyl and what has been done in the last 18 months and where we are today compared to where we were two years ago?

**MR. JAMMAL:** Ramzi Jammal, for the record.

I'll start at the high level and then I'll call onto my colleagues to comment at any time.

Unfortunately, the nuclear aspect or the nuclear industry, each design has its own specific requirements and each event has demonstrated either deficiencies in the human intervention or deficiencies in the design itself.

And you are correct to mention from a public perspective, you know, how come the industry didn't learn yet and what else can it take for the industry to

learn. And when we speak of industry, it's the regulators and the operators now.

So the progression of the events have shown that there are elements needed to be enhanced with respect to the enhancement of safety. That's where we are currently into a different mode of operations where the old combine the lessons learned from Fukushima or even Three Mile Island and the Chernobyl accident -- is being put together globally and looked at it from a horizontal perspective, from onsite and offsite capacity in order to respond to these events. That's the big change that is taking place.

In addition, the separation of the regulators and the operators at the international level has always been a great gap of "integrating and engaging" with respect to safety because the operator is responsible for safety.

Again, in this change -- in this environment right now, the openness of the collaboration of the WANO as a group -- operators group -- and the regulators through the IAEA is adding enhancement with respect to the collaboration for future enhancement.

But at the same time, it does not mean it's unsafe. If you compare nuclear accidents against any other large-scale events, it seems that nuclear is the

only one that has any memory. And it's being repeated over the period of times. Where in fact there has been just as extensive environmental damage or anything that caused similar larger magnitude accident. Again, it's the lessons learned from the industry -- lessons learned from the events has enhanced the industry and we will continue to mitigate and put in place measures.

And the question that everyone is asking now and the response is, what's different? Now what are the major differences? The protection of the public and the environment is a key element at the cost of the reactor itself.

Previously, there was the philosophy or the idea of saving the assets at any cost. Now it's been changed. The asset has no value in order to protect the public and the environment. So if there is a mitigation that will destroy the core of the reactor in order to prevent any releases or any evacuation, that is now the action and the philosophy in place. And that's the major difference from a few years ago.

**DR. RZENTKOWSKI:** To complement the response given by Mr. Jammal, I would like to say that international nuclear community has learned from the Chernobyl accident. As a result of this accident, the probabilistic safety goals were introduced in the power

reactors regulatory framework. The safety goals pertained to the core damage frequency and the large release frequency.

However, those safety goals were not consistently implemented internationally as minimum safety requirements. Some countries adopted them but other countries decided to continue with the normal business.

And because of that in countries like Japan, for example, there were very little enhancement put in -- very few enhancements put in place in order to raise the safety bar of operating reactors.

In other countries, like for example Germany or Canada, we decided to comply with those probabilistic safety goals and we put the improvements in place. New Brunswick Power is a perfect example because by complying with those safety goals for their refurbishment activities, they have very little to do right now in order to respond to our recommendations from the Fukushima Task Force.

So I would like to repeat my first sentence. The international community has learned from this experience, however, the lessons learned were not consistently implemented at the international level.

**THE CHAIRMAN:** I see somebody from OPG wants to comment.

**MR. DERMARKAR:** Thank you very much, Dr. Binder. For the record, my name Fred Dermarkar with Ontario Power Generation. I'd like to complement the answers given by Mr. Jammal and Dr. Rzentkowski.

From a utility perspective, the biggest lesson that we learned is that we need to be prepared for those things that we have not thought of in the design -- in the original design.

So when we designed and built our reactors we said what do these reactors need to be able to withstand? They need to be able to withstand a seismic event of x magnitude. We'll build it for something even bigger than that. They need to be able to withstand high winds; we'll build it for that. They need to be able to withstand flooding; we'll build it for that. But what about those things that we didn't think about?

And so when Fukushima happened, fundamentally Fukushima was something that had not been designed for. So we put our -- we put the questions to ourselves, if we didn't design for it, what can we do to better respond to it to mitigate it? And that's where the concept of portable equipment -- emergency mitigation equipment came in.

We don't know what's going to hit us that will render unavailable our safety systems, but in the

event that something does we have equipment that is stored away from the plant but close to the plant so we can bring it onboard. We can connect it in multiple different locations. So in case one part of the plant isn't accessible, we can connect to another part of the plant and the equipment provides both water and power.

So that's what's really changed for us is - - and that's the new paradigm that we're adopting -- to be able to mitigate those things that we have not thought of. Thank you.

**MEMBER HARVEY:** Is that point of view followed by all countries? As you mentioned that Canada was a leader in that exercise but are you aware that some other countries are not in the parade?

**MR. JAMMAL:** Ramzi Jammal, for the record.

Very good point you are making. As Dr. Rzentkowski mentioned about inconsistency in the implementation, there's a bit more than inconsistency in the implementation as most reports have shown; the effectiveness of the regulator and the effectiveness of the independence of the regulator and the enhancements towards improvements.

And the key point on the international scene right now -- without really pointing at regulators - - but there are deficiencies on the transparency with

respect to the international actions arising from either an IRRS or WANO peer reviews.

I can publicly now criticize one. I'm pretty sure the industry is not going to like what I'm going to say.

One, they would not publish their findings because they consider certain things are confidential, respect confidentiality but, at the same time, there should be efforts made that -- to say an audit has taken place and, you know, here's the elements that need to be done globally.

The same thing on the regulatory end. When the IAEA conducts an IRRS mission, some countries to date has not called for a follow-up mission or no closure to the recommendations given by the international community. Publicly, Japan is one of them now. It is publicly now saying *mea culpa* and then we are establishing independent regulator, putting in place the capacity and resources in order to render independent decision.

So that's -- that's where the inconsistency at the technical level where the implementations and applications of the lessons learned at the technical level and the inconsistency and -- at the political and safety champions.

Again, to date its major activities is for

safeguards, security, but in Canada we are the leader because we integrate the three Ss, safeguard, security and safety, under one organization, which is the CNSC.

**THE CHAIRMAN:** Okay. Let's remind everybody, we're talking about Canada Action Plan here, so this is a good time to take a biological break for about 10 minutes. We'll be -- to continue at five to 11:00.

Thank you.

--- Upon recessing at 10:49 a.m./

L'audience est suspendue à 10h49

--- Upon resuming at 11:02 a.m./

L'audience est reprise à 11h02

**THE CHAIRMAN:** Okay, we are back.

And Monsieur Harvey?

Okay. Dr. McDill?

**MEMBER McDILL:** Thank you very much.

I think it would have been great to have that video when the incident occurred but, failing that, kudos to that. I think it's a great video.

The only thing I would ask is, one of our most frequent intervenors is always concerned about the fuel base and the differences between the fuel base that we have and the ones used, the Fukushima Daiichi and many

other nuclear plants.

So if you can just do a little bit more on that. I don't know whether it's another video or a link from this video to another video. I think the fuel base really need -- and then it can bring in, for example, from Bruce's exercise that -- the idea of being able to bring water in to cool, and if it gets cracked and that sort of thing.

So that would be something, I think, going forward, we -- would be very good to have.

More specific questions. How frequently will we exercise the emergency website to see if it actually goes on when you want it to go on?

And -- and another one, you can -- in the same venue, idea, is there succession planning for the media training so that the talking heads, if they get seconded somewhere or retire or move that there's some way of identifying who's next in the talking head line?

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

I'll start with the operational aspect of the talking heads and, as we are aging with time, the succession planning.

We have an extensive succession planning in place that is -- the Management Committee reviews

continuously, an addition that will encompass all of the management fundamentals to include capacity to be the spokesperson, from translating information from technical to a common language that the reporters are able to understand.

With respect to the other aspect of your question, I will pass it on to Ms. Locatelli.

**MS. LOCATELLI:** Sunni Locatelli, for the record.

With respect to your first point, we actually have considered and are considering some further modules, so I appreciate the feedback, and we will look to do some further enhancements to the video once we get this video launched on our website.

With respect -- further to Mr. Jammal's comments, we do have quite a strong breadth of spokespeople available. Because in an incident -- because we don't know which incident would take place when, those who are trained may not be available to be spokespeople, they may be very busy in the EOC, so we actually have quite a broad reach of other staff that are trained to speak on a more corporate level on a variety of issues.

The point about the emergency website, the shadow site, as we call it, will only be invoked if the emergency takes place, either in Canada, major emergency

in Canada, or internationally would impact Canadians.

So that -- that will only be launched in those instances.

All of the information that is currently on the emergency site, the shadow or crisis website, is actually already existent in our website, so it's simply packaged per the actual event itself. It has been tested and will be continually tested to ensure it does go live.

It basically launches and replaces our existing site in the event of emergency once the Management Committee has decided that our -- like our site should be actually launched.

But it would -- on the site, once it is launched, you will be able to go back to the actual CNSC website as well.

**MEMBER McDILL:** So there is a plan to exercise the website virtually, at least?

**MS. LOCATELLI:** Absolutely.

**MEMBER McDILL:** My next question, I think, is for Bruce and maybe for Health Canada or Emergency Measures -- they've gone.

And that's -- recently, we're getting reports in now from Japan saying that the evacuation was too big or there were more people injured in evacuating than would have been if they'd been left. These are media

reports, of course.

So in terms of -- it was in Bruce's video. In terms of evacuation, how is that balance struck?

**MR. SAUNDERS:** Yeah, I can certainly answer some of that. Frank Saunders, for the record.

It's is the province's call, in essence, how much to evacuate and where. And based on information that -- partially -- that we would provide them.

But it is important that your evacuations be balanced and that you take into account the other risks. There is a tendency in a major event just to say "move everybody out of there". Of course, if they all get on the roads at the same time and they don't really have anywhere to go, you have another problem which, in fact, could end up costing you more casualties than the event itself.

So we do have a process that -- and we've enhanced it some with our plans for off-site monitoring that we're dealing with just now -- to be able to measure quite effectively where the area of concern is so that evacuations can actually be practised based on real information rather than just a generic "move everybody".

Now, in Bruce we have a bit of an advantage because our population close to the plant is quite small.

But you know, in winter you have to

consider that, so in this exercise we had reception centres set up for people and so forth so that you provide places for people to go to.

And it's important before you start doing a lot of evacuation that you know where those places are and where people should go and you can actually communicate with people and tell them these things.

You do set up roadblocks around these areas so once people are out, they can't go back. So they need to know things like if you have a pet you bring it with you or you don't bring it with you, how's all that going to be dealt with.

So those are all issues that the province is aware of and does have plans to deal with.

We are creating the technology to be more precise in terms of where the concern actually would lie. And in this exercise, we did practice a number of these things based on the fact that an emergency might occur rather than what had actually occurred. So you get time to pre-plan.

One of the reasons we did this in realtime was to show people that, in fact, there is time to make these decisions, you have time to look at it and decide. You don't have to panic and do it quickly.

So if you look at it carefully, you won't

evacuate tons of people too quickly and cause the kind of accidents and things that you may well do, and especially when you think hospitals and those sorts of things, right. I mean, you and I can probably move fairly easily, but you think about moving a hospital, not so easy.

**THE CHAIRMAN:** Can we hear from Health Canada? I think it's a good time to bring you in.

**MR. AHIER:** Thank you. Brian Ahier, for the record.

With respect to the specific question around evacuation, maybe more broadly around intervention, as you're probably aware, Health Canada has developed guidelines for intervention in a nuclear emergency to protect health, these criteria exist; they provide guidance for the federal response; they also provide guidance for those provinces that might not already have pre-established criteria.

Their numbers -- they were criteria that were used to inform our response to Fukushima, but the important thing about the intervention guidance, which at the moment is also being currently reviewed in light of international best practice and lessons from Fukushima, is that they need to be supported through a robust technical assessment of the situation, to basically inform the recommendations of how far to evacuate, what

are other conditions that we need to take into consideration.

So, in that regard, the federal government, through the federal nuclear emergency plan, will support the province in decisions around evacuation, if requested. As already pointed out by our colleagues from Bruce Power, it's within the domain of the province to make those decisions, but we will certainly support them with the best information, and we will work with partners, such as the Canadian Nuclear Safety Commission, to look at potential radioactive releases from the reactor with Environment Canada to do both short and long range atmospheric modelling of where a potential radioactive release could go to provide that information, and then that can be considered, with any other factors that are non-radiological factors, in the overall decision-making for evacuation or other types of interventions that could be taken.

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

I'd just like to add that, as you can see, it's an integrated effort, Dr. McDill, and we're putting in place these enhancements. The CNSC is a partner and strongly engaged with Health Canada, EMO with respect to enhancements.

And I will pass it on to Mr. Luc Seguin to add any operational points he can add.

**MR. SEGUIN:** Luc Seguin, for the record.

So as mentioned by Mr. Saunders, this is the province's responsibility and this is formally documented in the provincial nuclear emergency plans. Staff have observed this is in the plans and have observed them taking these actions during exercises.

The provincial authorities -- so in the case of Ontario -- will take into account all risks associated with the situation, including the health risks -- health or safety risks that may be associated with the fact of evacuating, and these risks are considered implicitly in setting the intervention guidelines that Health Canada was referring to.

In addition, the province has very clear mechanisms to seek advice, if they need it, either advice or confirmation of their planned actions, either through Health Canada, under FNEP or directly with the CNSC.

**THE CHAIRMAN:** Okay, let me tell you what my problem listening to all of this, and you saw some of it yesterday, there are so many moving parts, so many institutions, that in an emergency I am a bit sceptical knowing how governments work -- we are a part of this -- that the human factor works kind of well.

So we saw this video that shows a doomsday scenario. Don't we need, with this doomsday scenario, exactly what's going to happen to whom; who triggers what emergency; gets up -- which office phones; who decides where, et cetera? Because yesterday we heard the province says a site-specific game plan. Well, I've never seen a site-specific game plan that takes it throughout whole doomsday scenario. Very unlikely to happen, but if it does happen it has high impacts.

I think we need a site-specific plan that we, as a regulator, will be comfortable that it is a game plan, everybody knows what is going on, and it's composed of all the components that everybody plays in.

Mr. Saunders, would you welcome such a thing?

**MR. SAUNDERS:** Yeah, I think that such a thing is quite good. And, to be fair though, most of it is actually there, the levels, the details, the movements.

The bits that I guess are a variable that you need to look at on each specific site, is really about, for example, where are you going to house the people. So it's a little bit on how many, how big, what time of year, right, so some of that stuff is very hard to absolutely lay out.

So part of the year-round challenge that the

province was testing was their ability to set these up. So they set up several hospitals, the Red Cross was there, the Salvation Army was there -- you know, all these -- St. John's Ambulance were there, all these people that would be involved in setting up the centres and dealing with the people were there and they did actually set up the centres and established them. So it proved, at least in basics, that you can set it up.

I think probably what you're looking for is a little more mathematical calculation of saying is it 5,000 people or is it 10,000, and, if so, where are they going exactly; do we have enough capacity for 10,000 people if you had to move 10,000 people.

That's not specifically in the plan. The province may well have it behind the scenes, I'm not sure. Unfortunately, they're not here. I'm sure they could -- I'm sure they could answer ---

**THE CHAIRMAN:** No, but that's precisely in a crises mode. I'm not talking about a small incident I'm talking about a doomsday scenario where those big questions will be asked and there was one instantaneous reply. And we're not going to have time to sit down and figure out do we evacuate half of Toronto; who's going to make this decision and how and how quickly.

All we want to make sure is there's a well-

defined process which, in realistic timelines, will deal with this.

**MR. SAUNDERS:** Certainly -- Frank Saunders again, for the record.

Certainly the "who will make the decision" is clear, and the basic technical requirements to make the decision are clear. What's less clear is what the decision will be, I think. I don't think there's any doubt about who has the authority; it's absolutely clear who has that authority, and it's not us, it's the province, and it's through their PEOC that that decision is made, and the individuals are named in the plans so they know who they are.

**THE CHAIRMAN:** Sorry to interrupt, but I'm not even sure about this, because as a regulator, I know that we've been relegated many times to the "inside the fence." Well, I don't accept that. We're not "inside the fence." Whatever you do that has impact on "outside the fence" is of interest to us.

So what we want to make sure is there is a very, very well-defined plan, and I've not seen that site-specific doomsday scenario in something that I can -- that we can manage. So if something like this happened I have one pager to know what to do next, rather than the eight volumes that describe all the committees

and sub-committees that you need, but not in this kind of emergency situation.

**MR. SAUNDERS:** I think the one point we need to make clear is all our plans do actually go to a failure and release of radioactivity to the environment in a fairly significant way. So all the plans assume that that's the end point, that there is a major release and you have to deal with it. So the sort of worst-case scenario, as you say, are built into the plans.

And, actually, most of the time that's what we practice. We don't practice the front-end, which is why I wanted to do the front-end this time, because I just wanted people to see it in real time, how it would normally progress versus an eight-hour compressed schedule.

**THE CHAIRMAN:** Dr. McDill, I interrupted.

**MEMBER MCDILL:** No, no problem.

I think the challenge is if you're in a 767 and you have to go through a three-volume checklist you may not have 45,000 feet to read right through it. So I think that's something we need to be sure.

My last point is with respect to Bruce's exercise. That's a very good video to produce in less than a week, so that's good. Will our website -- will the CNSC web site link to that kind of exercise? Near

our video will there be, you know, see a sample exercise at one of our regulated facilities? Would we normally do that, or is it up to -- I mean Bruce is going to have it, I'm sure, but ---

**MS. LOCATELLI:** Sunni Locatelli, for the record.

Yes, we link to the crisis sites of each of the licensees, and any video or information they have with respect to their emergency preparedness or crisis we do link to and will be linking to from this video.

