Canadian Nuclear Safety Commission

Commission canadienne de sûreté nucléaire

Public meeting

Réunion publique

June 17th, 2015

Le 17 juin 2015

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

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

Commission Members present

Dr. Michael Binder
Mr. Dan Tolgyesi
Dr. Sandy McEwan
Ms Rumina Velshi
Mr. André Harvey

Commissaires présents

M. Michael Binder
M. Dan Tolgyesi
Dr Sandy McEwan
Mme Rumina Velshi
M. André Harvey

Assistant Secretary:

Ms Kelly McGee

Secrétaire-adjointe:

Mme Kelly McGee

General Counsel:

Ms Lisa Thiele

Avocate générale :

Me Lisa Thiele

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Ottawa, Ontario

--- Upon commencing on Wednesday, June 17, 2015
at 2:05 p.m. / L'audience débute le mercredi
17 juin 2015 à 14 h 05

CMD 15-M17/15-M17A

Opening Remarks

MME McGEE : Bonjour, Mesdames et Messieurs. Bienvenue à la réunion publique de la Commission canadienne de sûreté nucléaire.

Mon nom est Kelly McGee. Je suis la secrétaire-adjointe de la Commission et j'aimerais aborder certains aspects touchant le déroulement de la réunion.

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

Des appareils de traduction sont disponibles à la réception. La version française est au poste 2; the English version is on channel 1.

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

La transcription sera disponible sur le

site Web de la Commission la semaine prochaine.

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

Please silence your cell phones and other electronic devices.

Monsieur Binder, président et premier dirigeant de la CCSN, va présider la réunion publique d'aujourd'hui.

President Binder...?

THE PRESIDENT: Thank you, Kelly.

Good afternoon and welcome to the meeting of the Canadian Nuclear Safety Commission.

Mon nom est Michael Binder. Je suis le président de la Commission canadienne de sûreté nucléaire.

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

I am told that we have some technology challenge today, but the webcast should work and you will have to bear with us as we try to do some teleconferencing or videoconferencing.

So I would like to start by introducing the Members of the Commission that are with us here today.

On my right, Monsieur Dan Tolgyesi; to my

left are Dr. Sandy McEwan, Ms Rumina Velshi and Mr. André Harvey.

We have heard from our Assistant Commission Secretary, Ms Kelly McGee. We also have with us here today Ms Lisa Thiele, Senior General Counsel for the Commission.

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

Please refer to the updated agenda published on June 11, 2015 for the complete list of items to be presented today.

In addition to the written documents reviewed by the Commission for this meeting, CNSC Staff will have an opportunity to make presentations and Commission Members will have an opportunity to ask questions on the items before us.

CMD 15-M18.A

Adoption of Agenda

THE PRESIDENT: Okay. With this information, I would now like to call for the adoption of the agenda by the Commission Members, as outlined in CMD 15-M18.A.

Do we have concurrence?

So for the record, the Agenda is adopted.

--- Pause

THE PRESIDENT: I'm still looking for where it is.

CMD 15-M19

Approval of Minutes of Commission Meeting held March 25 and 26, 2015

THE PRESIDENT: Next I would like to call for the approval of the Minutes of the Commission meeting held on March 25 and 26, 2015. The minutes are outlined in Commission Member Document CMD 15-M19.

Any comments, additions or deletions?

Ms Velshi...?

MEMBER VELSHI: Thank you, Mr. President.

I do have a question. It's on Item No. 46 around periodic safety reviews. In there the Commission asked if the global assessment reports would be available to the public and the Minutes do not reflect staff's response to that question and perhaps staff didn't respond during the meeting. I cannot recall, but maybe we can get clarification from staff whether those reports will be available publicly.

MR. HOWDEN: Barclay Howden speaking.

The response to that is, yes, both the Global Assessment Report and the Integrated Implementation Plan will be both publicly available. As an example, for the Darlington refurbishment, the Integrated Safety Review, which is considered the first periodic safety review, both those documents are posted on the licensee's website.

In addition the IIP, the Integrated Implementation Plan is also appended to the CMD that comes to the Commission because this is the key document that the Commission needs to consider and accept for a periodic safety review to occur.

MEMBER VELSHI: Thank you.

Maybe, Mr. President, we can get the Minutes amended to clarify the availability of these reports to the public then.

THE PRESIDENT: Okay. Will do. Thank you.

CMD 15-M20

Status Report on Power Reactors

THE PRESIDENT: So the first item on the Agenda for today is the Status Report on Power Reactors, which is under CMD 15-M20.

I understand we have several people are joining us via teleconference so let me test.

The first person is from NB Power, Mr. Nouwens. Can you hear us?

Mr. Nouwens? Anybody from NB Power? I guess not.

From OPG we have -- I understand that Mr. McCalla is going to connect to us online. Can you hear us?

MR. McCALLA: Yes, I can.

THE PRESDIENT: Sorry, go ahead.

MR. McCALLA: Yes, I can, Commissioner Binder.

THE PRESIDENT: Okay, good. Thank you.

Mr. Howden, the floor is yours.

MR. HOWDEN: Thank you.

Good afternoon, Mr. President and Members of the Commission. My name is Barclay Howden.

With me today are the Power Reactor Program Division Directors, plus technical support staff who are available to respond to questions on the status report on power reactors as presented in CMD 15-M20.

The document was finalized on June 15, 2015 and I only have one additional piece of information to report. For the impingement of fish at the Pickering Station; OPG, in accordance with the *Fisheries Act*, has

notified Fisheries and Oceans Canada of the incident and quantity of fish loss.

This concludes the status report on power reactors. Staff are now available to answer any questions the Commission Members may have.

THE PRESIDENT: Thank you. I should have also mentioned that from Bruce Power we have Mr. Burton who is here with us.

--- Technical difficulties / Problèmes techniques

THE PRESIDENT: Did we get some feedback?

MS McGEE: This is Darlington that's listening.

THE PRESIDENT: Okay. The people who are listening to us, maybe you should not be on a teleconference and watching the webcast at the same time because there is some synchronization issues.

Okay, let’s -- Commissionaires, any questions? Let me start with Ms Velshi.

MEMBER VELSHI: Thank you, Mr. President.

My first question is on the situation at Point Lepreau. I'm not sure if you have someone from New Brunswick Power here to answer it, but maybe staff can.

So I'm not quite sure what this unavailability of the re-heaters really mean. I understand that it's not necessarily a nuclear safety issue, but it is

an abnormal operating condition. So maybe you can just tell us what not having the re-heater means and when is it likely to be back in service?

MR. HOWDEN: Barclay Howden speaking

If NB Power is not on the line, I will ask Ben Poulet to reply.

MR. POULET: Thank you, Mr. Howden. For the record, Ben Poulet.

The re-heaters are located between the exhaust of the high pressure turbine on the conventional side of the station, between the exhaust of that HP turbine and the inlet of the low pressure turbines. There are three low pressure turbines. The heating is essentially done by using live steam from the main steam system and it goes through a heat exchanger, which constitutes five tube bundles. The idea is to take the exhaust of the high pressure turbine and super heat it so that it gets rid of all the moisture and improves the steam quality above saturation temperatures, super heated steam. The idea behind the re-heaters is to allow flow to the upper turbines while minimizing moisture as the steam progresses through the low pressure turbines

The re-heaters are located on either side of the LP turbine, or above the turbine generator set and the temperature limits on the inlet of the low pressure

turbines are monitored to make sure that they are balanced to minimize metal distortion of the casings that would -- and to maintain the tolerances between the rotating part and the fixed part of the casing, so that these are monitored at all times.

As stated in the report, they reached -- they have some indication of a differential temperature between the casing on either side of low pressure turbine No. 2. And so they began investigating. The indication of difference is usually indicative of a re-heater tube bundle failure, heat exchanger bundle failure, so the live steam, instead of exiting the outlet of the re-heater base, it goes into the inlet of the LP, so it affects that. So that is usually indicative of that type of a failure. They confirmed it.

They reached the shutdown limit, so they shutdown the plant. They did some testing on the re-heaters and they found which re-heaters were -- which bundles were failing. So they isolated those and they returned to service.

Now, the implication is that they can only operate a certain limit of power to maintain the steam quality at the exhaust of the low-pressure turbine, so at reduced power, and it is going to be like this until they can repair it. You asked when they would be repaired.