Actually, when YouTube goes live it's going to make it much easier. YouTube's a much easier forum to be able to post this kind of information.

**MR. SAUNDERS:** Certainly, once we clean it up a little more we will make the video available. I need to give the video people more than one day to do it, but once we've cleaned it up we will make it in the public domain.

**MEMBER MCDILL:** I think there was lots there that would be of interest to, you know, high schools and communities -- municipal communities, in particular, looking at it, can see what it means.

**MR. SAUNDERS:** Yeah, the one piece that's missing, because of our short time and because of this audience -- we focused on Bruce Power -- so we only had a

couple of the things that are out in the community. But, you know, between us and the province we've got video of all those. So we do want to expand the video and add all that material in.

**MEMBER MCDILL:** OPG, have you got a plan to do something similar in the future?

**MR. DERMARKAR:** Fred Dermarkar, for the record.

The video that you saw last time, at the last Commission meeting, we've posted that on the OPG website and that provides -- and we're also, in community councils we're sharing that video as well to make sure that they're aware and we have frequent contact with the community that way.

**MEMBER MCDILL:** Thank you. Mr. Chair.

**THE CHAIRMAN:** Thank you, Mr. Tolgyesi.

**MEMBER TOLGYESI:** Merci, Monsieur le Président.

First I should just compliment both Staff and Bruce for the video presentation. I found it was both very good.

To Bruce, is this full-scale evacuation accident exercise, it was the first what you were you doing, or you do that on a regular basis?

**MR. SAUNDERS:** We actually do, about four

times a year, a fairly big exercise. The difference here was the involvement of all the various agencies and municipal partners. Typically they aren't involved.

The other difference here was, we played real time so it extended over three or four days, whereas most exercises we compress the time and they last from sort of 8 to sort of 16 hours. And the reason is simple, it's hugely difficult to run a three or four day exercise.

So I'm guessing this exercise is worth, because I don't have the total cost of this, but my guess it's worth a lot of money. Over a thousand people engaged for four days by themselves is a big price tag.

So this magnitude of an exercise we wouldn't do very frequently. One of the things, one of the big lessons learned out of this exercise was figuring out a better way of training people other than simply using exercises to do it; it's a) too expensive; and b) you can't do it frequently enough.

We have the standard training tools, but we're actually looking at a simulation type approach to train these crews, so that you can actually put them through the crises and the pressure of the moment, and all those things, and train them to deal with these broader events that happen.

Our world is a very proceduralized world as

you may know in nuclear, and then when you have a disaster-type scenario like this you can't really proceduralize it because you don't what the event is in advance.

So you need to be able to teach people to respond well under that kind of pressure. So one of the big lessons we've learned is, better training tools that we can do more often, do it in some sort of simulation environment so I don't have to have a thousand people involved in the exercise. But I can, just the same, familiarize the response crews with all that pressure and training.

So that was one of our major learnings and we're working on that.

**MEMBER TOLGYESI:** Do you have any kind of findings or observations? Also you said the local St. John Ambulance were involved. Health Canada, Ontario Emergency Media, CNSC, how far were they involved in this exercise and what's your observations, how it was working? Were there some shortfalls or something missing?

**MR. SAUNDERS:** Frank Saunders for the record.

I mean, there's always shortfalls in every exercise, without a question, and there's always a few people who get a little extra incentive in the middle of

the thing and cause some interesting twists.

But I think the lesson we learned, and it's the first time we've ever done it, is that we employed a third-party company that does these things for people like the Olympics and D&D and others, so help us organize this.

It took us -- this was, here in Challenge 4 for a reason, we did the -- the first three were warm-ups where we had all these players involved. So the big learning is, if you're going to do this there's a substantial amount of coordination effort that's required to just get all the players to the table doing what they want.

Once you get them there they're very good at their job and they do it quite well. I was actually, I guess in the end of the day, truly surprised at how well the exercise ran, how smoothly it ran. And the fact that we got through all the training objectives, we didn't miss any. And that we really didn't have any major hiccups.

There were a lot of people and a lot of apparatus to play throughout this area, I'd like to say 10,000 square kilometres, it was a big area. Including, I mean, we did a rescue in Port Elgin from the Heavy Equipment Team, with a house that was actually being demolished and half fallen down, so it was pretty realistic. You can see that one on the weather channel if

you want to go have a look at it.

So I thought the energy put into this by the communities and the various agencies involved was truly outstanding. I guess it was due, because we got tremendous cooperation.

In fact, we went from approximately 50 participants to 73 in the last couple of weeks because the thing just grew. So I really have no complaints, I think it worked amazingly well. And like I say, the big lesson on actually running the exercise is, make sure you've got an exercise control center that's up to the task.

If you have a big exercise, you need a very well thought through exercise control center.

**MEMBER TOLGYESI:** My last is to the Staff. There's an obligation of the licensee to have emergency preparedness, and there's nothing about exercise as such. It's not within the license, should it be (inaudible), should be double up a generic or site-specific handbook or guidelines for this type of exercise, or should it be a licensing handbook? And my last one is, how will you integrate also this kind of exercise inter-jurisdictional involvement? I'm thinking about Chalk River and the other side, you know, because the river is not so wide.

**MR. JAMMAL:** Ramzi Jammal for the record. I will start with the high level answer and then we'll

pass it on to the colleagues one at a time.

We do not issue a licence nor come before you for approval or recommending approval of a licence without an emergency plan. So hence, every site has its own emergency plan reviewed by our emergency division in order to ensure that safety is maintained.

Now with respect to the integration, that's part of the task force recommendations to integrate and establish clear regulatory requirements. Because as you mentioned currently, even though we don't have it referenced in the regulations as such, but we have licence conditions.

And under the licence reform we start to implement in the Licence Condition Handbook the timing for the exercise and when it's going to be done.

So the exercising is, without defending the licensee here, but each plan of the exercise costs them money, but at the same time it does not mean it cannot be done.

So the different scales of the exercise is of importance here, and to go on to the (inaudible) that the President always talks about.

From a regulatory oversight perspective we evaluate the program and right now we are putting in place, asking the licensee for definite plans, indicating

when the exercise is going to be done.

In the previous documents OPG has planned exercise. Your challenge was -- I didn't find it as one of the exercise -- integrated exercise.

And I'll pass it on for Mr. Luc Sigouin, any detail with respect to evaluation of the emergency plans or emergency measures of the licensees.

**THE CHAIRMAN:** Sorry to interrupt. Before you do that I think it will be very useful, because I know Health Canada is planning an exercise, and I understand in 2013 there's going to be some major exercise, I think; please correct me if I'm wrong.

And, again, you know, how does a national level nuclear exercise dovetail with a provincial and with a local. Because I thought in the Fukushima plan you are contemplating imposing a cyclical and we are debating how often that might be, tests, comprehensive tests on a specific site.

So Health Canada, maybe you want to share with us.

**MR. AHIER:** Thank you. Brian Ahier, for the record.

If I may just back up a bit to give you a bit more of the context of the exercise that you just mentioned. At the last Commission meeting I had mentioned

that we were in the process of completing the revision of the federal nuclear emergency plan, which is one of the items, one of the plans we intend to exercise in the national exercise.

We've done that in close cooperation with federal partners such as CNSC and Public Safety Canada. And I think it's important for the Commission to know that the plan was formally approved by the Deputy Minister's Emergency Management Committee on the 9th of October, so earlier this month. So that's an important piece moving towards a national level exercise.

With the endorsement and the approval of that plan we're going to be working on the specific provincial annexes, which will also provide additional clarity for province-specific and potentially site-specific aspects.

But the Deputy Minister's Emergency Management Committee was also requested to approve taking this version of the plan forward to a national level exercise, proposed for the next fiscal year, essentially the next 12 to 18 months.

It's important to realize that when we talk about a national level exercise we're not talking about an exercise of federal players. National means exercising across all the involved jurisdictions.

So therefore it would mean having involvement of a power plant, provinces, federal players and potentially international players so that the national exercise is one integrated exercise that would allow all jurisdictions to exercise their plans and arrangements, and an importantly to exercise the interfaces between those plans and arrangements to ensure that there is overall coordination of the response and to identify areas for improvement.

So that is a process that's been formally launched now. We're working with the staff of the CNSC as well as Public Safety to get the involvement of a provincial host, shall we say, and a power plant.

And we feel this is going to be an important element in the validation of the plan. But I would also want to say that we consider this to be one specific milestone, it's not an endpoint.

We are also working in parallel to develop a rigorous and sustainable exercise regime where we would see having full-scale national exercises conducted routinely, perhaps on a two to three year basis where all plans would be exercised across all of the relevant jurisdictions.

In order to get us to this point I'd like to mention that we're also working with CNSC Staff and

Public Safety in provinces to host a series of provincially based stakeholder workshops of all the relevant players so that people understand what the current arrangements are and to help us move towards the conduct of the next national exercise, as I mentioned, in the next 12 to 18 months.

**THE CHAIRMAN:** Mr. Séguin.

**MR. SÉGUIN:** Luc Séguin for the record.

So in answer to the first part of the question related to licensees' exercise requirements. There are clear requirements for the licensees to include exercises within their emergency management programs.

This requirement is referenced either in licence condition or within the licence condition handbook. CNSC has two documents, two regulatory documents, G225 and R353 that describe requirements for emergency programs including exercises and the components of the exercises and how they should be verified.

In the task force report and one of the Fukushima action items specifically addresses the difficulty, or how challenging exercises may be. And that's one of the things that will be reported on in the coming months is how the -- the progress of the licencees in developing more challenging exercises.

And finally, CNSC Staff has undertaken a

process to update the existing regulatory documents to make them more robust in recognition of the lessons learned from Fukushima.

**MEMBER TOLGYESI:** How will you manage, or how will you involve this inter-jurisdiction participation, as I said. Could we impose some kind of obligations on the licensee that they should do something, which is going over to the other jurisdiction also?

**MR. JAMMAL:** (inaudible) for the record.

There are two components here. First before I answer your question I want to make sure that from (inaudible) perspective that the onsite emergency plans for licencees do exist. They are from the training perspective to the response under the emergency management pillars, mitigation, recovery and response on site.

Now your question is very valid. Is what is the integration offsite to combine onsite and offsite and integrating the offsite of all levels of governments. Yes, our intent as Mr. Séguin has mentioned about enhancement and changes to our regulatory requirements, we will be putting in place the guidelines and the regulatory requirements, and the licensees must fit into them. And this is work in progress as we're doing right now, and as we are reviewing our regulatory requirements.

So the answer is, yes. We will be coming

before you. As a matter of fact, the commission, for approval of updating of regulatory documents as it pertains to let it be guidelines on exercise frequency, but the integration of the other government agencies, or the government itself, or multiple level of governments from offsite perspective.

**THE CHAIRMAN:** Okay. Any other kind of last minute question? I've got two very quick ones, just information piece. You mentioned the original emergency equipment center that has been established. I never saw any date when?

**MR. SAUNDERS:** You haven't seen a date yet because we're still working through the plans. So we've -- between us and OPG we've looked at the equipment list and we have that. And we're just working on the RFP now that would actually start to establish it. But I think you should recognize that that is for a long-term response.

The site equipment is actually the equipment. We have all the equipment we need to do the immediate site response, but there's anticipation that what if this is a long-term event and we need more materials and more things. And that's what the center is intended for.

**THE CHAIRMAN:** Have you decide the location

and have you talked to the Americans who I understand are trying to do the same thing?

**MR. SAUNDERS:** Yeah. We have been talking with INPO in the U.S. and one of the intents with an RFP is to see if there's any interest in some kind of a joint effort here, so we're certainly open to suggestions.

Once you've gone through the basic process setting it up is not that difficult. Maintaining it is probably the piece you have to pay the most attention to. You know, putting equipment in a warehouse is relatively easy. Making sure the equipment stays serviceable and is available to you is the bigger challenge.

So we're trying to make sure, as we put this thing forward, that we deal with all these things. So once it's set up it's really there and useable in the future.

**THE CHAIRMAN:** So is it going to be -- I'm trying to push for somewhat of a calendar date.

**MR. SAUNDERS:** I'd be pretty comfortable in telling you it will be setup sometime next year. But until I see some responses -- the issues you get into if you decide you need to build one then of course that extends the date a little bit. But I think that we probably won't need to do that, that there'll be sufficient space available that we can utilize.

**THE CHAIRMAN:** The other thing is, it seems to me that every time such events, post Fukushima, some enhancement are being implemented, do you release and inform the public of what happened?

So for example, you mention that OPG just put this automatic gamma detectors. Has anybody heard about it outside us? Was there a press release? Was there any information that this has happened? The sirens I assume are coming soon. Is anybody prepared to inform the public of this particular center?

I mean, those are the kind of issues that I thought that should be available as what happened as a result of Fukushima; lesson learned, share with the public.

**MR. DERMARKAR:** Fred Dermarkar for the record, Ontario Power Generation.

You bring up some excellent points. We do have a webpage that is dedicated to Fukushima on the OPG website. We do post a fair bit of information on that webpage that we judge to be of relevance to the public.

The specific issue of the automated near boundary gamma monitors we did not -- I'm not aware that we put out a press release on that, but we'll take that away as a suggestion to include that on our website.

**THE CHAIRMAN:** I think about a whole host

--- a list of all kinds of initiative that I thought that probably deserve sharing with the public I would argue, just throw it out there.

And for our staff for sure, if there's something that as a result of the plan we may want to point the public to some of those improvements.

**MR. JAMMAL:** Razmi Jammal for the record.

To confirm, sir, what you're stating is once we get the approval from the Commission and consolidate the action plan into one, we will be providing the update accordingly. And as we know, we publish everything to include our presentation today on the enhancement that did take place. And that's where we're going to go next.

**MR. SAUNDERS:** (inaudible) Just to add from Bruce Power's point-of-view, the simple answer is, yes. I mean, this for example is a booklet that we put out to all the local newspapers. It's on our website. It talks about Fukushima and our response to it. And we do this, at least once a quarter we send out substantial bits of information on what's going on and what we're changing and what's happening on-site.

So this is the one that dealt with Fukushima. We did go around and we go around, you know, every month to all the local community councils and those

things and brief them as well on things, and it's on the website.

You know, it's a little easier job for us because of our remoteness. The numbers of people we have to see are relatively small, but we make a very substantial effort to let people know what we're doing and why we're doing it.

**MR. DERMARKAR:** Fred Dermarkar for the record.

I would just like to build on the response that I gave you. We are doing a lot in the communities. Two weeks ago we had an article that featured Wayne Robbins describing the actions that we've taken in broad terms around the emergency mitigation equipment and so on. We are very active with the community councils.

But your suggestion that we provide a more comprehensive listing on the website is something that we will -- listing of the actions that we've taken and the response that we've taken, we will go back and re-evaluate and determine whether or not there is additional opportunity there.

Thank you.

**THE CHAIRMAN:** Okay. Thank you. Thank you very much. We need to move on. And while we're setting up for the next item I'm going to try to test technology.

I understand that we have to hook up with the Saskatoon office.

Saskatoon, can you hear us? Okay. Guys, are you with us? I don't think they are paying attention to us. Did we just get disconnected?

**(SHORT PAUSE)**

**THE CHAIRMAN:** Okay, you're now on. Can you hear us?

**UNIDENTIFIED SPEAKER:** Yes, we can.

## **8. Information Items**

### **8.1 CNSC Staff Report on the Performance of Canadian Uranium Fuel Cycle and Processing Facilities: 2011**

**THE CHAIRMAN:** Okay, good.

So the next item on the agenda is the CNSC staff report on the performance of Canadian Uranium Fuel Cycle and Processing Facilities: 2011. This is outlined in CMD 12-M55.

The public was invited to comment in writing on this item. A written submission was filed by the Port Hope Community Health Concerned Citizens as

outlined in CMD 12-M55.1. We will get to it a bit later on during the questions.

I understand that CNSC staff have developed a presentation in various components. So you will tell us when you want us to stop and ask questions by component; right?

So Peter Elder, the floor is yours.

**12-M55**

**Oral presentation by**

**CNSC staff**

**MR. ELDER:** Good morning, Mr. President, Members of the Commission. My name is Peter Elder. I'm Director General of the Directorate of Nuclear Cycle and Facilities Regulation.

With me at the front table today, Mr. Jean LeClair, Director of the Uranium Mines and Mills Division, and Mr. B.R. Ravishankar, Director of the Nuclear Processing Facilities Division. We also have a number of staff and licensees involved in this report here in Ottawa or joining us by video from Saskatoon.

So we are here to present this, the 2011 CNSC Staff Report on Performance of Canadian Uranium Fuel Cycle and Processing Facilities.

As you have noted, the -- we have -- this is a very comprehensive report, so what we are planning to do is present it in three parts.

The first, I'll give a general overview of the changes from what the report that we talked about to you in May of this year, and then Mr. LeClair will walk through the section on uranium mines and mills, and then we will pause and have time for questions on that portion.

Then we will do the next section that will look at the uranium processing facilities, and then another break for questioning.

And finally, we will do the last two parts of the report which deal with the tritium processing facilities and the other nuclear substance facility, which is Nordion, as a combined part. So we'll have -- take two pauses during this presentation.

I noted that we presented you a report for 2010 in May of this year as sort of a -- as a worked example of what the report was planning to do in future years. So this is really an update of that report to include the data for 2011.

So what we did for this report is -- can we get the presentation up; sorry.

So I'm just going to quickly go over the parts that we added to the report in response to things

that we had committed to do or the Commission had actually asked us to do.