Probably at the next maintenance outage. I can't provide a date.

But I don't know if NB Power is here to answer, but I would expect some time as soon as they get the parts in they may shutdown and do it over a short period and then restart, or they might wait for the next outage, which is currently planned for 2016.

THE PRESIDENT: You know, just listening to you and trying to follow you, I diagram would have been useful here to try to explain how this whole thing works.

Ms Velshi...?

MEMBER VELSHI: No, that's fine.

Yes, if it's going to be 2016 I just wondered if there are any risks in running in this condition for an extended period of time?

MR. POULET: No risk for -- no, it's being monitored and temperatures currently are within the -- well within the acceptable limits.

MEMBER VELSHI: Thank you.

MR. POULET: Thank you.

MR. HOWDEN: May I just comment?

One of the reasons we reported on this is because this plant is a major supplier of electricity in New Brunswick. So whenever there are operational issues those are reported publicly.

And what we try to do is make sure we keep the Commission in the loop. You know, if you were to see, oh, why are they only running at 80 percent power for such a period of time?

MEMBER VELSHI: I have another question and it's on the suspect material issue. I know we are not going to be getting a full report until the fall of this year, but I wondered if there had been any interim findings that had necessitated any corrective actions in the short term?

MR. HOWDEN: So I would like the industry to respond in terms of where they are at and then I can give you a little summary of our three-pronged regulatory approach with this.

MR. BURTON: Maury Burton, for the record.

I am the Regulatory Affairs Manager at Bruce Power and given the fact that I am here, I have been nominated by the industry to do most of the talking for them. But Robin Manley is online on the video conference and Jason Nouwens was supposed to be joining us by teleconference, if there are questions for the other utilities.

So essentially where we are right now, we have the engineering assessments from our supplier which demonstrates safe operation. One of the things that we

have gone back to is actually the original steel mills where the material was actually procured from and taken a look at the certificates that came from those that document the material content.

So this material was actually purchased at British standards, which is essentially their equivalent of our ASME standard, which is the requirement through 285 -- or N285, the CSA standard. So all the mill certificates were confirmed to be authentic. So we do have -- well, it's not ASME-qualified material. It was qualified to the British standards, so that gives us a great deal of confidence that the material is fine.

And all the valves have been tested to 1.5 times their design pressure before they are sent to the licensee. So essentially where we are right now, a lot of the licensees have completed our extent of condition. We know what valves are installed in the stations, valves that -- or parts that are not currently installed are all quarantined in our supply chain and we do have a path forward for either qualifying or reregistering valves that are currently in the systems and that really entails working with our authorized inspection agency, which in Ontario is the TSSA and, of course, CNSC staff to ensure the process.

There was actually a recent teleconference

as early as Monday where OPG and Bruce Power, obviously, because we have the same authorized inspection agency, were working very closely together with that and Newman Hattersley, which is the supplier on the process, to ensure that the valves are either qualified to their current registration or reregister those valves.

The other part of where we are going, looking forward, is actions prevent reoccurrence. Through COG, the three utilities are working with the Organization of Candu Industries, which is really our major supply chain suppliers.

Essentially what we are doing is we are working with them to set up an audit committee similar to what we have from the utility's standpoint. We have what we call the Candu Procurement Audit Committee that is run through the COG Organization which audits our, what we call tier 1 suppliers, so these are our direct suppliers.

What we are doing is working with these other organizations to set up a similar type audit committee so they can in turn audit their suppliers to the same standards that we audit our suppliers. That is ongoing. We expect to have that fully operational by the end of the year. So there are still some organizational issues with getting that set up and up and running.

I think that's about all I have for an

update. If you have any more questions I can try to answer them.

MEMBER VELSHI: When we got an update the last time -- or when we were first made aware of this -- we were told that this is a global situation, so besides the COG collaboration, is there further collaboration with other reactor design organizations?

MR. BURTON: As far as OPEX, OPEX has been sent through the World Association of Nuclear Operators and the Institute of Nuclear Power Operators in the U.S. to get the information out.

As Mr. Saunders told you the last time this -- well, at the last Commission meeting where this was discussed, this really came out of the incident in Korea where they actually did a couple of deep dives on their supply chain, and that's where the issue actually came from.

So we are working with the Koreans.

In this particular case, it was really centred on the one supplier that was qualifying the material to the ASME standard from the British standards.

So we are working with other industries, but it's -- it's really a small subset for this particular incident. Obviously, we're looking to prevent reoccurrence through the entire supply chain, which is why we're looking

at committees for our suppliers.

MEMBER VELSHI: And my question was, is there room for audit committees that transcends the CANDU design?

MR. BURTON: There are existing audit committees that we are actually members of the U.S. audit committee as well which they call NUPAC. I can't remember what -- I think it's Nuclear Utility Procurement Audit Committee, I think is what it stands for.

But these do exist worldwide, and there is some effort in the industry to look at how we can interact with other audit committees.

It's really an efficiency issue for us in putting these things together because we can share information quicker and instead of auditing suppliers 10 times for 10 different utilities, you audit them once and you can assure the quality of the audit at the same time.

THE PRESIDENT: We're going to go one question and go as many rounds as we need.

I understand also that NB Power now is online.

NB Power, can you hear us?

Yes; no?

Okay. So Mr. Harvey.

MEMBER HARVEY: Merci, monsieur le

president.

I just wanted to get back to Point Lepreau.

This 75 to 85 percent, is it a technical fact to operate between that because the heat -- something very -- very firm, or is it just a conservative decision?

MR. POULET: Ben Poulet, for the record.

The limit is based on -- it's conservative. It's based on ensuring that the steam quality -- that the exhaust at the low pressure turbine does not exceed the limit in moisture content. It's a conservative decision in terms of protecting the low pressure turbine blades at the last stages of the low pressure turbine blades.

MEMBER HARVEY: But that will be monitored by the exhaust. How will that be monitored to go to 75 or 85 percent is what I --

MR. POULET: I don't have a -- I don't have a clear answer to you as to exactly how they monitor. I believe it's -- those numbers, the range of values between 75 and 85 percent full power is probably what the manufacturer is -- specified with the turbine when it was delivered, so that's probably the manufacturer's recommendations that they're following.

I don't think they have a means of

monitoring steam quality at the exhaust of the LP turbine.

MEMBER HARVEY: Okay. Next, Mr. Tolgyesi.

MEMBER TOLGYESI: Merci, monsieur le president.

Just I have one small question regarding these manufacture valves.

You were saying that they were tested to 1.5 time design pressure and they respond to British standards. And you said after that, these British standards are, in general, equivalent to Canadian standards.

What it means "in general", and to what extent you could say that, okay, in general is okay, but sometimes we are in trouble.

MR. BURTON: Maury Burton, for the record.

The real difference between the British standards and the ASME standards are the test methodologies and the actual tests that they do to qualify the material.

So in the British standard, they only do an elongation test. And I'm not an engineer, so -- but in the -- there's an additional test for material strength in the ASME standard, you know, in addition to the elongation. And I can't really explain what that test is because, like I said, I'm not an engineer.

There may be other folks in the room that

could explain that difference a little better, but in general, the -- the British standards are essentially for qualifying the steel. There -- and the ASME has equivalent standards but, like I said, there's just difference in the methodology and some of the test limits for things like tensile strength.

THE PRESIDENT: Okay. We hear now -- let me try one more time.

NB Power, are you on line?

MR. NOUWENS: Yes, this is Jason. We are on line.

THE PRESIDENT: So welcome, and you may want to jump in on some questions that will be posed as we go along.

MR. NOUWENS: Yes, I will certainly do that.

We could hear the -- we could hear the conversation. We just couldn't speak back.

THE PRESIDENT: Okay. We'll give you a chance to reply, then, to what you heard.

Rather than getting into the engineering differences between the two standards, what I'm interested is how is it that somebody accept a standard which is not acceptable according to our rules and procedures?

MR. BURTON: Maury Burton, for the record.

It's not that we've accepted the standard. It's just that it's another confidence issue for us that the material was actually procured to a standard that -- and where the issue actually happened in the supply chain was the -- the -- well, we'll call them a tier 3 supplier, which was hired to qualify the material to the ASME standard from the British standard falsified documents, so that's where the issue came from.

Like I said, the fact that the -- we have the original mill certificates which demonstrate that the material was manufactured to a British standard gives us the confidence that the material is what we think it is, and also assists us in our engineering assessment for this.

Now, what we are doing right now with our engineering assessments is essentially the work that should have been done by the tier 3 supplier which is qualifying or demonstrating that the material is -- is meeting the ASME standards that we currently run to.

MR. HOWDEN: Dr. Binder, I'd just like to make a comment. Barclay Howden speaking.

So in terms of from a -- from a regulatory standpoint, there's four factors we're dealing with: safe operation today, which the licensees are going through their processes and our site inspectors are tracking this.

The second one is the one that we're

talking about in terms of the valves and where they stand with respect to the CSA standard N285, and so they're going through the process, the valve manufacturer, the licensees and our authorized inspection agency, so in Ontario it's the Technical Standards and Safety Authority. In New Brunswick Power, it's New Brunswick Department of Public Safety. And in Quebec, Régie du bâtiment du Québec.

So we have been talking with the TSSA, and in terms of -- from the standpoint in terms of the nature of the issue, and they basically said this isn't a complicated technical issue because there are large safety margins that are built in.

So what they're going through is the licensees are putting together their engineering assessments on the different parts of the valves if they're pulled together, and then once they're satisfied that the variance can be brought back to code, they need to go through the process of the history dockets of each file, which takes a long period of time.

So from what we're getting from our authorized inspection agency is that -- and they're experts on this stuff that we're talking about today, is that this is not a complicated technical issue, and it can be resolved.

The third part of our regulatory oversight

is lessons learned, so as Mr. Burton said, they're looking at how to prevent recurrence and they're going through various processes that we're monitoring to make their procurement process more robust.

And the last one is information sharing, so he described INPO WANO and these other industry groups that are used for sharing information. On the regulatory side, we've been sharing the information through our networks, and one of the key ones is we have a working group on inspection practices that all the international regulators sit in on

We have presented to them the information, and some of them have come back to seek further information because they want to be able to go and probe their own licensees to confirm that they aren't having issues within their industries.

So I just wanted to give you an oversight of that we're using our authorized inspection agency who brings this expertise to the table in terms of the difference between the codes and standards, and they're quite confident that things are coming together.

THE PRESIDENT: I just want to understand the text here that says, if I understand correctly, that this position affected valve.

So if you have the safety and everybody

says there's enough margin, are you disposing of those valves that are not according to ASME? What are you doing?

Are you changing the valves as you go along?

MR. BURTON: Maury Burton, for the record.

The process that we're using with the authorized inspection agency is to look at the valves that are currently installed and demonstrate that they do meet the ASME requirements. And in some cases, that will just be demonstrating that their meet their registration requirements under their current Canadian registration number. In other cases, that may mean registering the valve with the authorized inspection agency to a different design standard.

The essence here is that we will be demonstrating that these valves meet the ASME requirements and the -- thus the requirements of N285, which is our licence requirement.

As for valves that are not installed, like I said, those valves are quarantined. And as far -- I can only speak for Bruce Power on this point.

We haven't made the decision on what we're going to do with those valves at this point in time, whether we're going to try to qualify them or re-register those valves or whether we're going to scrap them.

And that's a decision that we'll make in the future.

MR. NOUWENS: Jason Nouwens, for the record.

If I could add, New Brunswick Power in the same situation. For the valves that we have quarantined right now, we're evaluating the effort to reconcile the history doc and the design specifications. And in some cases, for the smaller valves, it may be more cost effective to simply purchase new valves, but we're going through that evaluation process.

THE PRESIDENT: Mr. Tolgyesi.

MEMBER TOLGYESI: A very short one on this round.

You were talking about working with the vendor. My understanding is a steel mill producing the steel which is going to a valve manufacturer who's manufacturing the valve.

Now, is the next step going to a vendor and to the -- to your site or the manufacturer is the vendor also? Because if you add another step, you will have a little bit more complicated process.

MR. BURTON: Maury Burton, for the record.

And in this case, it is a little bit of both of what you describe because we have two manufacturers

here that were involved, one being Newman Hattersley, which is a direct supplier to us, so they would get their material from the mill and manufacture their Newsman Hattersley valves.

But Newman Hattersley also had a subsidiary called Thompson Valves which is where the majority of these valves are actually -- the issues lie with these ones. And in that case, the actual steel went from the mill to a third party, which is the party where the qualification from the British standard to the ASME standard was supposed to take place, then to the valve manufacturer, which are Thompson Valves, then to Newman Hattersley, who was a distributor of the Thompson Valves, then to us as the purchaser.

So it's a little more complicated there, so as Mr. Howden mentioned, we need to have a pedigree of all these valves which keep -- we call a history docket, so it's where the valve came from, what it's made of, what it's been tested to and all that material condition information is kept in our files so that we know what the pedigree of the valve is. And these ones are the highest pedigree that we have, being nuclear class valves.

MEMBER TOLGYESI: So independently, in which way the valve was coming directly or via some other third party, you have the same problems with all those

valves.

MR. BURTON: All the valves that came through this one company, yes, so it -- the company is actually no longer used by the -- our manufacturers to do this.

And from a business point of view, I guess that would make sense to not use a company that openly falsifies data.

So the process is going back through all these valves and then ensuring that they all meet the ASME requirement and, where we can't demonstrate that, we will need to replace the valves.

I believe that we can, given the information that we have, but that work is still ongoing.

THE PRESIDENT: Okay. We've got to move on.

Dr. McEwan?

MEMBER McEWAN: Thank you, Mr. President.

So understand this, the falsification of the data related to the steel or to the valve?

MR. BURTON: The falsification was related to the steel, so the material -- essentially, the company that was hired -- or I guess the middle man between the mill and the manufacturer was to qualify via testing, and this would be destructive testing, of parts of the steel.

So essentially, what they did was they falsified the documents or, where they did get test failures, they changed the numbers such that they passed.

MEMBER McEWAN: So I guess the second question would be, how frequently would steel that was -- that had passed the British standard would fail the ASME standard?

MR. BURTON: Maury Burton, for the record.

I don't have that information in front of me. I don't know if I can answer that.

But the qualifications are relatively similar, but without the standards in front of me, I couldn't -- I don’t think I can respond to that.

MEMBER McEWAN: Would staff know**?**

MR. HOWDEN: I don't think we have that information, Dr. McEwan.

MR. BURTON: If I can add one thing -- it's Maury Burton, for the record.

If the material -- like these valves were used in the UK, they would be okay for use in a UK nuclear reactor that has British standards as their requirement, so that's -- that may help answer your question a little.

MEMBER McEWAN: So the data falsification related to the conversion from British to ASME, or it actually related to steel failures during their testing

process?

MR. BURTON: It was in relation to the conversation from the British standard to the ASME standard.

THE PRESIDENT: Well, I assume that when you submit your final report, the event report in the fall of 2015, some of this debate about the various standards -- I mean, I don't -- something doesn't compute here.

If it's good for nuclear facilities in the UK, unless the pressure requirement is -- and the requirements are completely different, should be good here.

So something -- it really doesn't matter if somebody falsifying paper, loses any credibility whatsoever regardless of the standard itself.

So we would like to see a detailed report about the differences in the standard and what kind of forward-looking quality assurances you guys can do.

You know, what we always worry about, what else is there that we're not aware of, right, what are we not aware of.

People can falsify documents. It's a very scary thing.

Maybe I'll allow now Point Lepreau to answer the question that was posed by Mr. Harvey about how do you ensure that the machine will run at 75 to 85

percent.

MEMBER HARVEY: And I will add something because if I was the operator, 85 percent is conservative, what about 75 percent, why not just say up to 85 percent? What dictated that gap between the difference of 75 and 85?

THE PRESIDENT: Okay. Point Lepreau?

MR. NOUWENS: Jason Nouwens, for the record.

So the difference between the 75 and 85 percent is at different reactor powers, the steam conditions change slightly and the inlet temperature to the low pressure turbines will fluctuate.

We have a -- what we call an adverse condition monitoring plan to monitor the situation that we're currently in, and we basically use that plan to dictate the reactor power that we can operate at safely and still maintain the required temperature into the low pressure turbine.