So we have included for this year, for this report, a comparison in the mining sector and comparing the performance of uranium mines and mills on the effluent quality to other Canadian mines and mills based on a standard set of national regulations.

We have added an appendix that gives the status of the decommissioning and financial guarantees for each of the facilities covered in the report. That's Appendix D.

We've actually added an Appendix G on when we talked about reportable spills to the environment for each facility. So we've actually given short details on each of those spills in that appendix.

In Appendix H, we have actually, again, added details on the lost time injuries. So the body of the report will give you the number of injuries, but if -- there is short details on the type of injuries in the appendix.

And finally, we have added -- and this was discussed a bit yesterday with McLean Lake -- some production data on the uranium mines and mills, and any comments about further enhancing that one would be useful.

And also, as we committed at that time, we

have expanded the scope of the report to include three extra facilities, the Shield Source Incorporated and SRB Technologies Canada, that deal with tritium processes, and Nordion as well.

I'd just like to note we will not have much, as the Commission is aware, with Shield Source. There have been some recent events that have called into question many of their past data on their effluent releases. We are still in the process of reviewing that data.

So while we have included the 2011 data in the report, all that data is under review and should be taken as -- for the situation is everything according -- everything associated with Shield Source is under a very thorough review.

So in terms of the report structure, as said, would structure it in terms of four parts that deal with uranium mines and mills, uranium processing, nuclear substance processing. And finally, we've put Nordion as a sort of separate facility, but we will deal with it as other Part 3 facilities.

I'd just like to note that, actually, this only covers part of the work that we do for, let's call them, other major facilities. And we are looking at options about how we are going to present annual reports

on the other types of facilities like Chalk River and the waste facilities.

Chalk River, we are still predicting is to be for 2011 report, or when we come early -- I wouldn't say 2011. Next annual report on Chalk River will be done as a stand-alone report. But then we're considering making it on an annual basis, more of a report on all of AECL's facilities.

One -- and then we will look at, in future years, of adding some work on university-based reactors, noting that most of these facilities are up for licence renewal in 2013. So you will get a comprehensive review of those facilities in 2013 just through licence renewal, and then, going forward, we would then include them in some sort of annual report.

And we are also looking at trying to decide -- I think we may need to look at a separate report that would deal with the waste facilities and facilities undergoing decommissioning.

These are -- noting that these ones, they don't fit into the structure that we've developed for this report in terms of -- because a lot of them tend to be very static facilities. And while we recognize there's a need to give you annual routine information on these facilities because a lot of them are not actually

operating facilities, not a lot changes year to year, and they don't tend to have much work done so there aren't in the way much -- there isn't much in the way of work being done at them. So there isn't a large amount of dose to the public or the workers from them.

So we're looking at developing some sort of report that would cover off those facilities in the future years as well.

So in terms of the report, in this one we are just going to do an overview, obviously we've tried to focus report on significant events including any changes to licensees and major developments in 2011.

Again, we should point out that a number of these facilities, the licences were recently renewed. So there isn't a lot of new information that the Commission hasn't seen given a lot of them renewed last year.

We followed the -- providing information on every one of the safety and control areas at a very high level. In fact not just a rating, but focussing on three core indicators of radiation protection, environmental protection and conventional health and safety.

We've also included in the reports for each of the sectors information on the lessons learned from the Fukushima accident. Since this was the subject of a separate CMD this morning, we are not going to go much

into those during this presentation but the information is in the CMD.

And I won't go back in terms of the overview again. We look at 2011 and compare and give trending on the 2011 and trending for the other years. Again, for each of these in the presentation we will give an overview of the sector and then a very brief overview of the facility. And noting that, again, there is trending information for those key indicators in the CMD.

I will pass the presentation now over to Mr. LeClair to present on uranium mines and mills. After his portion of the presentation we will stop for questions.

**MR. LECLAIR:** Good morning, Mr. President, Members of the Commission. My name is Jean LeClair and I'm the Director of the Uranium Mines and Mills Division.

I'll be presenting Part 1 of the 2011 Annual Report that deals with uranium mines and mills that were operating or under construction in 2011.

Before I begin, I'd just like to note one correction I'd like to make to staff CMD 12-M55 on page 7. There is a Table of Production Data for Uranium Mines and Mills. The correction is for Key Lake at the bottom of the table, the milling concentrate produced should say 9,026,888 kilograms. That's a correction from the number

that currently says 7,686,177.

Pardon me? Nine-million, twenty-six thousand, eight-hundred and eighty-eight kilograms (9,260,888). The actual correct number is reported later on in the report in the Key Lake section. Thank you.

My presentation will begin with an overview of the location and operational status of uranium mines and mills facilities. This will be followed by a brief review of the 2011 ratings for the 14 safety and control areas. I'll then provide an overview of the performance for the safety control areas of radiation protection, conventional health and safety and environmental protection.

The environmental protection overview will also include a comparison of effluent quality at uranium mines and mills to other mining activities in Canada.

For each facility I'll provide some specific highlights for 2011 and 2012. And the presentation will end with CNSC staff's conclusions and the overall performance of uranium mines and mills in 2011.

There are currently five operating uranium mines and mills facilities in Canada, all located in the Athabaska Basin in northern Saskatchewan. Cameco

Corporation operates the four facilities of Cigar Lake, McArthur River, Rabbit Lake and Key Lake, while AREVA Resources Canada operates McClean Lake.

The licences for all the Cameco sites are due for renewal in 2013. Cameco has applied for an operating licence for the Cigar Lake project that will be presented to the Commission in early 2013.

Hearings for the licence renewal for the other three Cameco sites are tentatively scheduled for early fall 2013.

A request to amend the operating licence for AREVA's McClean Lake operation was presented to the Commission yesterday. The licence for McClean Lake expires in 2017.

The ratings for each safety and control area are based on the licensee meeting the regulatory requirements as assessed through CNSC staff compliance and licensing activities. The level of staff review for each safety and control area takes into consideration the facility specific activities and the risk that these activities comprise.

As was the case in 2010, for 2011 all 5 uranium mine and mill facilities received a satisfactory rating in all 14 safety and control areas.

Uranium mines and mill operations have

continued to maintain and implement comprehensive radiation protection programs at their facilities that are based on the ALARA principle of keeping radiation exposures as low as reasonably achievable.

As part of our ongoing compliance activities CNSC staff routinely review the programs, their implementation, to ensure that they ensure they are effective, review all action level excursions to make sure that corrective actions are appropriate and effective and that they are properly implemented.

This slide shows the average individual effective dose and maximum individual effective dose for nuclear energy workers at the 5 uranium mine and mill facilities for 2011. As you can see, all doses were well below the annual regulatory limit of 50 milliSieverts. The low numbers for Cigar Lake and McClean Lake reflect that neither facility was in production in 2011 and as a result the radiation exposures are quite low.

All uranium mines and mills licenced by the CNSC must develop and implement and maintain effective safety programs to promote a safe and healthy workplace.

A key performance measure for conventional health and safety is the number of lost-time incidents at each facility. As displayed on this slide, the uranium mines and mills continue to maintain a relatively low

number of lost-time incidents in 2011.

These lost-time incident statistics remain amongst the lowest in the mining industry and other industries in Saskatchewan.

One of the performance indicators for the safety and control area of environmental protection is the number of environmental spills. Licensees are required to report any unauthorized release of hazardous or radioactive material to the environment. The chart on this page displays the number of environmental spills at the uranium mine and mill facilities in 2011.

In the first 8 months of 2011, there was a marked increase in the number of environmental spills at the Key Lake operation compared to 2010. While all the spills resulted from routine operational maintenance activities and were promptly cleaned up having -- leaving no residual impacts to the environment, CNSC staff were concerned by the increase in number of spills.

Cameco were equally concerned and implemented a number of corrective actions to prevent spills. CNSC staff reviewed the corrective actions as part of its desktop reviews and inspections and were satisfied with the corrective actions taken by Cameco. Following implementation of the corrective actions, no spills occurred at the Key Lake operation in the last four

months of the year.

Another performance indicator for environmental protection is the quality of the effluent. Within the annual report are graphs providing the 2011 annual average effluent concentrations for radium 226, molybdenum, selenium and uranium for all 5 mine and mill facilities.

This slide displays the average concentration of the radiological contaminant radium 226 in effluent release from the 5 mine and mill facilities. The radium 226 concentrations are shown to be well below the regulatory limit of .37 becquerels per litre.

As part of our commitment to the Commission, we completed a review of the uranium mines and mills and compared them to other operating mines in Canada.

Currently, all metal mines and mills in Canada, including uranium mines and mills, are subject to the Federal Metal Mine Effluent Regulations enforced by Environment Canada. The Metal Mine Effluent Regulations include regulatory effluent release limits for arsenic, copper, lead, nickel, zinc, radium 226, total suspended solids and an allowable range for PH. These same limits are included in uranium mine and mill licences issued by the CNSC.

Environment Canada requires that metal mines across Canada submit effluent sample results on a regular basis for analysis. The results of these analyses are included in Environment Canada's published annual report, Summary Review of Performance of Metal Mines Subject to the Metal Mine Effluent Regulations.

Based on the most current information in Environment Canada's published annual reports, CNSC staff calculated the percentages compliance as shown on this slide.

The mines from across Canada reporting under the Metal Mine Effluent Regulations have been grouped into four metal mining sectors. The number of mines and mills representing each sector varies. There are 5 uranium mines and mills, 43 base metal mines, 50 precious metal mines and 7 iron mines.

The table provides a percentage of mines and mills in each sector that were in compliance for each year. For a mine to be in compliance, their effluent must have met all of the regulatory effluent release limits of the metal mine effluent regulations for the entire year. For sector to achieve 100 percent compliance rating, all the facilities in that sector must have met all of the parameter limits as shown on the previous slide for all submitted samples for that entire year.

For example, if a sector had a 50 percent compliance rating, this would mean only half of the facilities in that sector met all the requirements for the full year.

As shown, the uranium mines and mills sector maintain 100 percent compliance with the effluent parameter concentrations and pH limits from 2007 to 2010. This means that all five uranium mine and mill facilities met all of the metal mine effluent regulation effluent release limits from 2007 to 2010.

At this time, we only have the 2011 data for the uranium mines and mills which once again achieved 100 percent in compliance rating.

The next stage of slides provides some facility-specific highlights with regards to safety performance in the areas of radiation protection, conventional safety and environmental protection.

The Cigar Lake project is currently a mine construction project with production anticipated in the fall of 2013. The primary focus for 2011 at the Cigar Lake project was on continued remediation of the underground workings, mine development and surface support construction activities.

A significant 2011 achievement for the Cigar Lake project was the shaft No. 2 breakthrough to

their underground workings at the 480 metre level, which establishes a second means of egress, an important safety aspect.

On June 28, 2011, the Commission Tribunal approved the water inflow management project. This project established a water handling system with a different point of discharge that allowed for increased discharge capacity for the safe release of treated effluent from both routine and non-routine inflows.

There are no regulatory or licence limit exceedences at Cigar Lake in 2011.

**MR. ELDER:** Just --there seems to be a technical -- just pause for a second. Just a minute.

There seems to be a problem with our slide deck on the screen that we are missing the slide that should be in your presentation. That's slide number 16. Hopefully your deck has a number 16. Yes, okay.

So we'll leave it on 17 for the next -- to go on to the next facility.

**MR. LECLAIR:** The current Cigar Lake licence expires on Dec. 31<sup>st</sup>, 2013. However, Cigar Lake has applied to the CNSC for an early licence renewal to authorize mine production. A one-day public hearing is planned for early 2013.

Currently, the main focus at Cigar Lake is

the completion of all construction activities and commissioning of the facilities and equipment in preparation for mine production. CNSC staff has focused its regulatory oversight on Cigar Lake's ability to conduct their mine development and construction activities while ensuring health and safety workers and protection of the environment.

Chemicals in the McArthur River operation is the world's largest high grade uranium mine. The current McArthur River licence expires on October 31<sup>st</sup>, 2013.

In 2011, the dosimetry results for one worker exceeded the weekly action level of one millisievert effective dose. Cameco's investigations of the incident led to the implementation of corrective actions for the worker that included receiving additional radiation protection training and coaching.

CNSC staff reviewed the incident and were satisfied with the corrective actions taken by Cameco.

In February 2011, there was one lost time incident where an employee was struck by a rock. This incident was reported within CMD 11-M24 as an early notification report at a Commission Tribunal meeting on March 30<sup>th</sup>, 2011.

CNSC staff reviewed Cameco's Investigation

Report and found the corrective actions to be acceptable. CNSC staff later confirmed implementation of corrective actions during an on-site inspection.

There were no regulatory licence limit exceedences for McArthur River in 2011. Activities at McArthur River have been focused on ore production, continued mine and freeze development to support existing and future mine production.

Currently, Cameco uses a mining method called raise boring at McArthur River. They are also testing other mining methods such as traditional drill and blast and box-hole boring. CNSC staff will continue to review any proposed changes in mining methods with a primary focus on the radiation protection of workers, ground stability and mine water inflow.

While the annual report provides effluent concentrations for several potential contaminants with concerns, historically molybdenum releases in the McArthur River operation resulted in some elevated concentrations of molybdenum in the receiving environment.

As a result of these observations and CNSC staff compliance activities prior to 2008, Cameco implemented improvements in effluent management at McArthur River site. These improvements led to 75 percent decrease in molybdenum concentrations and treated effluent

from 1.34 milligrams per litre in 2008 to 0.34 milligrams per litre in 2011.

Currently, the measurable molybdenum concentrations in the receiving environment sediments and surface waters are stable or decreasing.

Cameco's Rabbit Lake operation includes both an operating underground mine and a mill. The current licence expires on October 31<sup>st</sup>, 2013.

For 2011, there were no regulatory licence limit exceedances at the Rabbit Lake operation.

In the area of radiation protection, there were two action level exceedances at Rabbit Lake in 2011. In March, one worker exceeded the one millisievert per week action level when he received a radon progeny dose of 2.06 millisieverts over two weeks of work.

In response, Cameco undertook several corrective actions, including improvements to housekeeping and hygiene, radiation work permits and work instructions and a provision of additional worker training.

The second event occurred in December when a worker's personal alpha dosimeter recorded a 2.4 millisievert dose over two weeks of work. It was identified the worker had failed to recognize a source of long-lived radioactive dust related to the work area.

Corrective actions included the review and

revision of mucking and truck loading procedures. CNSC staff were satisfied with corrective actions taken by Cameco in response to the two exceedances.

In November of 2011, a lost time incident occurred when a cement block fell on a worker's foot. Rabbit Lake conducted a root cause with numerous corrective actions and follow-up to the incident. CNSC staff were satisfied with the Rabbit Lake response and the lessons learned from the incident.

Cameco's activities at Rabbit Lake include continued production, increasing the tailings storage capacity at the North Pit Tailings Management Facility, improvements to water management, upgrades to the mill and progressive reclamation of existing waste rock piles.

CNSC staff's regulatory oversight is currently focussed on monitoring the licensee's compliance and performance during ongoing reclamation and infrastructure refurbishment, ongoing -- and ongoing reviews of the ventilation controls in the mine.

As I noted previously, the annual report includes effluent release limits on several parameters. From 2008 to 2011, there were no treated effluent action level exceedances and the annual average contaminant concentration values of the treated effluent remained well below regulatory limits.

However, CNSC staff identified that uranium concentrations and treated effluent were of some concern and there was an opportunity to further reduce uranium releases and effluent at the Rabbit Lake operation.

As a result, Cameco implemented improvements to water management practices in 2007 and, by May of that year, an 86 percent reduction in the concentration of uranium and the treated effluent had been achieved.

Further improvements to the water treatment system has provided a steady reduction of uranium to meet a site target objective of 0.1 milligrams per litre.

CNSC staff continue to monitor the overall performance of the water treatment systems at Rabbit Lake.

I just also want to take the opportunity to note that we've included the limit for uranium; however, that limit is under review currently by the CNSC and Environment Canada.

Cameco's Key Lake site operates a uranium mill and processes ore slurry from the McArthur River mine. The current licence expires on October 31<sup>st</sup>, 2013.

For 2011, there were no regulatory or licence limit exceedances at the Key Lake operation.

In 2011, as you recall, we had the MCP Altona incident that had resulted from a ship that was

transporting yellowcake that had hit turbulent seas and caused some problems within the ship itself. There was a major clean-up effort that was undertaken to clean up that yellowcake.

The yellowcake and the contaminated materials that were removed from the ship were shipped to Key Lake site for processing and management. The Key operation submitted a Yellowcake Return Safe Recovery Plan that was reviewed and accepted by CNSC staff.

Cameco successfully implemented the plan without incident and in compliance with their licence.

There was one exceedance of radiation protection action level at the Key Lake site in 2011. A worker conducting maintenance in a calciner was exposed to yellowcake dust resulting in a 6.5 millisievert effective dose for the first quarter which exceeded the 5 millisievert quarterly action level. In response, Key Lake made changes on how workers wear personal protective equipment, that included sealing the hood to the respirator with tape to prevent exposure pathways.

In addition, and perhaps more importantly, Key Lake submitted a request to modify to -- sorry to replace the calciner at the Key Lake. CNSC staff approve for the -- issued approval for the construction of a new calciner which will greatly reduce maintenance

requirements and the potential for these types of exposures.

Fundamentally, if the calciner doesn't need as many repairs, workers don't need to go in as often. And as a result, there's a reduction in overall risk.

CNSC staff was satisfied with corrective actions taken with the incident and certainly will continue to monitor as the calciner is constructed.