So for example, the higher reactor power we operate at, the lower pressure the -- or the lower temperature into the low pressure turbines will occur. And we have operating limit on how low that temperature can be, so we're maintaining the reactor power currently at 81.8 percent reactor power, which is putting us with margin on our temperature requirements, will continue to operate it

at that point until we can -- as I stated earlier, until we can implement a planned and orderly shutdown to do the permanent repairs.

But we are -- just to clarify, we are operating at a reactor power that maintains the current temperatures and our current state optimal for the turbines.

THE PRESIDENT: Thank you.

Ms Velshi?

Monsieur Harvey, une autre question?

MEMBER HARVEY: Just a question about the -- about Pickering, the large impingement of biomass.

What is the difference between a large compared to expected or normal or expected, and why that did occur? You had, I think, a procedure to follow, and what was the problem?

MR. HOWDEN: Barclay Howden speaking.

I think OPG is prepared to speak to this, too, and give the details on what's large and what's normal.

MEMBER HARVEY: Thank you.

THE PRESIDENT: OPG?

MR. McCALLA: McCalla, for the record.

THE PRESIDENT: Go ahead.

MR. McCALLA: Can you hear me?

THE PRESIDENT: Yes.

MR. McCALLA: So to answer your first question with respect to what we define as being large versus normal, on an annual basis, we would impinge -- looking at performance over the last few years, we would impinge approximately 4,000 kilograms of biomass. This one event which occurred over a period about eight hours, we impinged somewhere between 3,000 and 6,000 kilograms of biomass.

So that's why we considered this to be an episodic event of a large proportion in relation to our normal performance.

With respect to the event itself, the net that we have out on the lake, it's trapezoidal in its design, and it's anchored on either side of our groin by a panel that's attached to the groin. And during the installation process, on a temporary basis, what they do is they have ties -- plastic tie wraps which they use to actually support the entire net to the groin until such time as they can actually go and apply permanent stitching to the net to keep it in place during the entire season.

So during the evolution of putting that net fully in service, we had this episodic event. We had, you know, a huge fish run which actually compromised the temporary tie wraps that were holding the net in place on

the west portion of the net. And that resulted in the large level of impingement which we saw.

MEMBER HARVEY: Was it the first time you had such an event, first time you...?

Okay, go ahead.

MR. McCALLA: Raphael McCalla, for the record.

We have had one other episodic event where, in initial stages, a couple of years ago when we initially put the net in service we had a load on the net which resulted in the net sinking over a period of time. And we had a huge run as well, which resulted in us moving forward and doing modifications to the net where we added an additional 10-foot skirt on the top of the net to actually help us with the load-in issue.

So that was the only other time where we saw a similar event, but it was not to the same magnitude as we saw during this particular event.

MEMBER HARVEY: So do you plan to modify the procedure, the current procedure?

MR. McCALLA: Raphael McCalla, for the record.

So the investigation is still underway, but we would expect that coming out of this investigation one of the things that we will be looking at is the

temporary anchoring that we do in terms of attaching both panels together while we can apply the stitching to see if we can find a more robust means of keeping those panels together so that the divers can -- so that the net can actually provide the protection that it is designed for as well as give the divers time to actually stitch the panels together.

MEMBER HARVEY: Staff, you have some comments?

MR. HOWDEN: Barclay Howden, speaking.

So we are following it along. We are aware of the process that they used to put in the net and that, unfortunately, they had not got to the stitching stage with the divers. This takes a couple of weeks to do. But we will be monitoring it.

And their investigation report, when it comes in with causal factors and additional mitigation measures, we will take a look at that to assure ourselves that they are doing everything they can to do this.

So the recognition is the net is taken out during the winter season, because it would be damaged at that time. So there is always going to be this period when, in the spring, when they bring it in, and during the period of installing it, the tie wraps obviously aren't strong enough to withstand, so they may have to come up

with another measure to put in place until the divers can stitch it up.

So we are just waiting to hear their final report.

MEMBER HARVEY: That will be good to have something visible to get a better comprehension of that period.

MR. HOWDEN: I think for an update, we will provide pictures so you can see.

MEMBER HARVEY: Thank you.

THE PRESIDENT: Just to refresh my memory at least, when we talked about the net as the solution, I remember the discussion with OPG and DFO about the mitigation. We never expected in one day to have enough -- as much impingement indicated in one year.

That is why we went into -- remember, there was big discussion about whether we should like to see OPG put the net permanently in place? And we bought into the idea about the safety of the divers and the winter kill. But if in one day you can get a whole annual kill, I don't know if this is compliant with the original understanding between OPG and Fisheries and Oceans, and CNSC.

So I really would be interested in seeing the final kind of report, whether they are going to be

offside with the understanding of the impingement level.

I see some staff are coming here to try to help us with this.

DR. THOMPSON: Patsy Thompson, for the record.

So just to provide a little bit of context. The objectives for the reduction in impingement and entrainment had been discussed and agreed with the Department of Fisheries and Oceans.

There is also the possibility to bring this under further compliance with the *Fisheries Act* to go forward with an authorization under the *Fisheries Act*. So that is one option that can be discussed with OPG and the Department of Fisheries and Oceans.

MS DUCROS: Dr. Caroline Ducros, Acting Director of Environment Assessment Division, for the record.

Another component to this incident is that OPG has followed due diligence insofar as they have followed the *Fisheries Act*. There is a clause 38(4), which is a duty to notify. They have notified DFO. Again, DFO and ourselves will be waiting for the further information report that we had been promised in July.

And CNSC Staff has spoken with OPG in the past as well about whether or not an authorization will be

required at that site.

So this incident will inform future discussions on that.

THE PRESIDENT: Okay, thank you.

Monsieur Tolgyesi, notre question?

MR. TOLGYESI: Just one short one. We didn't have a precise answer, it is for Point Lepreau.

Considering that you are operating at 81 per cent of full power, what do you expect to replace these reheater systems? You will wait until the next maintenance outage sometime, I don't know where, or you will do that earlier? And when do you expect to do that?

MR. NOUWENS: Jason Nouwens, for the record.

At this time, we will not wait until our next currently planned outage, which would have been in the spring of 2016. We are evaluating right now the best time to do that.

But we anticipate within the next few months that we will schedule a maintenance outage to specifically fix the reheater elements and then return to service until the next planned outage in the spring of 2016.

THE PRESIDENT: Okay, thank you very much.

I would like to move on to the next item

on the agenda, it is event initial report concerning a heavy water leak during maintenance, April 14, 2015 at the OPG Darlington Nuclear Generation Station as outlined in CMD 15-M21.

I understand that Mr. Duncan is here to help us with this. You can still hear us, right?

MR. DUNCAN: Brian Duncan, for the record. Yes, Dr. Binder, we can hear you.

THE PRESIDENT: Okay. Mr. Howden?

CMD 15-M21

Oral presentation by CNSC staff

MR. HOWDEN: Thank you. Barclay Howden, for the record. I am here with Francois Rinfret, and we have our inspection staff at site.

The only thing we have to add is we have now received the detailed report, which just came in this week. We haven't had a chance to go through it in detail, but we have had a high-level review.

We suggest that Mr. Duncan gives you an overview of what OPG is doing as a result of this. And then Mr. Francois Rinfret can make some comments on what we have looked at so far.

THE PRESIDENT: Okay. Mr. Duncan, the

floor is yours.

MR. DUNCAN: Brian Duncan, for the record.

So as a result of this event, as documented in the event report, the key learnings, there are really two key learnings that came out of this. The first was that my staff were not adequately sensitive to working in proximity to equipment that was, in this case, providing for isolation to do the work.

The second item that came out of our investigation was that there have been events similar to this at our sister station last year and at other stations within North America. And we had not adequately applied the lessons learned from those other events so that could incorporate that knowledge and that experience into our own work practices going forward.

So one of the things we did immediately following this event was to stand our team down, walk through what had happened, walk through the fact that while workers were working on one valve and very focused on the work they were doing, they were in fact bumping up against an isolating valve that was providing -- stopping the water flow.

And although they had always done that work that way and had done it successfully in the past, it wasn't acceptable to continue with that practice. It

wasn't acceptable to live with what we had always done, and that we needed to be more sensitive and more aware of proximity, body position. And just the simple mechanics of if you are working on this device, what else is around you and what do you have to do about it?

So we started there, we started with that. We started with a review of all of the work that we had ongoing with our supervisors, our maintenance and our operations supervision in the field to see if there are other work activities out there that had similar impingements, if you will, or similar interferences just from the location, physical locations.

We are continuing to do that as we plan work and as we schedule work into our online and outage programs to look in each and every instance to ensure that our staff have considered the situation that they will be working under and the equipment in the proximity.

Going forward, as part of our investigation there are obviously some other actions we are going to take. We are going to use some dynamic learning activities which essentially are we have mock-ups of systems and components that we are going to retrain and refresh our staff through training on, where we are going to put them in situations where they have to make decisions, where they have to work on a device that is in a

very cramped location, for example, or where there are other pieces of equipment nearby.

And they are going to have to look and recognize, wow, while working on this I could hit that. What do I need to do with that? How do I need to protect it? How do I need to guard it? Do I need to lock and block it? Do I need to do some other kind of protective means to carryon?

We believe those sorts of dynamic learning activities will help really deliver the message and get our folks thinking about every possible permutation and combination that could exist while we maintain this plant, and look forward to seeing improved performance, improved recognition from those staff as to what kind of situations they could find themselves.

The other area we are going after is to understand how this operating experience that has existed in the industry, why didn't we learn from this sooner? Why did we not take that information from our sister station and incorporate that into our work planning processes earlier?

We believe, you know, we do an awful lot of work around learning from our own mistakes and learning from others. And here is a case where we didn't take those lessons to the fullest extent, we didn't take advantage of

them as well as we could have or should have.

And we are going to look back and, in fact, what we are looking at now is looking back over the last year to year and a half of events around the industry and see if we have applied that learning in each and every one of those cases as broadly as we should have.

THE PRESIDENT: So just for this particular incident you attached in your -- I don't know if it is you or if it is Staff who attached photos. And maybe somebody should explain exactly what happened.

When I am looking at this diagram, the photo and the diagram, maybe somebody can explain exactly what happened?

MR. RINFRET: Francois Rinfret, for the record, Director of the Darlington Regulatory Program Division.

I am not sure if Darlington management has this picture in hand, but it is attached to the EIR, that is one we can look at.

So basically, staff were working on the valve on the top of the picture, which is identified PV3. In order to reach PV3 properly, one maintainer would have to stand somewhere around, over or all around V1, V1 which is the valve on the lower part of the picture.

And V1 actually was the valve that would

isolate the area to provide safe environment for the workers that were working on PV3. Therefore, if you crack open V1 inadvertently, depending on the condition of PV3 water might come out of it.

So why would water come out of it? If you turn to the second diagram on the next page you will see there is a D_2O storage tank on the left, the one that is called D_2O storage tank. And between that and PV3 is your valve V1 that would normally be closed. V1 looks like a butterfly there with 33850-V1, that is the one that would provide it.

So water was allowed then to flow through PV3 as V1 was inadvertently cracked open. So that explains the notions that have been brought this table by inadvertent operation, risk evaluation of what happens while you are operating a component in proximity to another one that you can bump.

You can bump, and because you don't see that you are -- as you are suited in plastic suit with an air hose, you don't necessarily see everything that you touch.

So that is the area of the work planning that needed to be reviewed.

THE PRESIDENT: Just so I understand. So somebody opened up the V1, and V3 was already open?

MR. RINFRET: Yes. PV3 was already being -- was under maintenance. So basically --

THE PRESIDENT: Okay.

MR. RINFRET: -- authorized to be worked on for its planned maintenance.

THE PRESIDENT: Okay, thank you.

Questions?

Monsieur Tolgyesi?

MR. TOLGYESI: What is your lock out procedures? Because normally what happens, you have a V1 which is controlling, make sure that you could remove the V3 -- PV3 which is pressure valve. You should normally close it and lock it.

So what is your procedure that it did not happen?

Because when you say inadvertently, it is not a valve which has just a handle to push it left or right. This is a valve which you turn. So it is something what you should do in your mind because of something.

MR. RINFRET: Francois Rinfret, for the record.

I will turn it over to the management of OPG. But V1 is a manual valve which you turn in order to close it.

In the best of worlds nobody touches it.

It's been tagged properly, it's been tagged in other areas so that it is not going to be operated while maintenance is being done downstream. That is in best of worlds.

And there are sometimes when inadvertently such things could happen, and that is the basic reason for -- the direct cause of that event.

I will turn it over to OPG, if I may.

THE PRESIDENT: OPG, you want to add?

MR. DUNCAN: Brian Duncan, for the record.

So there are a couple of things to note there. Isolating devices, there is not a requirement that every isolating device be locked. In fact, some devices have no locking capability, no mechanism. Some devices, you know, if you look at the codes and standards, some devices are absolutely required to be locked and others just have to be positioned and tagged out.

Valve 1 is an example where the nature of this kind of isolating point is it must be closed, confirmed closed, and must be tagged appropriately. And our staff are trained right from the day they are hired, that they will never touch or operate a tagged device.

The real lesson here though is to access that PV3. There is concrete wall behind it, concrete and piping to the right and left. To access it, they have to work across, over the top of that valve 1. And valve 1 is

very -- while it is a manual valve, it is a very easy to operate valve. It is not stiff, it is very easy to turn.

Where we would expect the supervision to recognize that that is an error-likely situation and provide some sort of protection or guarding for that valve, they didn't do that and that is the failing here.

So there is not a requirement to lock the valve, but from a practical and prudent point of view, we really should have protected, guarded, and/or found someway to lock it, some other way to lock it, prevent it from rotating, and we didn't do that.

MR. TOLGYESI: I hope that you will include in your procedures right now that it should be locked. Because I don't see, you know, it is kind of -- usually in the industrial procedures you said you have valves which are not necessarily locked because you operate.

But in this case you are talking about preventative action to make sure that you could work on the PV3. And when you are saying that it was difficult because it was a concrete wall and it was piping left and right, which means that it was lots of physically difficult operations to do. I will say that valve should be really really locked.

And I am coming back. This is a valve

which is turning to be closed. So it is not a simple contact which you could move it, you know, to open or close. Because then I will understand that, okay, you didn't lock it, but inadvertently you pushed the handled and you opened it. But this is a valve which you turn to close.

So I hope that next time you will lock it.

MR. DUNCAN: Brian Duncan, for the record.

So it is not just this valve that we are looking at. Of course the work packages, the preventative maintenance packages that we put together have all been updated now to reflect that this valve will be guarded, locked. And actually, it's more than that.

You know, this hand wheel you could operate with one finger, it is that smooth. And that the way the PV3, the challenge with it, they have been working on it for several hours, the PV3 work, the valve was jammed in the seat, they were really having to work hard on it.

They have to actually literally almost straddle valve 1. And so when you have a hand wheel that is easy to move like that and you are in proximity, in a plastic suit like that, it is possible to move it.

Again, there is no defence. So I mean, our hindsight here is absolutely 20/20, we should have recognized this was there. Likely we should have done

something about it. All of our procedures have been updated to reflect that. But the investigation is looking beyond just this valve 1. That is never going to happen with this valve again. I need to learn from this though and see where I would apply that elsewhere.

THE PRESIDENT: Mr. McEwan?

MEMBER McEWAN: Thank you, Mr. President.

So in the environmental, little section of the EIR, there is a very generic statement, the small amount of release of airborne tritium was negligible. It would be helpful to actually understand the number and what the negligible was.

And I presume that the bioassay that you reference in the licensee actions was looking at the tritium and not at something else?

MR. RINFRET: Francois Rinfret.

Yes, our special staff have reviewed to answer your second part of the question, and there is no doubt bioassay looks at the uptake of tritium. So it is taken into consideration.

Regarding your first comment about the environmental release or small one, negligible one, I think we wrote in there that it remains under 1 per cent of the regulatory release limits. And for that maybe at this point -- I don't have the exact number, but that basically

is below that level which we constitute a negligible value.

Basically, you are looking at a leak of water in a confinement of the station. That is why there are systems that would dry the air to keep the water from going anywhere and near evacuation to the outside. So very clear that this -- the systems are such to be able to pickup the humidity in the air and the water on the floor as well.

THE PRESIDENT: Maybe OPG can help us. You know, there is 7,000 litres of heavy water. How radioactive was it?

MR. DUNCAN: Brian Duncan, for the record.