In addition to continuing mill operations at Key Lake, Cameco has applied for an extension to the Key Lake operation that includes an increase in production capacity to 25 million pounds U308 and an increase in tailing storage capacity. The proposed project is currently undergoing an environmental assessment.

Numerous mill upgrades are also being undertaken, including mill floor and sump refurbishments and construction of the new calciner, as I previously noted. There's also ongoing work, excavation of the Deilmann sandpit walls. You may recall, we've reported to commission previously, these are the walls of the pit that were sloughing. There was some sloughing of the walls.

So work is beginning on that and this was approved by CNSC staff. And this work is currently underway with plans to have it completed in early 2014.

Preliminary reclamation plans for the

Deilmann north waste rock pile were approved by CNSC staff. Investigations by Key Lake are also underway to develop the submitted detail reclamation plan in 2014.

Staffs -- CNSC staff's regulatory oversight at Key Lake is currently focused on the health and safety of workers, protection of environment as Key Lake continues on its ongoing improvements and revitalization activities.

As selenium and molybdenum concentrations were the primary concerns for Key Lake, chemical target improvements and water management to reduce the effluent concentration of these parameters. A molybdenum and selenium removal circuit became operation in 2009 and continued to operate effectively in 2011.

As this slide demonstrates, significant reductions in selenium concentrations in effluent were achieved from 2008 to 2011. Similar reductions were also achieved from molybdenum. It is noteworthy that these reductions occurred during a period of increasing production.

There were no regulatory or licenced limit exceedances at McLean Lake in 2011. In July 2010 processing a stockpiled ore was completed and milling at McLean Lake was temporarily shut down. The only circuits operating in 2011 were those required to treat

contaminated water.

Activities at McLean Lake are primarily focused on the resumption of milling operations that include, in particular, Commission hearing for a licence amendment to operate the high grade milling circuits, increasing maximum annual production to 13 million pounds, and for receiving and processing McArthur River ore, which took place yesterday.

Pending the Commission's decision, AREVA plans on resuming operations at McLean Lake mill in 2013. In the meantime, AREVA continues to implement upgrades to the existing mill in preparation for milling higher grade ores.

CNSC staff regulatory oversight is focused on the McLean Lake mill upgrades for receiving and processing high grade ore with a particular focus on radiation protection programs to ensure the protection of workers and the operation of the tailing's preparation circuit to ensure the protection of the environment.

In conclusion, for 2011, CNSC staff compliance activities confirmed a satisfactory performance rating for all 14 safety and control area for uranium mines and mills facilities, that the licensees radiation protection measures were effective in keeping doses ALARA, that their environmental protection programs were

effective at keeping impacts to the environment ALARA and that their conventional health and safety programs continue to protect workers.

Based on CNSC staff assessment from compliance of activities of the site inspections, review performance indicators, desktop reviews, event incident reviews, general communication, exchange of information with licensees, staff conclude that in 2011 each regulated facility operated safely and met performance expectations with respect to the health and safety of persons and the environment and Canada's international obligations.

This concludes the presentation by CNSC uranium mines and mill staff and now available to answer questions.

**THE CHAIRMAN:** Okay. I assume this is Part One question, so why don't you jump right into it? Also, we have Cameco and AREVA people here that can help us in any questions.

And let me start here with Ms. Velshi.

**MEMBER VELSHI:** Thank you Mr. President and thank you CNSC staff for this very thorough update.

This is a 2011 report and at the outset you said you'd present any significant results or trends from 2012. I didn't see any in the report or in the presentation. And I'm just asking, is it false to assume

that there have been no significant results in 2012? And if that's not the case, I think it would be helpful to include that, perhaps in future annual reports.

**MR. ELDER:** Peter Elder, for the record.

You will get some updates in some of the other sections on this one. In terms of the mines and mills, we didn't have any specific updates.

As you've seen, you know -- again in things like while we are doing some detailed analysis of the reports that come in, certainly we would be telling you that if the 2012 data was out of line with the trend that we've seen before, that sort of thing we would bring to you. And you'll see when we get into some of the other facilities, one in particular, we will be talking about the current status for -- rather than what's happened in 2011.

So recognizing that it takes a lot of time to actually -- you know, we don't just take the data from the licensees and regurgitate it; we actually review it, we analyze it and make sure that we agree and it makes sense as well. So that does take some time.

When we get the annual reports that come in, usually in -- they come in in March and April of each year -- is when we actually get the formal submissions.

**MEMBER VELSHI:** Thank you. No, I'm glad to

get the reassurance that had there been any you would have tabled it.

So if you turn to Slide Number 11 and this is on the conventional health and safety performance and the presentation of lost time incidents.

I think it would be helpful if this data was normalized for, you know, 200,000 hours or whatever the standard norm is, so it allows for a more meaningful comparison.

You also said in the presentation that this compares favourably to the mining industry. And I think even a footnote or something to show what the average is so that it's on record on how it compares, I think would be helpful. So that was just a comment.

And following up on the reporting of lost time injuries, further down as you get into the specific mines, you single out some lost time injuries to discuss. So whether it was for Rabbit Lake or I think for McArthur River, you talk about one single lost time injury, provide a little bit of detail. And I just wondered why you'd picked one when they've had three injuries. Is that because that was the more significant one?

**MR. LECLAIR:** So there's two -- that's a very good question.

There were two -- there were two incidents.

One was because the -- actually event warranted a notification report. That was the one event.

The second event, I felt was important to note it was the Rabbit Lake incident. Because if you actually read the report, it's actually not the -- it's not the incident itself, it's what came afterwards.

In the report, as it's noted, the person had a crushed foot, and as a result of premedical conditions, there was some complications that led to an amputation of the foot.

So it wasn't the accident itself but because it was in the report I felt it was important to state that looking at the accident, looking at the event, looking at what was done, that the appropriate corrective actions were taken and appropriate measures were made. So that was the reason why we brought forward those two events.

**MEMBER VELSHI:** Thank you.

**MR. LECLAIR:** But -- just going back in, we chose the ones that we felt were more significant, recognizing that the lost time -- it's not -- the events -- well it's an indicator, it doesn't tell you everything about what's going on, and we also are working on presenting the normalized data.

And so one of the things that we've done is

you get the annual reports -- is that we then have to go back and to make sure that we're asking all the licensees to give us the appropriate data to make those comparisons. So certainly our intention is to start using the normalized data.

And you may have recalled when the power reactor -- people talk about this when we talk to them because even using the normalized data, you have to make sure that you're using it in an appropriate way. And this is very important, actually, when it comes to the mines, because we've looked into this a bit, is on the mine sites there can be significant number of contractors working on the site so we want to make sure we're giving you a data that includes the employees of the company and the contractors. And that was harder to find initially than we thought it would be. So we're looking at making sure that they are giving us that data rather than us going out and find it.

**MEMBER VELSHI:** Thank you.

And my last question is Slide Number 15 which is the compliance with Environment Canada regulations. Found this very, very insightful and I wondered if you could comment on the uranium mining industry and its 100 percent compliance rate and it kind of sticks out from the others. And what does it say

about, perhaps the culture within the uranium mining industry?

**MR. ELDER:** Peter Elder, for the record.

I will point out two things on this one. I got to say that uranium mining is the only one that has a full-time regulator, so that we follow-up on this one and it is actually -- one of the other things going back in, one of the things that the CNSC has done with all licensees -- and this is an effort that's been going on for the last 10 years -- is actually stressing the importance of safety culture and management systems. So if you go back through the trends, if you went back in, you can see that some of the mines -- a few years ago we were saying they needed to improve their management systems as those things come into effect and there's more recognition of the importance of safety culture; then I think you start to see this in terms of the performance of this type of indicators.

But we also note that -- we would -- uranium is the only one that I would say has a specialised regulator that does routine compliance and very close monitoring of these facilities.

**MEMBER VELSHI:** I know we generally don't like to self-congratulate but I think, just the industry and the regulator should take a lot of pride in that.

**THE CHAIRMAN:** I'd like to pursue this. First of all, these are CNSC calculations based on Environment Canada data, is that correct?

**MR. ELDER:** I'll just -- correction, Environment Canada gives us the data, all we've done is amalgamated it into a sector by sector comparison.

**THE CHAIRMAN:** Right.

Did you share this with Environment Canada?

I would like them to include it in their report. Why wouldn't they show benchmarking and compare their sectors performance and put some incentive on the rest of the mining company to come to -- you see the industry are arguing we over-regulate them, and they can use this demonstrating that maybe our regulatory oversight -- I'm being felicitous here, right, in case you don't get it, it's a bit of humour.

The point though is that it definitely shows that uranium mining is safer. So my question is, then how can we use this to deal with some of the very, very topical subject being discussed in -- right now, as we speak in certain province?

**MR. ELDER:** Peter Elder, for the record.

I think what we're doing is we did make -- obviously -- contact with Environment Canada to get the data and see if we could get the 2011 data.

So that report is still being finalized so we will provide the feedback to them, and examples of the comparisons that we have done based on the previous year's data and see if they can start to include this in their report.

**THE CHAIRMAN:** And if you eliminate 2008, you can actually also include the toxicity; you know the fish, the trout test, which is again after 2008. That was one question that was within -- with just 80 percent compliance. But after that it's still 100 percent.

So there is a huge interesting story here about safety case for the uranium mining, vis-à-vis other mines.

**MR LECLAIR:** Perhaps one of the things just to complement what Mr Elder was saying.

One is sharing the report with Environment Canada but it will also be our intention to summarize, extract some of that information and put it on our website as well so that other people can see that as well.

**THE CHAIRMAN:** Okay, thank you.

Ms. Velshi, that's it?

Okay, who's next on my list?

Monsieur Harvey?

**MEMBER HARVEY:** Merci, monsieur le président.

When you look at the performance rating it's satisfactory everywhere. So when you get to -- like on page 12, on such graph, it's the -- well, to evaluate the importance of such a figure. In fact, when we see a Key Lake with nine spills, and I think it's during eight or nine months, it's much more than the others. But then once again you've got to take the importance of the spills, something like that.

When I see McClean Lake while there was almost no activities at the McClean Lake mills or mining, so I've got six spills, so how can we -- what can we deduct from such graph? Taking into account that it's satisfactory everywhere?

**MR. ELDER:** In terms of -- looking at the satisfactory, as you said before, this is, are they in compliance with the requirements or how the overall program is working and we would certainly -- when there are minor issues like the spills -- look at the significance of the spills.

And in these type of industrial facilities the -- you know, while your aim is always to have zero spills, in reality, given the amount of material they are handling and how they are handling you would expect to have a few.

And it's really how they react to the

spills that is as important as having the small spill.

The reporting requirements is any unauthorised release, it doesn't matter if it's 1 litre or 1,000 litres of material, it doesn't matter if it's -- and some of them, if it's clean water that comes out of the wrong point, it is unauthorised release.

So we look at these ones in terms of the satisfactory ratings, again, I would go back and say if you look at the trends, there were certain focus areas that we've had for a number of years that they have successfully met our requirements in those ones.

There was a lot of work over a number of years on fire protection, on management systems to bring these up to the current expectations. Once we've got there, you see through the report, is that we are actually focusing on quite minor incidences.

Not that they aren't -- you know, and so we've actually looking at and now we're going back in and saying -- looking at how those programs are functioning in their actual bases which is why we put some focus on the radiation protection program.

Because we're looking to make sure that those action levels are working. The same with environmental releases, we put action levels on all these contaminants and we are actually now following -- not

necessarily what the regulatory limit is, because they're well below that, but are they actually applying ALARA principles to those releases to keep them low.

So in terms of -- when you look at this, the ratings overall, I don't think -- you know, basically all these facilities are operating quite well and that's why we try do the comparisons with the other mining facilities to try to explain why we say everything is satisfactory.

I think you need that other comparison term because right between themselves there isn't a lot of variation. But that becomes -- in terms of effort and how we approach the regulation and identifying issues at a very small level and getting them dealt with rather than letting develop bigger issues.

I know it -- you know, and again, that's why we're looking at other ones, can we have comparisons because you need that comparison, that comparison with the other mine companies supports us saying these are satisfactory.

**MEMBER HARVEY:** I do understand your explanation, but at the moment we do have a figure in the report to look at it and we try to deduct something from -  
- from the figure.

**MR. LECLAIR:** If I could perhaps add, just

to provide some further context.

So when we look at environment protection we're looking at the entire program. You'll notice in the previous slides we noted the actual performance compared to other mines which is 100 percent performance on effluent releases.

We've included actual data on the effluent releases, which is a key measure of performance on varied performances, what's the quality of the water going into the environment. All the data is, particularly on the parameters of concern, are all trending down.

So when we look at environmental performance and we come up with that rating, we're looking at all factors. We believe it's important for transparency, spills are an indicator of potential things that need to be looked at.

We've included this in the report so that we can show that in fact yes, you see Key Lake, you know, there's nothing secret, everything's available to people to be seeing it.

We have nine incidents. The incidents were not significant, the risks, the consequences, were very low. And perhaps more importantly is what was the reaction and how did the licensee respond to those incidents. And as we noted, they identified a number of

corrective actions, they implemented them.

And in the last quarter of the year, there were no more spills. So when we look at the rating systems, we're looking at the entire program, we're looking at the implementation program.

We certainly are looking at spills and spill frequency is one indicator. But it's also the effluent releases, the quality of the water going into the environment and downstream effects that make up the whole assessment.

**MR. ELDER:** Perhaps Mr. Harvey, there's one -- there's another point I would want to add on this one. We included the table to show that while we're focusing on certain areas, it's not like we ignored the other ones.

So it's really, to my view, the table of all the ratings, it's just to show yes we did think about all those ratings, we have thought about them. And it's, you know, because we want the reports and each of the sections to focus on what we see as being the key indicators for those facilities.

So it's really just to demonstrate that there was a comprehensive review done, but we're not -- we didn't feel it was appropriate or valuable to everybody to talk about each individual program when those programs are operating fine. But we will give you indication that we

don't have any concerns on them.

**MR. HARVEY:** Okay. I'm just seeing that from the public point of view, and one -- at the moment, you've got something on the paper, you will get questions from that. So if it's so small that it's not important, well I'm just questioning the utility of having it represented there. That's all.

**THE CHAIRMAN:** That's a good kind of thing to talk about, that we -- you remember that many times, when it was the NRU, let me use the NRU, any spill was important to talk about. And in fact, that's when we start measuring any spills and try to assess its importance. So I'm still a fan of seeing a measurement, but that's assessing them.

And really, slide 12 is one way of looking at it, but then of course in the organization -- in the document itself, it gives the time series of Key Lake. And then you can see there's a variation. You know, 2008, there were eight spills, 2009, there was one, and then 10.

So it's another indication in operation which we talk to the operators, presumably. So let me -- maybe it's a good time to talk to the operators. Do you count number of spills and do you investigate every spill for its impact?

**MR. MOONEY:** It's Liam Mooney, for the

record, Vice-President of Safety, Health, Environment & Quality and Regulatory Relations with Cameco.

With respect to the counting of environmental incidents, we do keep track of that, that's an important metric for us as an organization. And we do have a corrective action process that speaks to the risk rating associated with incidents such as these and what sort of follow up is required.

**THE CHAIRMAN:** Okay, AREVA, by all means.

**MR. CORMAN:** Jim Corman, for the record. AREVA concurs with the continuance of reporting of all spills. It's a regulatory requirement that we have and certainly a metric that we follow very closely on site. We set performance objectives for site to continuously look at and improve on these kinds of situations.

I just want to correct one misconception. In 2011, we -- our water management systems were still operating. So at McLean Lake, the process of treating -- handling and treating contaminated waters was continuous.

So that was a source of the number of our small spills. We also encourage a very strong reporting culture so that any spill of any amount is reported to our team and investigated and followed up on. So we're supportive of continuing to report all spills.

**THE CHAIRMAN:** Thank you.

M. Harvey.

**MR. HARVEY:** About McArthur River, it's very nice to see the decrease of the concentration of molybdenum. And is this the end? We've got the curve there from -- it's very important -- from 1.3 to .34. So are we at the bottom there or there will be efforts to go lower than that? And at that level, is there any back on the -- any effect on the environment?

**MR. ELDER:** Peter Elder. I'll start in terms of the back half because I think that's the important bit, is for these ones, for all the mines, there is a very comprehensive environmental monitoring program. And sometimes, we are looking at what's happening inside the plant based on what we see from those monitoring programs and if we're seeing increases in concentrations of certain elements in the environment.

So in this case, we noted in the speaker notes and in the CMD that actually, the concentrations in the environment are stable or decreasing. So if that trend continues, then there probably isn't a need to push more to get that -- those release numbers down. But we will continue to look at what's happening in the environment to see if it is actually seen the -- you know, again, it's a combination of what happens in plants and it's also what is happening in the environment.

So I think Cameco may want to talk to if they have any -- what their plans or future of this one. But our immediate concern was then to reduce it, to control it. And a lot of these contaminants, it's a matter of making sure that you are actually controlling the releases in the long term.

For some of the facilities with molybdenum and selenium, there was no removal circuits. So whatever was in the ore was released. So now, what we're seeing is that they have removal circuits, they're getting constant good performance from those circuits, so it's something that is monitored and controlled.

And then, you have a chance to watch closely to see if you actually see any effects in the environment. Otherwise, we were seeing an increase in the environment because they were not actively being controlled.

So the first one is to put the controls in place and then we'll see, you know, to make sure they get to a place where we believe it's satisfactory. But this is ongoing process of making sure that you're monitoring the environmental effects as well.