This is heat transport water, so the heat transport typically runs around 1.2, 1.3 curies per kilogram. You know, this leak occurred into one room which then is actually over top of another, so essentially two rooms where we were able to collect and contain the vast majority of the water that was released and recover that water.

That room is part of the confinement system, it is part of our dried areas in the plant to minimize releases. However, the driers aren't perfect and there would be and there was a small uptake in tritium emission from the plant.

We have done the initial analysis, and its

early yet, but to the critical group, we are talking in the neighbourhood of 0.104 µSv of exposure.

THE PRESIDENT: Thank you.

Ms Velshi?

MEMBER VELSHI: I think we would be interested in hearing from you once you have completed your review of historical OPEX and lessons learned, and which ones you may have overlooked.

I just want to make a comment -- it's not so much a question -- that the two areas that you're focusing on, one is that this incident has happened at many other facilities and you have not learned from that, I mean that is such a fundamental issue and, from the sounds of it I mean you are looking at this very seriously. So I think it would be interesting to hear exactly what your findings are and what else you have missed.

But the second one, and it is really all fallout, as Mr. Tolgyesi was saying, the valve that can be moved by, you know, your little finger doesn't give much reassurance on how robust this is. If there are many such cramped areas in the plant it looks like this is a very serious issue or, potentially, a serious issue. How widespread exactly is it? And is providing training and being more aware of what else you can move around when you have these bulky personal protective equipment, is that a

sufficient barrier?

So, as I said, we would be interested to hear more on your follow-up once you have looked at OPEX and any other similar situations in the plant.

MR. DUNCAN: Brian Duncan, for the record.

So, Commissioner, you know, the early look at the follow-up of the OPEX search, the lessons learned search, we do have a pretty robust process there and we are not finding -- early days -- we are not finding other significant or significant large numbers of areas where we have not applied OPEX. Certainly this one, this one caught us, there is no doubt about it, this particular example.

The way that Darlington is laid out, the way that the plant is configured and the equipment is laid out at this plant, a lot of sensitive equipment is not easily accessible so some of the challenges that other plants have had where equipment from a hallway could be accessed don't really exist here. But having said that, you know, absolutely, we need to understand why we didn't recognize it in this case and where in other cases would this exist.

You know, the valve itself closes the well, that's true. It provides solid isolation. It provides solid isolation, though, when you don't then touch it afterwards. And that's the key for us here, without a

doubt.

We are taking this very seriously. This is not -- this is not something I'm going to be proud of.

THE PRESIDENT: Monsieur Harvey...?

MEMBRE HARVEY : Merci, Monsieur le Président.

But this 7,000 is quite an amount of water. It's quite a volume. Did the spill occur immediately once somebody opened the valve or did it happen after that, later after that? How long did it take?

MR. DUNCAN: Brian Duncan, for the --

MEMBER HARVEY: Okay, go ahead.

MR. DUNCAN: Sorry. Brian Duncan for the record.

The work on the PV3 in the photo, the work on the valve had been going on for several hours and the two maintainers had returned to the work after lunch. They had been working on it for another, oh, 15-20 minutes or so when the leak occurred and they backed out of the room immediately. So we believe that the moment the valve was blown is the point at which the leak would have started and the leak would have been -- we were able to isolate the leak fairly quickly afterward. The key, though, was, you know, managing. When you have a leak like that is you are not just going to just send someone in. They have to get

their PPE, their personal protective equipment, on to be able to go in and access the area, so that took a little bit of time.

But the work program had been going for quite a period of time, but our best judgment is that from the point the valve would have come off its close protection is the point we would have seen water because the distance there is only -- is very, very small, so there wouldn't have been any sort of hold up or any delay.

MEMBER HARVEY: So in fact at the bottom of the photo we have here, so the explanation, it's not appropriate to say that the one failed to provide the isolation as expected, so it should have been something else.

MR. RINFRET: François Rinfret, for the record.

MEMBER HARVEY: I mean it's not the valve itself.

MR. RINFRET: François Rinfret, for the record.

MEMBER HARVEY: The valve was open? I mean the explanation here is false.

MR. RINFRET: François Rinfret.

I should add that when this was put together, the picture in particular, that was done without

the benefit of having assured ourselves of the -- well, having the licensee sure of the actual root cause of the event or even the timing of it. So that was done very quickly after.

So that may explain the discrepancy in what you read there what the actual root cause evaluation follow-up leads to.

MEMBRE HARVEY : Merci.

THE PRESIDENT: Okay. It's early notification and maybe we will get the full report a bit later on, so unless anybody has a burning question, I am going to move on.

CMD 15-M26/15-M26.A
Ontario Ministry of the Environment and Climate Change: Unplanned release of non-radioactive construction wastewater at the decommissioned Deloro Mine Site

THE PRESIDENT: Okay. So the next item on the agenda is Event Initial Report concerning an unplanned release of non-radioactive construction wastewater at the decommissioned Deloro Mine Site, as outlined in CMDs 15-M26 and 15-M26.A.

We have representatives from Ontario Ministry of the Environment and Climate Change that are

joining us by teleconference.

I understand, Mr. Doggett, you will be online? Can you hear me? Mr. Doggett...?

MR. DOGGETT: Yes, I'm here.

THE PRESIDENT: Mr. Doggett...?

MR. DOGGETT: Yes, I'm here.

THE PRESIDENT: Okay. For whatever reason you are not coming across clearly. Can you get closer to the microphone maybe?

MR. DOGGETT: Yes. Can you hear me now?

THE PRESIDENT: A little bit better.

MR. DOGGETT: Okay.

THE PRESIDENT: You still need to be closer --

MR. DOGGETT: We do have folks in the room with you, too.

THE PRESIDENT: Okay. I know, I will introduce them in a minute, but first let me start with CNSC Staff presentation.

Dr. Newland, I understand you're going to make the presentation. Please proceed.

DR. NEWLAND: Thank you. My name is Dr. David Newland and I am the Acting Director General of the Directorate of Nuclear Cycle and Facilities Regulation. With me today is Karine Glenn, Director of the Waste and

Decommissioning Division and the Ontario Ministry of Environment and Climate Change staff are also available to my right.

We are here today to prevent -- to provide you with information regarding an unplanned release of nonradioactive construction wastewater to Young's Creek that occurred at the Deloro closed mine site on April 29, 2015 and continued through May 5, 2015.

I would just like to note that this is an information item to the Commission and that the review of the designated officer order will be done at a separate time.

I will now pass the presentation to Ms Karine Glenn, who will briefly describe the event, the actions taken by the Ontario Ministry of Environment and Climate Change and by CNSC staff and next steps.

Thank you.

MS GLENN: Thank you. Good afternoon.

My name is Karine Glenn and I am the Director of the Waste and Decommissioning Division at the Canadian Nuclear Safety Commission. The Commission issued a license for the Deloro closed mine site to the Ontario Ministry of Environment, now known as the Ontario Ministry of Environment and Climate Change, or MOECC, in December 2009, with an expiry of December 31, 2016. The Deloro

closed mine site is a legacy waste site located adjacent to the Village of Deloro, approximately 200 km southwest of Ottawa near the town of Madoc.

The licensed area of the Deloro mine site, shown by the orange and red lines on the aerial photograph on the slide is bounded to the south by Highway 7, which is visible at the bottom of a photograph. This aerial photo is oriented on the points of the compass, with north at the top of the photo.

The Young's Creek Area project is the smaller inset area north of Highway 7 at the bottom right of the photograph. The Moira River can be seen running down the centre of the photograph and Young's Creek joins the Moira River a short distance south of Highway 7. As part of the Deloro clean-up, sediment in Young's Creek, contaminated mostly with arsenic, cobalt, copper and nickel will be excavated and placed into an engineered waste containment facility.

The Young's Creek Area project is at an early stage where construction of the containment area is nearing completion and dry work zones are being established to facilitate excavation of the sediments. The dry work zones are being created within the creek bed using aqua barriers, which are large tubes filled with water and used to enclose the work zones. Once the aqua barriers are

installed, water is pumped out of the work zone and over the aqua barrier into the creek, leaving a dry work zone.

At the time of the event three work zones had been delineated with aqua barriers, but remained wet. The water behind these barriers was nonradioactive and was construction wastewater. Outside those works zones, the creek continued to flow along its usual course, flowing to the south off-site via the culvert at Highway 7.

A rock barrier had been placed upstream of the work zone to limit the spring flows and a similar rock barrier was established downstream of the works zones to limit flow and retain sediments from leaving the site.

Aqua barriers are used extensively on site, as shown in the photo on the left. As mentioned earlier, aqua barriers are large tubes that once filled with water are used to contain water within an area as a temporary dam of sorts.

The photo to the right shows a close-up of an aqua barrier.

On Thursday, April 30, 2015, MOECC notified the CNSC of an unplanned release of construction related wastewater to Young's Creek due to the collapse of an aqua barrier on the afternoon of April 29, 2015.

On May 1, 2015, MOECC notified the CNSC of another unplanned release caused during the installation of

a new aqua barrier, as shown on the slide.

Between May 1 and May 5, 2015, MOECC deployed a series of control measures, including sandbags, two additional aqua barriers and silt curtains.

MOECC notified downstream users of these releases and reported them to CNSC staff and the Ontario Spills Action Centre. It should be noted that neither Young's Creek nor the Moira River are used as sources of drinking water for approximately 12 km south of the Deloro site.

Upon becoming aware of the first release, MOECC immediately began taking water samples and the sampling continued after containment of the wastewater was restored. Furthermore, MOECC has set up a portable water treatment plant and is investigating the cause of the aqua barrier failures leading to the unplanned releases.

CNSC staff have reviewed the results from the sampling conducted by MOECC and concluded that no environmental impact is likely to result from the releases that took place between April 29 and May 5, 2015. MOECC's actions since the event have been focused on maintaining the integrity of the aqua barriers. Due to the high water levels, these actions have included planned releases of surface water off-site. Sampling results from these releases are not yet available but will be reviewed by CNSC

staff once they are available.

Following the initial report by MOECC, CNSC staff reviewed the 21 day report submitted on May 21, 2015. This review prompted CNSC staff to visit the Deloro site on May 28 in order to gather additional information about the releases. Based on CNSC staff's findings and observations from the site visit, CNSC staff increased regulatory oversight of the Deloro project and on June 3 issued a Designated Officer Order directing MOECC to cease any activity which could further jeopardize the integrity of the aqua barriers and to develop and implement a contingency plan. The Designated Officer has referred the Order to the Commission for review as per the CNSC Rules of Procedure. The Commission shall confirm, amend, revoke or place the order in a separate proceeding.

CNSC staff will provide the Commission with an update on the Deloro site as part of the regulatory oversight report for nuclear waste in Canada which is scheduled to be presented to the Commission in December 2015.

This concludes CNSC staff's presentation. We are available to answer any questions that the Members of the Commission may have. As mentioned earlier, MOECC staff is also available to provide additional information and answer your questions.

Thank you.

THE PRESIDENT: Thank you.

So before opening up the floor for questions, I would like to turn the floor to the Ontario Ministry of the Environment and Climate Change.

I understand that Ms Kew will make some remarks. Over to you.

MS KEW: Thank you.

President Binder, Members of the Commission, for the record my name is Hollee Kew and I am the Eastern Region Director for the Ontario Ministry of Environment and Climate Change.

To my right I have my Technical Support Manager, Peter Taylor, and to my left I have the Project Manager, Katharine Faaren, and the Project Engineer for the Young's Creek area; as well, Kara Smith.

So thank you very much for this opportunity to provide some remarks. We are here today to talk to you about the discharges of construction- related wastewater and storm water from the Young's Creek area of the Deloro mine site on April 29th and 30th of 2015, but of course we are here to answer any questions that you may have of us as well.

The Deloro mine site project is a multi-million-dollar initiative of the Government of

Ontario to remediate the abandoned mine, mining and refining a manufacturing site at Deloro. The Ontario Ministry of the Environment and Climate Change leads this project for the Province of Ontario.

The Deloro mine site is a former gold mine, an industrial complex abandoned by the private sector. The site is sheeted, or forfeited to the province or the Crown in 1987. What the Ministry is dealing with at this site is nearly a century's worth of hazardous by-products and residues, a complex blend of compounds, metals like cobalt, copper, nickel and low-level radioactive waste.

Arsenic, as you have heard, is the main contaminant of concern. Low-level radioactive slag and tailings were produced as a result of the refining of by-products from uranium refining. Up to 6 percent of the waste at Deloro is low-level radioactive material. That material came from spent uranium ore from Port Hope that was further processed at the Deloro to extract the cobalt. All these materials cause significant environmental impact at the site, including contamination of the site soil sediment, surface water and groundwater.

In addition to chemical concerns, the site was scattered with -- from abandoned mine workings as well. The Ministry has made significant progress in dealing with

the complex and multifaceted environmental issues at the site. In 2012 our contractors completed an engineered cover on the tailings area of the site, which has effectively prevented more than 2 million litres of contaminated water from getting into the Young's Creek wetland. Work in the industrial and mine area is more than 70 percent complete. In this area, the most highly contaminated materials are being excavated, consolidated and will be covered with an engineer cover. That work is scheduled to be completed by next year.

Work in the Young's Creek area of the site started in 2014 under contract with Quantum Murray LP. That work is about 30 percent complete. The plan for this area is to build an engineer containment cell that will be used to manage about 135,000 m^3 of arsenic-contaminated sediment from both the on-site and off-site portions of the creek. The ultimate goal of the clean-up is to isolate and contain waste at the abandoned mine site and keep it out of the Moira River.

Since taking over the site, the Ministry has spent more than $93 million on the project to address contamination issues and to rehabilitate the Deloro property, resulting in an 80 percent reduction in arsenic loadings to the Moira River. At the Ministry of Environment and Climate Change, our mandate is to ensure

clean air, water and land. We also work with industry, stakeholders and the public to achieve compliance with environmental standards.

I can assure you we take this mandate very seriously. Our responsibility to the people of Ontario as well. We regret that the two discharges of construction related wastewater and storm water happened in the Young's Creek area of the Deloro mine site on April 29th and 30th of 2015.

The construction wastewater and storm water had slightly elevated levels of arsenic and cobalt typical for this area of the site. However, the results of the sampling show no impact on aquatic life and no risk to human health and safety. Sampling for radionuclides shows that no radiological material was discharged. The Ministry has taken measures to deal with the situation, but also to do a detailed analysis of what might have been the causes of the breach of these temporary aqua barriers and to improve every process we can make sure we are remediating the site in a way that is protective to the environment. We have also added additional staff to ensure good, effective and timely program oversight.

From a regulatory perspective to meet our own regulatory requirements, we have also increased our Ministry of the Environment of Climate Change inspection of

the site as well. We take our duty to keep the people most affected by this project aware and informed of what's going on.

The Ministry has a very clear notification protocol in place of the event of spills at the site. We developed the protocol with input from local municipalities, Moira Lake Property Owners Association, Hastings Prince Edward Public Health and the Quinte Conservation Authority. As a precaution and before we knew the exact nature and extent of the discharge, we notified each of these groups about the discharge of construction wastewater and we continue to keep them informed about sampling results. We also reported the release to the local Ministry office and to the Canadian Nuclear Safety Commission.

For the record, we have provided copies of the letter that we sent on June 11th and 12th. The Ministry distributed a detailed letter to stakeholders, including door-to-door to residence in the Village of Deloro and residents who live adjacent to Young's Creek south of Highway 7. This is also posted on your website, the CNSC website as well.

We emailed it to the local Moira Lake Property Owner's Association for further distribution to their membership.

We emailed it to each of the three local municipalities, to our Public Liaison Committee, to Quinte Conservation Authority and to Hastings Prince Edward Public Health.

I will now turn it over to Katharine Faaren, the Deloro Project Manager, to provide some additional information on the existing plans, protocols and measures we have in place and to describe the additional contingency measures we have put in place as a result of the incidents on April 29th and 30th.

MS FAAREN: President Binder, Members of the Commission, my name is Katharine Faaren. I am the Project Manager for the Deloro mine site clean-up project.

For context I want to provide you with a brief overview of some of the plans and protocols that the Ministry and our contractor, Quantum Murray, had in place prior to the discharges on April 29th and 30th.

The contract we have with Quantum Murray for the work they are doing in Young's Creek area includes requirements for a number of planning documents. These documents anticipate risk and set out roles and responsibilities and detail actions that the contractor must take in the event of a discharge, spill or an environmental emergency.