**MR. HARVEY:** Merci.

**MR. CHAIRMAN:** Can I cut in, before we get into this, maybe I'd like some -- our environmentalist

specialists to talk about -- a little bit about this lack of standards, right, in molybdenum and selenium. I know there's a provincial standard. It's not a national standard, if I understand correctly.

So what's the long-term view about where are we going with selenium and molybdenum in terms of environmental protection?

**MR. RINKER:** Mike Rinker, for the record. I'm the Director of the Environmental Risk Assessment Division.

From a federal level, the lead for setting limits in the metal mine effluent regulations would be Environment Canada. Certainly for selenium, Environment Canada's done a considerable amount of work on determining what would be an appropriate limit. They've commissioned studies on best available technologies for the mines. And they may in the future be engaging stakeholders in the public on an appropriate level for selenium, and maybe some others, but in the interim the CNSC would look at each facility, on a site-specific basis, consider the risk posed by the environment and set limits for those -- to ensure protection of the environment for those constituents.

**THE CHAIRMAN:** Is Cameco -- I thought that Cameco was the leading -- has the leading technology,

technical -- in terms of selenium, Cameco and AREVA -- I mean, Canada has the leading technology in selenium and molybdenum. So I assume that Environment Canada will talk to them.

**MR. RINKER:** Mike Rinker, for the record.

For some context, selenium is one of the main issues facing the coal mining sector, both in Canada and in the U.S., and there is considerable political discussion back and forth on what would be an appropriate limit ---

**THE CHAIRMAN:** Okay.

**MR. RINKER:** --- and Environment Canada is working on that. In fact, there is a limit in the U.S. that's quite low, and there is no a limit in Canada, and so the U.S. is feeling that that is unfair, and that's one of the drivers why Environment Canada is working on this file

And Environment Canada is engaging the CNSC to look at the work that the uranium mining sector, particularly Cameco, has done in terms of selenium releases to put the whole story into context.

**THE CHAIRMAN:** Anybody from Cameco or AREVA want to comment on this?

**MR. MOONEY:** It's Liam Mooney, for the record.

I would add that Cameco is committed to safe, clean, and reliable production of uranium, and in that conversation molybdenum, which is specifically where we started this conversation, has been an area of focus for the McArthur River project in particular.

This is, in our view, a good-news story as far as the detection of molybdenum in the receiving environment, and then steps taken to determine that there was no effects, and at the same time reducing the molybdenum that's coming out of our facilities -- in our facilities effluent.

Going to your question, President Binder, I would say that on the consultation with Environment Canada we had one of our experts, this week in fact, presenting -- the Mining Association of Canada was hosting a workshop in relation to all things selenium. And in that conversation we had our technical expert from our corporate resources attend and give the story on selenium reduction at our facilities in northern Saskatchewan for the understanding of the broader MAC audience but also the Environment Canada attendees.

**THE CHAIRMAN:** Thank you.

Monsieur Harvey?

**MEMBER HARVEY:** No. Merci.

**THE CHAIRMAN:** Dr. McDill?

**MEMBER MCDILL:** Thank you.

I have only one sort of general comment. I think Slide 15 -- people have drawn attention to it already -- is very helpful to the cadre of intervenors who have come before us, in terms of showing both the strengths of the regulator and the activities and responses of the regulated, but this molybdenum-selenium-radium is not on the chart, obviously.

And I realize it's extremely hard to benchmark when there are no limits, but the comment a moment ago that moly is an issue for coal mining would give us a place to put another line on the next table, you know, 15B, moly-selenium-radium, and radium limits are there so that's okay.

Are there other places -- we could even put the U.S. limit on a slide -- just a suggestion for next year not for this year. Is it possible to do a little bit more benchmarking?

I think the goal is not to prove that the regulated mines are good -- I think they are -- but as a purpose of education, because it's very difficult for the general public to get a handle on this stuff.

**MR. ELDER:** I'd maybe note -- we certainly can look into that.

The challenge we would have is that the

reporting requirements are based on the regulations that all mining companies must comply with. If selenium-molybdenum is not a regulated limit currently in the other industries, the availability of information is questionable, and being able to get the information may also be a bit of a challenge because of the obvious sensitivities around that issue.

But that's certainly something we definitely would look into to see how we might be able to incorporate some other data, like you were mentioning, uranium-molybdenum-selenium, that we're looking at for uranium mines and mills. But we'd definitely want to work closely with Environment Canada to ensure that that kind of information is brought forward in a way that all parties and stakeholders are informed and aware.

**MEMBER McDILL:** The President brought up the recent hearings we were at, and there may not be opposition in some communities to mine type 1, but unless the uranium mines can identify themselves as not having bad effluent, it's tricky, right, and education, I think, you know, is a part of our job.

Thank you.

**THE CHAIRMAN:** Thank you.

Mr. Tolgyesi?

**MEMBER TOLGYESI:** Merci, monsieur le

président.

I will have just a few. When you're talking about -- Mrs. Velshi was talking about accidents, it's true that, generally, it's accepted that it's the frequency not the number accidents, but it's the frequency which is compared and the frequency is measured per 200,000 hours worked, which is about 100 persons, say, 2,000 hours per year, and the severity, which means the lost days per accident. And I didn't see that here. I saw just a number of accidents, lost time incidents.

So if you would like to compare to other sectors, other mining sectors or so. And I'm quite sure that uranium mines, they have these figures, because they are participating on a John T. Ryan trophy, which is a lost time injury or incident per 200,000 hours. So you have those figures, so probably we would include them somewhere here.

**MR. LeCLAIR:** Yes, I'm quite familiar with the John T. Ryan Trophy Award.

We actually have been looking at the data, and perhaps I should clarify. We have been looking at the data. The challenge we're having is in ensuring that we're doing a proper comparison, that the lost-time incident statistics that we're looking at include all workers.

There's always a challenge when looking at results -- safety results, is ensuring that all comparisons are equal. We have some data from Saskatchewan, because I think it's also important to talk about uranium mines compared to other mines within Saskatchewan, compared to other industry, and we do have reports.

We have quite detailed reports on first aids, medical aids, lost-time incidents, and frequency statistics, but we haven't had a chance yet to make sure that all the data is complete and it includes all workers, for instance, at the mines, because of the large contractor component within the statistics. So we do have that information.

It certainly is my intention to come back, and we should be in a much better position next year to include that information, but we just want to make sure that we've analyzed the data.

Because, for instance, we've looked at our reporting for lost-time incidents in our own report, and we're looking at the numbers in one of the other reports, and they don't line up, and I think it has more to do with who's included, which workers are being included within those statistics.

So it's just those kind of things that we

need to sort out and make sure that we're clear on, so that when we come forward and we bring forward some data, that we're really very clear on who is included within those statistics.

**MR. MOONEY:** Liam Mooney, for the record.

And if I could just add in that regard, our LTI numbers do include contractors at our facility. I think part of the complication is it's not necessarily clear with other comparables facilities if they include contractors. So that's a complication.

On the John T. Ryan Award, I think it would be appropriate to just crow a little bit about our McArthur River operation in that regard, which won the national John T. Ryan a couple of years ago, and won the regional John T. Ryan for 2011. So that's indicative of very strong safety performance on the conventional side, and it's very heavily tied to LTI performance. So we have that sort of benchmarking across Canada that speaks to the safety performance at one of our facilities.

**MEMBER TOLGYESI:** Just to say, that regulations for John T. Ryan require that all employees, including contractors, are included.

Now ---

**THE CHAIRMAN:** Just to finish on this, could we make sure we don't get back to our big internal

debate about the purity of the data and use what is normally accepted as a standard. Remember, we had this debate when we were looking for RD-GD99.1 and all the indicators. I thought we put this away, because we've agreed we're going to use existing standards, however they're defined.

**MR. ELDER:** Agreed on that one, is to use the existing standards and -- you -- we are getting that information, like I said, from Cameco and for our purposes when we look in the site we -- you -- because of how we do it, it's ---

**THE CHAIRMAN:** Let's not do it -- that's my point, let's not do it, just take it from how it's reported up the line to many of those award and many industry statistic being collected by governments.

**MR. ELDER:** But I'm saying there are two -- even when you look at that there are two different ways that are being done and that's our problem. We got the statistics from Cameco, we didn't ask for anything different, we said give us your statistics that they would use for things like the competition and the -- in the associations and then we looked at what was in the provincial data reports.

And they actually don't match because the province regulates the company and doesn't -- it regulates

the company and the contractor separately, for other ones, they combine everything.

So I don't -- we're not looking for anything purist we're trying to use available information. When we try to do a comparison we ran into some minor issues. So maybe the easiest comparison to start with is actually within the mining industry, where I think there is a standard view.

**THE CHAIRMAN:** That's what I'm talking about.

**MR. ELDER:** Yes, but then you can't -- some point your comparison -- well how does that compare against other types of occupation and then you run into problems sometimes, the contractors are in there, sometimes -- you know, you just have to be cautious in the comparisons. I think that you can still make them, but let's get the proper data.

We're not asking again -- we've said all along we're not going to ask -- invent our own, we're going to use the standard one and then we looked into this one and find out there are two standards so..

**THE CHAIRMAN:** Mr. Tolgyesi?

**MEMBER TOLGYESI:** Merci.

Now, when I'm looking at this Appendix E on your document, where you are talking about radiation data;

I expect that the total persons monitored, it's the number of employees who are working on the site, and it's not the number of persons who were -- somebody was monitored 10 times a year or 20 times a year; it's not 20 in this number but it's only one. Am I right?

**MR. ELDER:** Peter Elder, for the record.

These statistics, if you look -- I'm going to give you on the mines, I think Cigar Lake will be the most dramatic one, if you look at page 133.

It's number of people that are monitored, so it's not -- we're not double-counting the people but it does include the contractors.

And you can see in something like Cigar Lake, the number of people from 2009, there were 700 -- you know, about 800 people monitored; by 2001 when they were heavily into construction there's almost 2,000.

So these are people, individual people who have worked on the site and were monitored. They're not necessarily all full-time employees but if someone came in for a month to do a particular job, got monitored, they'd be included in the statistics.

And one of the other things we're trying to note, is we're trying to give -- but that gives you a good -- these statistics give you a good indication of how many people, over a course of a year, are working on those

sites.

**MEMBER TOLGYESI:** So you see that's where we have if somebody is coming, it's counted as a person but he worked just a week.

So when you do your frequency on 200,000 hours you could just forget that he came for a week or a day or six months or 12 months, so it will be much easier, you know, you could compare figures.

Just to say that when I compare the table at 134, I think it's a typing error, it's 1,253 employees at McArthur and at page 19 it's 1,192. I suppose it's just a typing error.

**THE CHAIRMAN:** You're moving too fast for us. One thirty-four (134) McArthur.

**MEMBER TOLGYESI:** Yeah, 134 McArthur River, total persons monitored 2011, 1,253.

**THE CHAIRMAN:** I got that. Compared to?

**MEMBER TOLGYESI:** And you go to page 19.

**THE CHAIRMAN:** Page 19.

**MEMBER TOLGYESI:** Number of nuclear energy workers at lost time incidents, you go to McArthur River, 2011, it's 1,192.

**MR. ELDER:** What I'll do is I'll see if we can direct this back to Saskatoon, see if someone can give me an answer right away and if not we'll get you an answer

so that we can correct that on the record because I'm not sure which one is correct. So maybe we can move it to Saskatoon.

**THE CHAIRMAN:** Anybody in Saskatoon that can answer it now, if not, get back to us. Or Cameco.

**MR. ELDER:** But we'll -- we'll try to get back to you. I mean we're obviously going to be here for the rest of the day, and I think we're going to be on lunch break, so hopefully over lunch ---

**THE CHAIRMAN:** Right.

**MR. ELDER:** --- we'll be able to find out.

**THE CHAIRMAN:** Okay, let's do that.

**MEMBER TOLGYESI:** I have another question, it's a little bit of -- you know, when you were saying that this morning that -- on page 7, kilograms of milling, uranium concentrate, Key Lake, it was, you said, 9 million -- how much?

**MR. LECLAIR:** That was 9,026,888.

**MEMBER TOLGYESI:** Yeah, which is not the same as when you looked at page 42 where it's 9,063,888.

**MR. LECLAIR:** Yeah, you're correct, sorry, my mistake. I was looking at the 026 on the 2010 data. That's correct.

**MEMBER TOLGYESI:** Okay.

**MR. LECLAIR:** Nine million sixty-three

thousand eight hundred and eighty-eight (9,063.888). My apologies.

**MEMBER TOLGYESI:** Because I was looking at this and I was missing something.

**THE CHAIRMAN:** And you thought we don't read these documents, right.

**( LAUGHTER/RIRES )**

**MEMBER TOLGYESI:** I just -- to explain, when I'm looking -- go to the page 7, uranium mines and mills. On the upper part is mining ore, bottom part is milling. Usually what you mined eventually you mill.

So we mine the 277,000 tonnes and we mill the 398,000 which is about 120,000 more. I suppose it's a -- it's a development ore, low-grade, because the grade of Key Lake is much lower than the McArthur River say.

So -- and when you look over years or it's a stockpile; I don't know.

**MR. LECLAIR:** I'll give you -- let Cameco answer that questions. But fundamentally, is, Key Lake blends the ore with stockpile material in order to get it down to that grade.

But I'll let Cameco maybe explain that a bit more.

**MR. ALONSO:** Jean Alonso, Director of Compliance and Licensing for the Mining Division, Cameco,

for the record.

You're right, it's not -- the mining method doesn't allow for a traditional stockpile that you would see in a conventional mine, for example, at McLean Lake where they would stockpile and then feed that material into the mill.

So that the differences that you're seeing is accounted for with in-circuit inventory between what's in the mine and what's in the circuit set at Key Lake.

So it hasn't been put in the bin yet.

**MEMBER TOLGYESI:** When you were looking at spills, in general I'm talking about spills. It kind of increased, specifically on one operation which was -- I'm sorry -- it was Key Lake I think.

And when you look in the addendum where you describe these leaks or spills, it's Appendix G, on page 145, when you are looking it's a kind of various source of leaks, spills, it's not necessarily one specifically.

But what you do -- what you have is a plan or program to prevent these leaks?

**MR. ALONSO:** Jean Alonso, for the record.

I think you make a good observation; that there's a few different sources and often times what we identified as the cause is really related to when we're doing activities that aren't -- that are out of the

ordinary.

So a number of them that -- that made it into the stat were the result of temporary breaches of containment in the plant floors, when we're repairing plant floors, and providing proper containment, and they had not done an adequate hazard assessment of that particular risk.

So what you've all -- what we've learned from there and implemented is a breach of containment protocol, and improved that practice so that prior to doing -- and so going forward now, those types of circumstances when we're going to have some sort of unusual activity, there's a process that we'll follow that's -- that we've improved that allows us to account for those.

**MR. MOONEY:** I would add on that, going back to the bookends that staff put around this, that the spills, the way they're characterized, it's an unauthorized release, so a very low threshold for reporting.

That being said, we do take things seriously and I would echo Mr. Corman's comments in relation to encouraging a reporting culture in that regard. But I would flag that the last four months, after the corrective actions were put in place in Key Lake,

we're spill free and that operation is 435 days without an environmental spill as of today.

So you know, there was corrective actions identified. They've been implemented and tracked through our Cameco incident reporting system, and they've been effective.

**THE CHAIRMAN:** I found that the report's really useful because it put the discipline to explain each unauthorized spill and, obviously, if they occur too often you will take action and, if it's not, I think staff will get engaged.

So I found them very, very useful, and I think it's a good explanation. And I encourage to continue to report it that way.

Anybody else before we break for lunch?

**MR. ELDER:** Just to -- I've been informed that our Saskatoon people do have the answer to the question about which number was right on the production.

**THE CHAIRMAN:** Okay. Saskatoon?

**MR. STEWART:** On the production.

**THE CHAIRMAN:** Go ahead, please.

**MR. STEWART:** For clarification, the answer that we have is with respect to the number of workers on Table 19 versus the one in Appendix E.

This is William Stewart, for the record.

And it's our understanding of those two different values are, one is the total workers monitored by the radiation department for dosimetry. The other one is in total nuclear energy workers. So individuals who are not nuclear energy workers may also be monitored.

So there's two different sources for that data and that's why it's clarified for -- one is total nuclear energy workers versus the other one is total persons monitored. And that's why they are different numbers for McArthur River.

**MEMBER TOLGYESI:** I'm a little bit confused because I suppose that you have contractors also who are coming to the site and they are not necessarily energy -- nuclear energy workers, but you monitor them. So -- and it should be probably something like this on other sites also, but it's not. So I'm ---

**THE CHAIRMAN:** We've got lunch to really figure it out and compare it with the other site, which reports differently.

**MEMBER TOLGYESI:** Only one -- I think that it would be useful if we add to this report its number of employees and number of contractors, maybe equal and full-time contractors or employees, something like that. It will give you a kind of sense of the size.

**MR. ELDER:** Peter Elder, for the record.

We agree that we're trying to look into that one again. The number of employees you can get very quickly. The number of contractors, I think you'd have to do it -- because of large numbers, again, we'd have to normalize it to ask if they could give us a normalized number, like a full-time equivalence of the contractors because very much they are in for two weeks, or anything like that one. But we agreed to look into it.

**MEMBER TOLGYESI:** Or if you used the number of hours. Number of hours that ---

**MR. ELDER:** Well, that's where we -- it is a full-time equivalent to the -- to convert it to number of hours.

**THE CHAIRMAN:** Okay. Let me just remind ourselves, this is the first annual report of the mines. So first of all, congratulations, I think I found them very useful, learned a lot and I like that we will continue to improve it in the next few years as we gain more experience with it.

And so congratulations on that, but there's always room for improvement. That's our mantra. And we've just got to be careful that we don't make it too unwieldy so we cannot absorb it, and we obviously will have to allocate a little bit more time for going through such reports.

So we will break for lunch for 45 minutes, reconvene at 1:45, and we will go for Part 2 of this report. Thank you very much.

--- Upon recessing at 1:06 p.m. /

L'audience est suspendue à 13h06

--- Upon resuming at 1:54 p.m. /

L'audience est reprise à 13h54

**THE CHAIRMAN:** Okay. We're back and we are now into Part 2 of your presentation, Mr. Elder.

**MR. ELDER:** Thank you.

**THE CHAIRMAN:** Please continue.

**MR. ELDER:** Thank you. Just quickly before we start, we do have an answer on the doses for the RP.

I can do -- the 30-second version is they are both -- both numbers are right. It's just the question of how the programs are -- how the nuclear energy workers are defined and monitored between the different sites.

And we did quickly check through all the numbers, and there are other instances where the numbers don't match.

So sometimes they do and it's a variation in the radiation protection programs. And for next year,

we'll make sure that we've clarified -- if there is such a variation, that we put a footnote on the variation as well.

With that, I will pass it over to Mr. Ravishankar, who is going to go through the next portion of the presentation.

**MR. RAVISHANKAR:** Thank you, Mr. Elder.

Good afternoon, Mr. President and Members of the Commission. My name is B.R. Ravishankar, Director of the nuclear processing facilities division.

This portion of our presentation will cover Canada's uranium processing facilities and will begin with an overview of the location of each facility, followed by a brief review of each facility's 2011 safety and control area ratings.

I will then provide an overview of the performance for the safety and control areas of radiation protection, conventional health and safety and environmental protection. For each facility, I will provide some specific highlights for the year.

There are five uranium processing facilities in Canada. All are located in the province of Ontario. They are the Blind River Refinery, the Port Hope Conversion Facility and the fuel manufacturing facility. All these three are Cameco's facilities. And the fuel

fabrication facilities in Peterborough and Toronto that belong to GE Hitachi Canada.

The two GE Hitachi Canada facilities operated under separate licences up until December 2010. However, at the time of renewal in January 2011, the two GE Hitachi Canada facility licences were combined into a single licence. Therefore, this report includes performance data for both facilities, but has only one safety and control area performance rating.

All five uranium processing facility licences have been renewed in the last two years. Their licensing durations are provided on the slide.

In addition to these operating licences, all of them have Licence Condition Handbooks. The report includes the 2011 performance ratings for five uranium processing facilities.

The licensees' requirements to satisfy each safety and control area are dependent on facility-specific activities and the risk that those activities may pose. CNSC staff rate each safety and control area based on the results and observations from the compliance and licensing activities.

For 2011, all five facilities received a satisfactory rating in the safety and control areas of conventional health and safety and environmental

protection. The conventional health and safety and environmental protection areas at GE Hitachi Canada were rated as fully satisfactory.

In 2010 CNSC staff rated the Blind River refinery's waste management safety and control area as below expectation. Since that time, the Blind River refinery has made significant improvements and, therefore, that safety and control area was rated satisfactory for 2011.

Radiation protection: This slide provides a comparison of the annual average and maximum effective dose to workers at each uranium processing facility during 2011. The maximum dose received by a nuclear energy worker was 12.6 milliSieverts at the Blind River refinery. The average dose at each facility ranged from 0.72 milliSieverts to 2.7 milliSieverts. Effective doses to nuclear energy workers were kept well below the annual regulatory limit of 50 milliSieverts at all uranium processing facilities.

Additionally, worker exposures to ionizing radiation are being kept as low as reasonably achievable by all five facilities.

The next slide shows the dose to the public from each uranium processing facility for 2011, which is calculated using environmental monitoring results. Public

doses resulting from operations at GE Hitachi Canada facilities are based on environmental data. The calculated public dose is below 0.001 milliSievert per year since these facilities have very low emissions. Doses to the public from all uranium processing facilities continue to be well below the applicable regulatory and our licence limit.

Environmental protection: To confirm the effectiveness of emission abatement systems and to monitor the impact of uranium emissions from the facility on the environment, all facilities, except GE Hitachi Canada Peterborough, operate high volume air samplers.

A risk assessment for GE Hitachi Canada Peterborough facility has demonstrated that the ambient air sampling is not required since the measured releases from the stack are already lower than the Ministry of Environment's standard for uranium concentration in ambient air at the fence line.

The results from the high-vol samplers for 2011 shown in this slide indicate that the maximum annual average concentration of uranium in ambient air measured around any uranium processing facility was less than 0.03 micrograms of uranium per cubic metres, the new Ministry of Environment air standard for uranium that will only take effect on July 1<sup>st</sup> of 2016.

Soil monitoring programs are intended to monitor the long-term effects of air emissions to show whether there is accumulation of uranium in soil in the vicinity of the facility.

This slide shows the annual average uranium concentrations in soil. This value for all the facilities is well below the most restrictive limit which is Ontario Ministry of Environment's guideline of 23 micrograms per gram for residential or parkland land use.

Elevated results at Cameco fuel manufacturing are due to historic uranium contamination which is common to the Port Hope area.

All sampling programs are risk-based and hence the sampling frequency has been reduced to every three years in the environmental monitoring program for Cameco fuel manufacturing. The risk is assessed to be lower now due to the cancellation of the low void reactivity fuel project back in 2010.

The GE Hitachi Canada Peterborough facility does not conduct routine uranium in soil sampling as part of its environmental monitoring program as the uranium releases to the environment are very low and the environmental risk assessments indicated that soil monitoring is not required.

Soil sampling results in 2011 continue to

indicate that current uranium emissions from the uranium processing facilities have no measurable impacts on the surrounding soil.

As summarized in this Slide Number 33, the frequency of recordable lost-time incidents reported by all facilities has remained low in 2011. There are no trends with respect to the number of lost-time incidents reported to the CNSC.

CNSC staff conclude that the uranium processing facility licensees have been implementing their conventional health and safety programs satisfactorily during 2011 and their programs were effective in protecting the health and safety of persons working in the facilities.

In the next few slides I will provide some specific highlights for each uranium processing facility for 2011.

This slide talks about the Blind River refinery. The Blind River refinery operates a Class 1B nuclear facility in Blind River, Ontario. The refinery processes natural uranium ore concentrates into natural uranium trioxide. Cameco receives uranium ore concentrates from mines and mills worldwide.

At the time of re-licensing the Commission approved Blind River refinery to increase their

production capacity from 18,000 tonnes to 24,000 tonnes per year. During 2011 there were no significant process modifications that affected safety-significant systems. The design and development of training programs based on systematic approach to training for all the necessary positions were completed by Blind River refinery in 2011.

There were two minor transportation related events reported in 2011. Neither incident had any effect on the environment, the health and safety of persons or security. CNSC staff are satisfied with the actions taken for these events. There were no other reportable events that year.

The Blind River refinery continued to operate within the framework of the *Nuclear Safety and Control Act* and met all requirements as per its operating licence.

In 2011 there were no regulatory or licence limit exceedences.

The Port Hope conversion facility is located in the Municipality of Port Hope, Ontario, situated on the north shore of Lake Ontario. The Port Hope conversion facility primarily converts uranium trioxide powder produced by the Blind River refinery to uranium dioxide and uranium hexafluoride.

Uranium dioxide is used in the manufacture

of CANDU reactor fuel bundles, whereas uranium hexafluoride is exported for further processing into fuel for light water reactors.

In 2009 the Port Hope conversion facility reported a series of events that upon investigation revealed operator error. Subsequently the Port Hope conversion facility developed and implemented a systematic approach to training for all uranium hexafluoride plant-operator positions. CNSC staff reviewed the training program and its implementation and found them to be satisfactory.

There was one action level exceedence reported for the uranium dioxide plant that was deemed to be a result of maintenance work on the uranium dioxide main stack. Cameco implemented corrective measures to address this issue. CNSC staff are satisfied with the actions taken.

There were three lost-time incidents in 2011 at the conversion facility. One related to a finger laceration while performing maintenance work on a drum dryer. A detailed investigation was conducted and revealed that no dose limit had been exceeded and that no health effects are expected from the estimated doses to the affected worker.

The second incident involved an operator

suffering from first-degree burns to his upper chest and neck as a result of being exposed to a liquid electrolyte when attempting to take level readings on a fuel cell with high pressure in it. This resulted in a 12-day plant shutdown while an investigation was carried out. A root-cause analysis was undertaken resulting in seven corrective actions. CNSC staff are satisfied with these corrective actions and will follow-up on the implementation of these actions.

The third incident involved a worker suffering from heat stress while wearing a full chemical suit. Initially the worker's symptoms were treated, classified as first-aid and was later classified as a lost-time incident. As a result, Cameco investigated the incident, resulting in five corrective actions to prevent a similar incident. CNSC staff are satisfied with the actions taken by Cameco.

The Port Hope conversion facility continued to operate within the framework of the *Nuclear Safety and Control Act* and met all requirements as per its operating licence. In 2011 there were no regulatory or licence limit exceedences.

The conversion facility continues to evaporate rather than discharge process liquid effluent. This practice has been ongoing since 2007 and has been

reported to the Commission in the past.

In January 2010 Cameco submitted a site-wide environmental management plan for the conversion facility. The objective of the plan is to identify additional options that will further reduce contaminant discharges to Port Hope harbour and Lake Ontario to as low as reasonably achievable.

As a result, Cameco added an additional four groundwater capture wells. These wells commenced operation in October 2011. CNSC staff note that the effectiveness of these four new wells will not be fully appreciated until several years of sampling data is collected for a proper trend analysis.

CNSC staff find that the groundwater quality across the conversion facility site remains stable. In turn, there has been no change in harbour water quality.

The Port Hope conversion facility's soil monitoring program includes annual sampling in the municipality, including the waterworks parking lot. The average uranium in soil concentrations in 2011 remained similar to past years. This indicates that current uranium emissions from the conversion facility have had no measurable impact on soil.

Cameco Fuel Manufacturing operates a Class

1B nuclear facility in Port Hope where they primarily produce natural uranium dioxide fuel bundles for CANDU reactors.

During 2011 there were a number of facility changes, including the establishment of a fuel storage area in the north side of the main building. This will reduce the number of tractor trailers used for the temporary storage of new fuel bundles waiting to be shipped out.

There were two incidents in which action levels were exceeded during 2011 at CFM both involving worker exposure, one associated with extremity dose of an employee in the first quarter of 2011, and another associated with the external whole body dose of an employee in the fourth quarter. Cameco Fuel Manufacturing's corrective actions to address both action level exceedences were acceptable to CNSC staff.

Two lost-time incidents occurred in that year, one involving a back injury while installing a spill blanket in the waste storage building, and the other involving a janitor slipping while stripping and waxing the floor. Each incident resulted in a one-day loss of time.

The Cameco Fuel Manufacturing facility continued to operate within the framework of the *Nuclear*

*Safety and Control Act* and met all requirements as per its operating licence. In 2011 there were no regulatory or licence limit exceedences.

GE Hitachi Canada: The Toronto facility of GE Hitachi Canada occupies a small site in the City of Toronto where uranium dioxide powder is processed into precision and dimension ceramic pellets. The majority of these pellets are shipped to their Peterborough facility and assembled into CANDU reactor fuel bundles while the rest are sent to their U.S. facility for further processing.

The Peterborough facility is part of a larger industrial site that belongs to General Electric Canada. This site is located in the middle of the City of Peterborough in Ontario. The Peterborough facility takes the uranium dioxide pellets, fabricated in Toronto, and assembles them into CANDU reactor fuel bundles.

In addition, GE Hitachi Canada Peterborough facility has a nuclear services and design business, which includes work associated with receiving, repairing, modifying, and returning contaminated equipment from offsite nuclear power plants.

For 2011 CNSC staff rated all safety and control areas the same as in 2010. Of the 14 areas 12 are rated satisfactory, while the environmental

protection and the conventional health and safety control area remain fully satisfactory.

A safety culture council was established globally for GE Hitachi Canada. This improvement has resulted in a process for reporting concerns which are tracked in a central database.

GE Hitachi Canada continued to operate within the framework of the *Nuclear Safety and Control Act* and met all the requirements as per its operating licence. In 2011 there were no regulatory or licence limit exceedences.

In conclusion, for the 2011 year, CNSC staff's compliance activities confirmed that a satisfactory and above performance rating was assessed for all 14 safety and control areas for uranium processing facilities. All licensees' radiation protection measures were effective at keeping doses as low as reasonably achievable; that their environmental protection programs were effective at keeping impacts as low as reasonably achievable, and that their conventional health and safety programs continued to protect workers.

Based on CNSC staff's assessment activities of site inspection review of performance indicators, desktop reviews, and other compliance verification activities, we conclude that in 2011 each

regulated facility operated safely and met performance expectations with respect to the health and safety of persons and the environment and to Canada's international obligations.

This concludes our presentation on uranium processing facilities. We are now available to answer questions.

**THE CHAIRMAN:** Okay, thank you.

Just to point out that there's still a representative from Cameco, and from GE, to answer any -- GE Hitachi, to answer any questions that might come up.

So let me start the questions with Ms. Velshi.

Okay, I'd better read my notes here. There's also an intervention filed by the Port Hope Community Health Concerns Committee, as outlined in CMD 12-M55.1, and I guess also when we are asking a question we should also consider dealing with some of the intervenor observations, okay.

So back to Ms. Velshi. No questions?

**MEMBER VELSHI:** No.

**THE CHAIRMAN:** Monsieur Harvey?

**MEMBER HARVEY:** Merci, monsieur le président.

I've got maybe one or two questions for

Cameco and the staff. It's about the groundwater. You mentioned that groundwater continues to be captured and treated on the site, four additional groundwater capture wells installed. What is the objective of those new wells? And -- well, first, I will ask that question first.

**MR. ELDER:** Well, just to -- just a quick answer and then to give you some details, because this is based on some modelling and analysis report. Was the basis of the new wells was to make sure that -- a quick history is that there was -- there is contamination on the site that cannot be easily cleaned up with the current buildings in place so Cameco installed a series of wells.

And we work very closely with the Ontario Ministry of the Environment to make sure that -- reviewing the data to make sure that the wells are -- the current wells are capturing where we think the plume is going. So the addition of wells was actually to give more coverage and capture any parts of plume.

But I'll ask Mike Rinker to give you a quick view of the science behind the additional wells.

**MEMBER HARVEY:** Is this to say that the plume was extending, or were ---

**MR. ELDER:** I'll pass it to Mike.

**MEMBER HARVEY:** Okay.

**MR. RINKER:** Mike Rinker, for the record.

In general, you know, the groundwater contamination at Port Hope went through a stepwise evaluation and then a risk management plan, where part of that was to set up a series of groundwater wells to capture the plume. And there was some performance criteria put to that network of wells and that would require capturing the plume, making sure that it was capturing the uranium that was leaving the facility, and then also causing some sort of drawdown on containment that would give you an indication of whether you were, indeed, catching the rear and incoming in the right areas.

After a couple of years of monitoring, Cameco deemed that they did need four more wells to supplement what was already there. So it wasn't another area, it was simply to supplement the network of wells that are in existence, for the same purpose.

**MEMBER HARVEY:** Those wells are very -- it's not far from the water. Am I right?

It's close -- where all the contamination at the time was located.

Have you noticed any changes in the quality of the water coming by that pumping? Is there -- it's

always the same thing or is there any, you know, is it better than it was in the past or -- and will you have to pump forever?

**MR. RINKER:** I think Cameco may have more details than I have handy. But in general, there's -- much of the contamination was in the dirt and soils in and around and underneath buildings at the facility.

What could be excavated was excavated, but there was some residual contamination left because it was underneath the foundations of some structures and you couldn't remove all of it.

So some of the uranium was expected to continue to flow through the groundwater towards the turning basin. And there were some estimates on how much uranium is there and how it would steadily decline over time.

But over a few years, there's been some decreases, but it's not a substantial decrease, it's not -- we're not expecting to get 50 percent one year, 25 the next and be finished in the third, it's a much more gradual decrease.

And I should add that Vision in Motion, Vision 2010 project, has as part of its goal is to do much more site remediation and to remediate this problem. So we're not expecting these groundwater wells to be the 30-

year solution, they are the temporary solution and there's another plan in place.

**MR. ELDER:** Just -- Peter Elder -- just add one additional point, one of the areas that we were discussing yesterday on the Port Hope Area Initiative that needs to be cleaned up is the Port Hope Harbour. So there is historic waste in the harbour as well so we are not relying on the water quality of the harbour because it's actually already contaminated from the historic waste.

And rather than trying to see -- you know, we're trying to prevent it before it gets to the harbour because -- essentially. But the harbour quality water is stable. I won't say it's great because there is historic material in there as well.

**MR. HARVEY:** Cameco, you want to add something?

**MR. MOONEY:** It's Liam Mooney, for the record. I would just add in that regard that the site-wide environmental management plan and the site-wide risk assessment spoke to doing -- taking certain steps. And the four additional wells that were brought on in 2011 were above and beyond that.

Right now, echoing Mr. Ravishankar's comments, it's too early to see what effect those four additional wells are having, but we nevertheless expect

they will assist in the -- in alleviating the contamination.

**MR. HARVEY:** Where goes the water after being treated? Directly in the basin or the sewer?

**MR. RAVISHANKAR:** Currently there is no liquid effluent discharge of any kind of the processed waste water. The groundwater, once it is captured, it is -- there is a treatment -- evaporated treatment system, which is a recognized treatment methodology for these things. And the sludge is then shipped out, there is no liquid effluent discharge.

**THE CHAIRMAN:** Dr. McDill.

**DR. MCDILL:** Two questions. Excuse me. I wonder since we don't know whether this intervenor was watching yesterday, could you -- with respect to the bullet at the bottom of page 3 and the clean up, I realize we're sort of crossing topics a bit here, the clean up with respect to natural uranium, could you reiterate what your understanding was of what was said yesterday with respect to natural uranium versus U236, et cetera.

**MR. ELDER:** So Peter Elder, for the record. I will just repeat what AECL said yesterday ---

**DR. MCDILL:** Thank you.

**MR. ELDER:** --- is that they are cleaning up all the uranium in the town that is above the criteria.

So they're not doing isotopic anywhere they see uranium. Regardless of the isotope, above those clean up criteria, they will be cleaning up.

**DR. McDILL:** Thank you. And my second question relates to the uranium and soil for residential parkland. In a comparison of -- it's your slide number 32 -- the 4.8 at Blind River and the 4.4 around Cameco fuel manufacturing, these are approximately the same in terms of magnitude. Could you or Mike Rinker perhaps discuss what this means for the people in the community. Thank you.

**MR. RINKER:** Mike Rinker, for the record. Province-wide, I guess you could say that the average natural background concentration of uranium is in the two to four range. So what we would be looking for is first of all uncontaminated soil has two to four milligrams per kilogram or ppm of uranium.

And we're watching very closely for this soil monitoring to watch for trends. So if that soil plot is at, you know, in the two to four range, are there releases from those facilities that would bring them up to 10 and so on. That doesn't necessarily mean that there's a risk because those are still very low. However, it gives a sense for either releases from the facility that are causing accumulation that could accumulate over time.

And you would compare those, I guess, to the generic clean up criterion that is established in regulation for Ontario of 23 ppm. And that really is if you clean up the 23, you don't have to do a risk assessment because you're pretty much convinced, without a risk assessment, that there is not a risk. And these values are a factor of 10 -- I guess factor 5.

**DR. McDILL:** For next year, would it be worth putting a bar across with natural background for Ontario? Sort of down around the two to four or maximum background in Ontario. I'm assuming we're talking about --

**MR. RINKER:** Mike Rinker, for the record.

**DR. McDILL:** Blind River's not to the north.

**MR. RINKER:** Yes. I guess the difficulty is it's a very variable number as opposed to a line. It's a range and you can say in general two to four. There may be pockets of Ontario, certainly in say the Bancroft area where it's much higher.

And so it would -- to get a value for Port Hope, you would -- or in that region -- it would take some study to give something that is meaningful because the -- you know, two to four is what we expect for natural background as an average, but the variance is fairly high

in the background.

**THE CHAIRMAN:** Nevertheless, I still think it could be useful to find a way of depicting what is out there in nature. However complicated, if you have to put a range, people can understand a range and they can understand it varies across this large geography of ours. But it puts a good context to what is -- what kind of standard we are starting to achieve.

**MR. RINKER:** And I think we'll again look into them and see if we can see some -- get some numbers in terms of what the average concentration for this one would be.

**DR. McDILL:** If Bancroft happens to be the highest in Ontario, there's no reason why it couldn't -- I'm not sure the Bancroft municipal government might care for it, but that would be something to put on.

**MR. RINKER:** Yeah. And I would point out, in terms of the 23 number is, again, is based on calculations -- very conservative calculations on restricted use. So that would be -- in residential, the assumption would be is that you would have a toddler in the backyard eating the soil. It's -- so they're very conservative numbers and they're purposively very conservative to make sure that you can have completely unrestricted use and there's no health effects from values

below 23.

**DR. McDILL:** I understand that, but ---

**MR. RINKER:** I understand ---

**DR. McDILL:** Something for the public to get their teeth around.

**MR. RINKER:** Yes.

**DR. McDILL:** Thank you.

**THE CHAIRMAN:** Mr. Tolgyesi.

**MR. TOLGYESI:** Merci, M. le président. On Shield Sources Incorporated, at page 96 -- oh, I'm sorry. I have other one, yeah. I was too fast. This Port Hope community health concern -- I'm within? Okay. On the slide 26, what they are -- there is an unattended truck trailer with cylinder destined transport, probably uranium hexafluoride. And it's parked in the vicinity of, I should say, I suppose it's the facilities, but it's unattended, the truck is not there, just the trailer. It's a -- I understand that the transportation should go through public facilities, but it's normal that it's parked unattended like this, nearby the facility and nobody is there? The truck -- the tractor is not there, just the trailer and there is a wall(ph) or a cylinder. Do you see that?

**MR. MOONEY:** I'll let Dave Ingalls discuss it a bit further but I think on this, we would start on

from the premise on the UF6 cylinders being transported all over the world safely by a number of producers.

And in that conversation, I'll then hand it over to Dave Ingalls for a bit more detail.

**MR. INGALLS:** Dave Ingalls, for the record.

All of our transport of UF6 cylinders do meet the -- both domestic and international shipping requirements and regulations.

This particular picture that's on this slide is actually a picture taken in the Cameco parking lot. So this is the Cameco parking lot where that cylinder is parked and there is access from the public into that parking lot but it is on Cameco property there.

**MEMBER TOLGYESI:** No, my question was that the public has a -- easy access just for your relations with the community, this is what is -- they see.

**MR. INGALLS:** Dave Ingalls, for the record.

All of the transportation of these cylinders has been well studied and then documented to show that the potential dose to the public and also the driver driving the material is very low and well below the public dose limits for any reasonable exposure from the transport of these cylinders.

**THE CHAIRMAN:** But just to put perspective again, can you go and stand beside this truck, okay, for

an hour, what dose will you get? Will you get any dose, will you get a neutron gamma radiation dose? Anybody?

**MR. ELDER:** Peter Elder, for the record.

We did discuss this in the past and what sort of dose you would get. There are guidelines in our regulations on what the maximum dose on contact is. It's in the microsievert per hour range in terms of this one.

So -- and we also had looked in the study about the neutrons and while you can get some neutrons, their travel distance outside of the cylinder would be very short. So ---

**THE CHAIRMAN:** So I'm trying to get, is it safe ---

**MR. ELDER:** I know ---

**THE CHAIRMAN:** Is it safe to stand beside this?

**MR. ELDER:** Yeah, well that's not the -- you asked about -- it is safe; they are designed to be safe. They are designed to be protective of the driver of the truck who's going to be one closest to it for the longest time.

There is no measurable dose to any measure of the public from casual -- you know, even standing beside it for a long period of time.

**THE CHAIRMAN:** Mr. Tolgyesi?

Anybody -- anybody else?

I got -- first of all, you promised that whenever there's an incident, you, Ms. Velshi thought -- asked before that you will update us to 2012 incidents; right?

**MR. ELDER:** Yes.

**THE CHAIRMAN:** Wasn't there an incident in Blind River you want to talk about?

**MR. ELDER:** In terms of -- in terms of this report, in terms of -- sorry may I -- not misspoke coming back in and saying, if we have -- we have outstanding commitment to get back to the Commission.

We presented a notification report about the handling incident at Blind River earlier this year. There is still open to commitment for us to come back and give you an update.

**THE CHAIRMAN:** That's fine.

**MR. ELDER:** That's fine.

**THE CHAIRMAN:** But I think ---

**MR. ELDER:** So -- so in terms of yes, for next year we'll make sure that even -- if we have since publications in the report or put it together, there has been an incident, we will put it in the notes, yes.

**THE CHAIRMAN:** Or at least you can verbally update on anything that occurs since the report to now.

**MR. ELDER:** Yes.

**THE CHAIRMAN:** So is there anything else, in any other facility that happened since the report was published?

**MR. ELDER:** Well we had -- we reported at the meeting in September that there had been a small spill of water from -- at the conversions facility, overrun of -- during the storm, of some water being -- coming out of some waste bags.

And there was a potential for this one going in the harbour but the analysis since has confirmed that most of it would have been captured by Cameco's storm water management system.

**THE CHAIRMAN:** So the detail will be presented in the next report?

**MR. ELDER:** Yes.

**THE CHAIRMAN:** Cameco, you want to say anything about that?

**MR. MOONEY:** In relation to the instance, specifically the waste bags, I think we did want to emphasize our focus on minimizing any spills and looking again to the language that we saw on the report, that we by and large enjoy a strong record in that regard.

Mr. Ingalls might have some more detail in that regard but I think the actual spill in that instance

had less than 14 grams of uranium in the liquid that came out of those waste bags.

So a very small incident again, we start talking about that unauthorized release threshold and where we live in that respect.

**THE CHAIRMAN:** Okay.

I got -- on page 62 of staff report, just for clarity, there's a Table 9-2. Once and for all, please explain to me this little footnote about Port Hope facility -- about the limit because the regulatory licence limit is .3 millisievert, and again, even that's different than the 1 millisievert, right? So there's three numbers.

**MR. ELDER:** Yeah, I'll -- and as you know, Port Hope has a -- there is a complicated history behind Port Hope and many things but the regulatory limit is the one millisievert per year, it applies throughout the country everywhere.

In the early -- about 10 years ago or so, there was a special study commissioned by the Commission to look at what the appropriate value for Port Hope, given the proximity of the facility to houses and its location in there. So it was a very site-specific analysis. And that report, by independent consultant, recommended that there be a dose limit -- overall dose limit of .3 millisieverts per year.

And then there are -- and I'll get back in terms of -- and then we changed it again, with the new licence is to actually even a small number based on performance of the facility and Cameco's commitment to keep those numbers as low as possible.

**THE CHAIRMAN:** Okay. Just some time to figure out -- so the .05 limit, where -- the licence limit, when was that put on, just remind me about it?

**MR. ELDER:** So it only came into effect when the new licence was issued in -- and I believe it came into effect March 1<sup>st</sup> of this year after the hearings on that one. So we noted that that number is even smaller. So for 2011 it was .3, it's actually even lower now.

**THE CHAIRMAN:** You want to add anything to that, Port Hope -- Cameco?

**MR. INGALLS:** Dave Ingalls, for the record. Just to clarify the old number there. So in the past we did have what we called an operating release limit or ORL, which was lower than the DRL, which was derived release limit. The .3 millisieverts includes both the gamma component and the portion related to the emissions.

So in our current licence, the portion related to the emissions, which is from the air and water

emissions, is .05 millisieverts but conversion -- the Port Hope facility has always had a lower overall number, including the gamma as well at .3.

**THE CHAIRMAN:** Okay, thank you.

One other one, on page 87 for Blind River flood; I still remember this flood study that was supposed to be done. Flood prediction, and there was a commitment to put a report in September; was it done?

**MR. RAVINSHANKAR:** We do know and Cameco has informed us that currently, the draft report is being peer reviewed before sending to CNSC staff.

So right now the -- a consultant -- qualified third-party consultant is peer reviewing this document and we haven't yet received but we have been promised that we will be very shortly receiving that.

**THE CHAIRMAN:** So we're going to hear about that in the fullness of time, is that correct?

**MR. RAVINSHANKAR:** Ravinshankar, for the record.

That's correct.

**THE CHAIRMAN:** Mr. Tolgyesi?

**MEMBER TOLGYESI:** Where is the Port Hope Area Initiative, it's work will be included -- it's included somewhere. We will have -- they will report on that or how we will do?

**MR. ELDER:** Peter Elder, for the record.

When we've had some internal discussions we committed to report on it and we will see if it makes sense to put it in this report or whether we do a separate report on some of the other facilities.

I know this morning this is still not covering all the facilities and we do want make sure the reports are kept to a manageable size, so we may need to do it in a -- we also are doing reports on AECL, so if it stays under AECL maybe we'll do a consolidated AECL report and put it in there.

**THE CHAIRMAN:** Let me repeat, it will be reported we just don't know in what vehicle?

**MR. ELDER:** That's right. That's right.

**THE CHAIRMAN:** Okay.

**MR. MOONEY:** President Binder, It's Liam Mooney, for the record again.

In relation to the Blind River flood study, while the report itself is being finalised, the model is complete and indicates that using the same consultants that were used by another party confirms that there's no risk for Blind River flooding.

So again, although we didn't get it completed as we had initially intended in the timeframe, the overall model that's being used provide to some

comfort that there is not that flood risk associated with the facility.

**THE CHAIRMAN:** Okay. My last question is GE Hitachi, you've been very quiet and I think that's maybe a good news for you guys.

But I am still -- this is a first time we try -- the staff has tried to put together an annual report and I'd like to hear views from you, and from Cameco, whether this first attempt is good can -- should it be, from your perspective, can it be improved does this fairly represent what happened. I'm also looking for some helpful advice.

Why don't we start with GE Hitachi, Mr Mason?

**MR. MASON:** Peter Mason with GE Hitachi, for the record.

Actually, I think now that we have a 10-year license, I think the annual review is a prudent approach and this is the first time I've seen a report like this on the annual performance and I think it is a good approach and it covers a good summary of our operations. So I would say the staff have done an excellent job on this.

**THE CHAIRMAN:** Thank you.

Cameco?

**MR. MOONEY:** Liam Mooney, for the record.

It's a bit of a difficult question. One of the challenges that we have in this regard is with the longer license terms; we're leery of the annual report turning into a mid-term review and that it takes a lot of effort to prepare for these proceedings. And so that was one of the concerns we had going into it.

The report itself is thorough and a number of the conclusions are very positive in relation to our operations and we support what staff concluded and how they graded our facilities.

So with respect to the report itself, we have no issue, we remain of the view we don't want to necessarily see the annual report process turn into the mid-term reviews.

**THE CHAIRMAN:** Okay, thank you. Thank you very much.

**MR. LEBLANC:** We will ask representatives from Shield Source, SRBT and Nordion to please come to the front.

Thank you.

**THE CHAIRMAN:** Good, you just took my speaking points away.

So moving we're moving to your third part, which I think will include Shield Source, SRB and Nordion;

right? Okay.

Nobody wants to sit in front?

**(SHORT PAUSE/COURTE PAUSE)**

**THE CHAIRMAN:** I don't know if we want to introduce them, maybe we should -- I didn't do this before with the other intervenors but do we want to do an introduction here because I don't have a list of all the names. Maybe in the due course of the question for each company you will identify yourself.

So, Peter, over to you,

**MR. ELDER:** Okay, thank you.

As you've mentioned, this final part of our presentation is going to cover off three facilities.

And I'd just like to note, is that in the presentation we put a little more information on Nordion. Nordion actually hasn't been in front of the Commission for a couple of years, and if we hadn't done this format would have been in front of you for a mid-term report about this time.

So the presentation has a little more detail on Nordion given that the Commission hasn't seen any data or information on it for a couple years.

And with that, I'll turn it back to over to Mr. Ravinshankar

**MR. RAVINSHANKAR:** For the record my name

B.R. Ravinshankar.

I can take this opportunity to just place the various visitors here. The centre row has got Nordion staff; on the far side, the front table, Shield Source staff, and at the back table it is the SRB staff.

In the next few slides I will present the performance overview of the gaseous tritium light source production facilities.

There are two tritium processing facilities in Canada, both of which are located in Ontario.

Shield Source Incorporated is located in Peterborough, and SRB Technologies Canada Incorporated in Pembroke.

Both facilities process tritium gas to produce gaseous tritium light sources and manufacture different radiation devices containing these sources.

Following CNSC staff's concerns about their management system in 2010 and 2011, Shield Source conducted additional verification measures which resulted in the discovery of errors in their total tritium discharge reporting.

As a result, on March 28<sup>th</sup>, 2012, Shield Source tritium filling operations were shut down. This discovery has resulted in significant review of Shield Sources operation and practices, especially those related

to safety and control areas of environmental protection and management system.

CNSC staff have increased the regulatory oversight of Shield Source and are currently reviewing the revised submissions and the root cause analysis by Shield Source.

In May 2012, the Commission extended the expiry date of the license for Shield Source from July 31<sup>st</sup>, 2012 to December 2012, and amended the license in order to restrict Shield Source from processing tritium gas. Shield Source is not allowed to carry out tritium gas filling operations until the Commission approves them to do so.

SRB continues to operate as per their operating license at this time.

This slide provides some additional information on Shield Source. As noted earlier, since the shutdown in March of this year, the Commission has not allowed Shield Source to process tritium at its facility.

Back in 2011 the errors in total tritium discharge monitoring system had not yet been discovered. So at this time, all ratings for Shield Source are under review.

CNSC staff are currently in the process of reviewing Shield Source submissions and we will approach

the Commission with our conclusions and recommendations when Shield Source applies for its license renewal.

SRB Technologies; in 2011 CNSC staff rated all safety and control areas for SRB as satisfactory.

The average annual effective dose received by workers at SRB was 0.25 millisieverts while the maximum dose received was 1.15 millisievert.

CNSC staff are satisfied that SRB is adequately controlling radiation doses below the 50 millisievert per year regulatory limit and keeping doses as low as reasonably achievable.

Tritium as tritium oxide air emissions was 12.5 terabecquerels in 2011. This is 19 percent of SRB's license limit of 67 terabecquerels per year. Total tritium emissions which is tritium oxide plus tritium gas was 55.68 terabecquerels in 2011. This represents 12 percent of SRB's licence limit of 448 terabecquerels per year. SRB's annual emission releases are well below their licence limit. Please note, a minor error in the slide: SSI's licence limit for total tritium air emissions is 448 terabecquerels, not 446 terabecquerels, per year.

SRB continues to effectively control liquid effluent from their facility. Tritium concentrations remained consistently below their licence limit. SRB released 0.008 terabecquerels of tritium in

2011, or 4 percent of their licence limit.

In 2011, there was one lost-time incident at SRB. This was related to an injury that occurred outside the active area where no tritium was handled or processed. Nevertheless, it is CNSC staff's opinion that SRB's conventional health and safety program remains effective.

SRB continued to operate within the framework of the *Nuclear Safety and Control Act*, and met all requirements as per its operating licence. In 2011, there were no regulatory or licence limit exceedences.

The current issues identified in Shield Source's Root Cause Analysis are not observed in SRB's operations or monitoring programs as they have periodic independent verification in place for tritium discharges.

SRB has recently made improvements to their operations and programs. Tritium levels in groundwater remain consistent and, in some instances, reduced tritium levels are being observed.

Drinking water sources, including the surrounding residential wells and the Muskrat River, continue to be safe and below the provincial drinking water guideline of 7,000 becquerels per litre.

In addition to the information noted on this slide, CNSC staff had been asked by the Commission

to gather comparative data on tritium levels in wine and municipal wastewater sludge near SRB and other regions of Ontario. Staff continue to gather this information and will be providing out findings to the Commission in a future report.

This concludes the presentation on tritium processing facilities.

The next and the last segment of staff's presentation covers Nordion Canada Inc.'s activities and follows a structure similar to earlier segments. Nordion processes unsealed radioisotopes such as iodine 131 for health and life sciences, and manufactures sealed radiation sources for industrial applications.

Since the last interim report prepared for the Commission Tribunal in 2009, the Commission Tribunal has amended Nordion's licence twice to include a total of 5 changes.

Of the two amendments, one amendment occurred in 2011. The Commission approved a change to the licensee's name from MDS Nordion to Nordion Canada Inc., in November of that year.

As a global provider of radioactive substances, Nordion continues to export sources internationally. Nordion exports a multitude of radioactive materials for both the health industry and

industrial applications. Many of the sources exported by Nordion are cobalt 60 and iridium 192 that meet the International Atomic Energy Agency Category 1 and 2 definitions.

These sources are subject to licencing controls under the *Nuclear Safety and Control Act*, and international guidance specified in the IAEA Code of Conduct on the safety and security of radioactive sources. As such, CSC issued 100 licences to Nordion for these sources to approximately 30 different countries in 2011.

There were no major regulatory concerns or issues of non-compliance with export licences issued to Nordion.

At the time of licence renewal, the Commission requested CNSC staff to present two interim status reports on the performance of the facility during the 10-year term of licence. The updates, as mentioned by Mr. Elder before, were to occur following the completion of the third and seventh years. This report concludes CNSC staff's commitment for the second and final interim status report before licence renewal.

During this period, Nordion has made significant improvements to their fire protection program, including completion of a fire hazard assessment

for the facility and all corresponding upgrades. Nordion also implemented a fire protection program in the operations.

CNSC staff also observed that since 2009 Nordion has carried out several security improvements that have enhanced the overall site security program.

These improvements included the establishment of an internal job position of Corporate Security Manager, as well as the creation of an Executive Security Committee, to take a more proactive approach to enhance Nordion's security. This approach included the development of a corporate security program that led to several security infrastructure upgrades being successfully commissioned.

CNSC staff also note that Nordion continued to improve on its public information program. Nordion reported that it had increased targets of its advertising related to environmental health and safety.

In 2011, Nordion posted advertisements in key community papers underlining its commitment to protect the safety of its employees, the community and the environment. The ads noted that Nordion is certified to ISO 14001, an international standard for environmental management systems.

The advertisement directed people to the

Nordion website key contacts at Nordion to answer questions and overall encourage the public to contact Nordion with any questions, comments or concerns.

The 2009 to 2011 performance ratings for Nordion are presented in this slide. In 2011, CNSC staff rated the safety and control areas, environmental protection, and conventional health and safety as fully satisfactory.

CNSC staff raised the rating for the environmental protection safety and control area because of the continuing very small releases of nuclear substances, and even further reduction in 2011.

CNSC staff also raised the rating for conventional health and safety because of Nordion's continued excellent implementation of its health and safety program.

Radiation protection: This slide compares the average and maximum effective doses over five years for the workers at Nordion.

In 2011, radiation doses remained low at the facility, with a maximum annual effective dose of 5.08 millisieverts, approximately 10 percent of the annual effective dose regulatory limit of 50 millisieverts. This is compared to a maximum annual effective dose in 2009 of 4.63, and in 2010 of 4.86

millisieverts.

Public doses resulting from operations at the Nordion facility continued to be negligible; it's less than 0.001 millisieverts per year. This was due to the very small quantities of nuclear substances released into the environment.

Environmental protection: This table shows that the average airborne releases of cobalt 60 and iodine 125 from 2009 to 2011 have remained relatively constant over the past 3 years. A noticeable emission reduction in iodine 131 from 2010 to 2011 is attributed to the installation of pollution control equipment.

As noted in this slide, Xenon-133 emissions were relatively lower in 2009 and 2010 compared to 2011, as molybdenum 99 production was interrupted during AECL's NRU shutdown during that period.

Public dose resulting from the 2011 average airborne releases are also shown in the table. As seen, these releases are well below the public dose limit of 1 millisievert per year.

Nordion continues to monitor and control the releases of radioactive and other hazardous materials from the facility. CNSC staff confirm that no regulatory limit or action limits were exceeded during 2011.

Liquid effluent monitoring: Slide 53

shows liquid releases from 2009 to 2011. Nordion continued to monitor all liquid effluent releases prior to discharging them into the municipal sewer system.

Equivalent public dose for all liquid releases are far below the public dose limit of 1 millisievert. No liquid effluent licence limits or action levels were exceeded from 2009 to 2011.

The frequency of recordable lost time incidents reported by Nordion remained low. Nordion continues to take corrective actions to prevent reoccurrences of injuries, including formal ergonomic reviews of several processes using manipulators used hot cells.

CNSC staff conclude that Nordion continues to implement its conventional health and safety program above expectations, and its programs were effective in protecting the health and safety of persons working in its facilities.

In conclusion, since the last mid-term update in 2009, CNSC staff compliance activities confirmed that all 14 safety and control areas were rated satisfactory and above. Nordion's radiation protection program was effective and kept doses as low as reasonably achievable. Nordion's environmental protection program was effective at keeping environmental impacts as low as

reasonably achievable. And Nordion's conventional health and safety programs continue to protect workers.

This concludes our presentation. We are now available to answer questions.

**THE CHAIRPERSON:** Thank you.

Let's get into the questions session starting with Mr. Harvey.

**MEMBER HARVEY:** I would like to first compliment SRB for the results and the efforts done. I think I do appreciate the distance within what it was before and now.

And I've got a question for Mr. Levesque about -- does the fact that the results are a lot better than they were in the past, does that have any effect on the public relations with the local citizens?

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

In 2011 we've only had one request from the public regarding the facility but we've also made some efforts to, despite our results, also to communicate a lot more with the public what our data has been.

And I think basically our communications effort, along with the reductions that we've had, have basically helped reduce the amount of public concerns that we have around the facility.

**MEMBER HARVEY:** Thank you.

I want to compliment Nordion because -- to see some fully satisfactory appreciation from the staff is not quite frequent. And we'd appreciate to see some from time to time. Thank you.

**THE CHAIRPERSON:** Thank you.

Mr. Tolgyesi.

**MEMBER TOLGYESI:** Merci, Monsieur President.

I will ask the SS, Shield Source, that the amendment restricted SSE from processing tritium gas until the Commission turn around and said it otherwise and extend the licence -- we were extending the licence for 5 months up to December 31<sup>st</sup>.

And do Shield Sources -- will apply for approval of restart of operation? Because now you are not operating I suppose.

**MS. McMURRAY:** Lisa McMurray, for the record.

Shield Source will be looking to reapply for a restart of our tritium fuel processing. However, we're still trying to work to get all our programs and processes updated and put some new ones in place before we do this.

So we will be probably -- we will be

looking to ask for an amendment to extend our licence until we have everything in place to go for a full licence renewal.

**MEMBER TOLGYESI:** So you expect you will come back sometime next year? Or ---

**MS. McMURRAY:** At this point, we are hoping to be able to -- probably about mid-year of next year -- be able to come for licence approval to get our tritium fuel process back up and running.

**MEMBER HARVEY:** Also your management system was rated below expectation 2011 due to failure to implement some portions of SSIs management system in a timely manner.

Where do you stand now with this?

**MS. NEWTON:** Leisha Newton, for the record.

We have worked with the CNSC to have a better understanding of what their expectations were with regards to the corrective actions from the March 2010 inspection. And we have closed out all of the findings or provided information to the CNSC staff to satisfy all of the findings, and we expect that they will all be closed out very soon including the findings that have subsequently come from November 2011 inspection and a February -- sorry, November 2011 inspection and a February 2012 inspection. All of those findings should be closed

out very soon.

**MEMBER TOLGYESI:** Do staff have some comment on that?

**MR. RAVISHANKAR:** Ravi Ravishankar, for the record.

Notwithstanding the action items that are from the previous inspections, right now we are thoroughly reviewing every single program, including management system, to ensure that we are confident if we come in front of the Commission that our conclusions and recommendations are reasonable and thorough.

For that reason, everything is currently under review for Shield Source programs and data.

**MEMBER TOLGYESI:** And the last one is still to Shield.

You know, your air emissions of tritium were rising for the last three years. What do you expect to do or what ---

**THE CHAIRMAN:** I've got to stop here. This is not a hearing about something that they will have to come to us because ---

**MEMBER TOLGYESI:** Okay.

**THE CHAIRMAN:** --- the data here is under review, so we should not get into the detail of that. This is the staff annual report. They will be coming back

to us in the fullness of time I assume and explain every little bit. So I think we should keep it focussing on the annual report of staff, Mr. Tolgyesi.

Dr. McDill?

Ms. Velshi?

**MEMBER VELSHI:** So, again, getting to Slide 43 and it's question for staff. So will you be -- once you're finished your review, will you re-rate their performance in the 14 SES for 2011; do you make retroactive changes?

**MR. ELDER:** Peter Elder, for the record.

We may make some retroactive changes based on the programs and the information that we know about.

So the information we have to date is -- you know, let's be clear -- there was a significant error in the reported data. So our conclusions are based in some places on reported data in one area.

So we're looking for -- to make sure that there are no errors in any of the other reported data. And if there are significant errors in -- if there are errors in other ones then we may conclude that the overall conclusion was not valid.

We're not there yet. But we're just saying everything we are putting already is under advisement.

**MEMBER VELSHI:** And I know that Shield

Source has done their root cause analysis and that you're reviewing their submission.

Has the CNSC done a similar investigation on what lessons the CNSC could have learned as far as their oversight of this? And how do we make sure that there is no shaking off of confidence in the regulators reporting and reassurance that it provides?

**MR. ELDER:** Peter Elder, for the record.

We are looking into this and it will be -- form part while we look at the -- when the application comes. I think we will be in the position to explain what we've done at that time as well. We are certainly looking into this -- if there was a significant error why was not that apparent to -- not only to Shield Source, why wasn't it apparent to us as well.

**THE CHAIRMAN:** But I still -- this is an annual report that you incorporate all data. I think somewhere in -- right up at the beginning there's got to be a sort of explanation that you have in the slide with respect to the data associated with Shield Source.

**MR. ELDER:** It is there. Maybe it's not there often enough.

**THE CHAIRMAN:** Right. In big -- so everybody knows that there may be a revision depending on

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**MR. ELDER:** Yes.

**THE CHAIRMAN:** Okay. Anybody else?

Maybe I have a couple of questions that may be a bit off-topic. The cobalt 60, you know, we hear more and more cobalt 60 contaminate steel coming from offshore.

Nordion, particularly since you have so many contacts abroad, any view as to how one gets stricter operational prohibition -- not prohibition but avoidance of such material coming to Canada. Any ideas about that?

I know it's a bit off-topic but, you know, we had recently -- we had another shipment of such material. It was detected at the border and it's cobalt 60 and we never know where the cobalt 60 is coming from?

**MR. DECAIRE:** Richard Decaire of Nordion, for the record.

I imagine most of the reported cases I have heard about are generally level gauge sources that are used in industry that Nordion does not produce, that get recycled to scrap metal incorrectly.

So the main places to stop that activity from happening is at the recycling location, to have measurement devices and at Ports of Entry to check containers or whatever with gamma detectors.

**THE CHAIRMAN:** It's going to be -- I was told it could have been for medical apparatus actually.

**MR. DECAIRE:** That's true too, but as I say, that has happened and it's happened with -- you know -- incorrect or abandonment of sources in other countries with cesium sources and Cobalt 60 sources used in teletherapy or braccetherapy but ---

**THE CHAIRMAN:** Not likely to be a Canadian source again.

**MR. DECAIRE:** Right. Again, Nordion does not manufacture those sources.

**THE CHAIRMAN:** What about -- another kind of off topic but we've just heard a lot about e-coli in certain processing; I thought you guys would be jumping up and down in the press advocating irradiated food. Where were you?

**MR. MCGREGOR:** Ron McGregor, for the record, from Nordion.

That's a difficult area. Food processing - - Nordion has taken several runs at the food processing industry and tried to demonstrate the benefit of gamma radiation for food processing and the benefits are demonstrated.

In the past poultry has been irradiated, in the past strawberries have been irradiated, potatoes, with demonstrable benefits to those. But in the meat industry, my understanding of it is the margins are very low and the

time it would take to put an irradiation process into place would cut into those margins and cut into the throughput of the plants.

Having said that, Nordion has designed irradiators that would be -- they would be an ideal kind of irradiator to add to a food processing line.

So anything that we can do to push that along is certainly something we would like and anything that the Commission is willing to talk about with respect to food irradiation and push that in the industry, that would be good.

There are a number of barriers though. Health Canada, you know, the health agencies do require a lot of data on these things. I know some of the food irradiation is approved in the United States, some aspects of food irradiation are approved in Canada. It's not a broad approval at this point in time.

And then there's the consumer as well, concerns that consumers have about the effect of food irradiation on the food. Even to the point that people might believe that if you irradiate food, it becomes radioactive and some of those things would have to be dispelled.

So it's a bit of an uphill battle but it is a good idea and we appreciate the question.

**THE CHAIRMAN:** Well timing is everything. I think the margin has just gone up quite substantial and I thought it would be a good time to get Health Canada to approve this -- because I'm told it's approved in about 40 countries and consumers can have always a choice if you label it properly.

**MR. MCGREGOR:** Ron McGregor, for the record again.

Absolutely. And things like spice irradiation are approved and we in fact even do spice irradiation in Canada in our Gamma Centre for Excellence Irradiators. So there are things that are approved. Meat is a little bit more challenging.

**MR. DECAIRE:** Sorry, just to follow-up. I didn't want to be incomplete in my answer.

Nordion does contract manufacture teletherapy sources for two different companies but they're not our products. I just wanted to put that out there because I didn't say that last time.

**THE CHAIRMAN:** They of course would not be the source of the quabble (ph)?

**MR. DECAIRE:** None to our knowledge has that ever happened.

**THE CHAIRMAN:** Right.

Okay, let me ask you the same question I

asked the previous intervenors, what do you think about this annual report, is a new initiative to try to put in some more information either to ask to the public about the performance of some of our licensees?

**MR. MCGREGOR:** Ron McGregor, from Nordion, for the record.

This was the first year that we went through this process. We went through our mid-term licence hearing a couple of years back and that was a large job to prepare for that.

These smaller reviews, such as this one, although the timing and I think everybody was trying to work out the timing in the process. I think that was the only challenge that I think the staff and us faced with that. There were very tight timelines and the process was being run through for the first time. But I think if it's done on an annual basis, everybody will get used to it.

Smaller reviews, I think, are a good thing. It highlights what's going on in the early basis and would cut the element of any surprise going forward as well with a more frequent review like this. So we appreciated the process.

**THE CHAIRMAN:** Thank you.

Shield Source?

**UNIDENTIFIED SPEAKER:** Shield Source finds

that it's a great opportunity to be able to come towards the Board.

Definitely the tight, tight, tight timeline did create some issues. Our President, who wanted to be here today, was unable to because he had already had other business plans.

But we -- you know, definitely it's a good way to be able to keep track for the public what's happening in everybody's facilities on a yearly basis.

**THE CHAIRMAN:** Thank you.

SRBT?

**MR. LEVESQUE:** Stephane Levesque, for the record.

I think like other licensees, I think it takes us a long time to put out a report that with appendices; for us this year was 215 pages.

I think the CNSC staff has done a good job to convince that in a few relevant pages for your consumption. I think that going forward, it's a good thing on a yearly basis for you to be aware of what we do to make maybe a little bit less of an introductory job to do when we come for relicensing every five years or 10 years, depending on the license term.

**THE CHAIRMAN:** Okay, thank you.

Anybody have one last question?

Well, thank you. Thank you very much.

This concludes the public meeting of the Commission. Thank you all for attendance and participation.

Marc, you want anybody ---

**MR. LEBLANC:** Yes, if somebody borrowed interpretation devices, please return them at the reception and claim your ID card.

Thank you.

--- Upon adjourning at 3:14 p.m./

L'audience est ajournée à 15h14