We have 17 of these plans in place created

by the contractor and reviewed by the Ministry, including plans for stormwater erosion control which would include work sequencing and control measures to minimize erosion and specifications on how specific measures like silt fencing are to be installed.

We have health and safety plans that detail roles and responsibilities, work practices to reduce exposure to hazards, personal protective equipment and worker training.

We have radiation protection plans.

We have quality control plans, including inspections, audits and oversight by a dedicated quality control and quality assurance engineer.

The Ministry's Deloro team works very closely with the Construction Contract Administrator and the contractor to make sure the project is carried out effectively. When the discharges happened on April 29 and 30th, the Ministry's Deloro team worked with the contractor and the Construction Contract Administrator to stop the discharge of water, increase regular inspections on the temporary barriers, install additional measures to control erosion, add contingency measures for surface water control and immediately begin sampling of downstream water quality.

We worked with the contractor to assist us in conducting a detailed analysis of what caused the

temporary barrier to fail. That work is ongoing. We have also begun a review of the contingency plans associated with the site to ensure that we have the right plans, protocols and measures in place to prevent future discharges and if they do happen to control them quickly and efficiently.

Thank you.

THE PRESIDENT: Okay, thank you.

Let me then start the question session avec Monsieur Tolgyesi.

MEMBRE TOLGYESI : Merci, Monsieur le Président.

May I see those slides that you were showing?

THE PRESIDENT: Are you talking about staff?

MEMBER TOLGYESI: Staff, yes.

DR. NEWLAND: Which slide would you like to see?

MEMBER TOLGYESI: This is the response to event, okay. If you go to prior to event? The next one, prior to event.

So the objective here is to isolate rooms, pump the water, remove the tailings, eventually, and after, I don't know, maybe rejuvenate or recover or whatnot? Yes?

MS FAAREN: This is Katharine Faaren, for the record.

Yes, you are correct, the objective is to -- our first step is to build a containment cell just to the left of those --

MEMBER TOLGYESI: Yes.

MS FAAREN: -- lines there. And when that cell is complete, which it's not quite yet, the sediment excavation will begin.

MEMBER TOLGYESI: So you have three thoughts there.

MS FAAREN: Yes.

MEMBER TOLGYESI: Okay. What is the process? You work on the first one, you pump to the second one and third one or you work on all three at the same time?

MS FAAREN: Actually, until the cell is built we are not going to disturb any more sediment. We had to disturb a small volume of the sediment so that we could establish the cell. At that point in time we will work, work zone by work zone, to remove the sediment.

MEMBER TOLGYESI: And which aqua barrier failed of these three?

MS FAAREN: Kate Faaren again, for the record.

The first two barriers -- I'm sorry. The first two barriers you see to the left, those are the ones that contain the excavated sediment. The one that's all the way to the right that was a secondary barrier for contaminated sediment. It was the secondary barrier, not the primary barriers that failed.

MR. TOLGYESI: When you look at them -- then going to the after events, post event, the other one. Yes, you have some additional barriers there. Yes? Yes.

And what are these three additional barriers? Because they are one in a creek, one just north of the road and one just on the, how do you call it, next to the road. Were these barriers originally planned or it was just because the event happened so it was a kind of protective measure?

MS FAAREN: The two rock barriers, you see the lines in black, they were not originally planned, we put those in at the end of the winter period to help control both water coming into the site during a spring fresh-up period and water leaving the site to help reduce any erosion of sediment. Those were installed prior to the event.

The other two aqua barriers, which are the pink lines you see, those were originally planned to be installed at a later date for the work sequencing. Our

objective is to isolate specific areas at a time, work in that zone, finish and then move to a new zone. Only the sandbags were never originally contemplated in the original design.

MEMBER TOLGYESI: Sorry. When you were talking about -- maybe I will wait because we should go around.

THE PRESIDENT: We will do that. I will start with Dr. McEwan.

MEMBER McEWAN: So thank you, Mr. President.

So if we go to the first, I think it was the first slide showing the overall map of the whole site, so slide 2, so you say I think that about 6 percent of the waste is radioactive waste. Is that uniformly distributed over the site or is it limited to the tailings pond or...?

MS FAAREN: Katharine Faaren again, for the record.

The low-level radioactive waste is within all three of the major clean-ups of the areas of the site, which is the tailings area, the Young's Creek area and the industrial and mining area. However it is not entirely uniformly distributed. We have -- within the tailings area there was pockets of tailings material that was low-level radioactive waste and that is the same within the Young's

Creek area. It is primarily restricted to the left arm or the western arm of Young's Creek. It does not extend all the way to the highway.

And within the industrial and mining area we have both tailings and slag material. Most of that low-level radioactive waste within the industrial and mining area has already been removed and it is placed within the long-term waste consolidation area.

MEMBER McEWAN: So how much of the sediment now would contain radioactive waste if it is removed and stored?

MS FAAREN: In terms of volume of sediment --

MEMBER McEWAN: Yes.

MS FAAREN: -- that has low-level radioactive waste? Off the top of my head I'm not sure. I will pass that over to Kara Smith, our engineer for the project. She is just going to refer to her notes.

MEMBER MCEWAN: So maybe I could sort of continue.

With the breach in the barrier -- so the breach in the barrier was to the right -- what is the protection between the tailings pond and the Young's Creek area? Is that just normal woodland or is it --

MS FAAREN: The tailings area was the

first area of the site that we have cleaned up. That is covered by a cap that is over a metre thick of various materials, including clay, Geosynthetics to prevent erosion, and then it is covered with the vegetation, including a poplar plantation to help with evap or transpiration. So that material is no longer leaking or could leak from the tailings area.

MEMBER McEWAN: So all of the leaking would have come from Young's Creek through the -- the loss through the barrier would all have come from Young's Creek? It wouldn't have been overflow from other areas to the north?

MS FAAREN: There is overland flow from -- this is a vegetated area and the wetland is a low point. There are no more tailings going into Young's Creek. However, water does come from both the north, the west and the east.

MEMBER MCEWAN: Okay. So if the sediment is sort of uniformly distributed with low-level radioactive waste and you saw basically chemical contaminants that were representative of the sediment downstream of the leak, would you not have expected also, just by normal flow, to also have found some of the radioactivity there as well as the chemicals that it was sitting with in the Young's Creek sediment?

MS FAAREN: Kate Faaren again, for the Ministry.

We don't actually have any low-level radioactive materials, radionuclides, present in water above the Canadian Drinking Water Guidelines. We have not had that throughout the history of our project.

MEMBER MCEWAN: So I don't think that answers my question. I'm surprised that you find contaminants from other chemicals that were in the sediment, but you don't find any additional radioactivity if it was co-mingled, coexistent with the radioactivity in the sediment.

MS FAAREN: The Ministry did take over the site after all the processing was done, so I admit, I'm not sure how they mechanical processes would have deposited various sediments of different weight and during the processing if the sediments that contain uranium have a different specific gravity it may settle out quicker than a sediment that contains arsenic, but the details of that I'm not sure.

MEMBER MCEWAN: Okay.

Staff, am I on the wrong track completely?

MS GLENN: So maybe I can help provide a little bit of clarity.

First of all, the tailings area which was

shown on the previous slide, it was not a tailings pond, it is a dry storage area, so there is no overflow of water per se. So just for clarity's sake I just wanted to clarify that.

As the MOECC mentioned in their address, most of the radioactive material is located in the west arm of Young's Creek, so the radioactive material contamination in the sediments is not uniformly distributed in Young's Creek, but is mostly found in the west arm, which is on the left side of the slide. The release that occurred on the 29th and the 30th was with respect to the areas that you see behind the aqua barriers in pink, so they were not the areas that we show indications of higher radioactive contamination, which may explain why you are seeing -- we didn't see any of the elevated radioactive contamination in these samples that were taken by the MOECC following the event.

THE PRESIDENT: Ms Velshi?

MEMBER VELSHI: I know my fellow Members will come back to exactly what happened. I'll try something different.

How many orders do you issue, typically, in a year that would then get referred to the Commission?

MR. NEWLAND: Dave Newland, for the record.

Maybe one.

MEMBER VELSHI: So a very rare event.

And I know we're not talking about the order, but there's a big hole in my understanding on when you visited the site what caused you enough angst to issue an order, and what were they not doing that necessitated an order being issued?

MS GLENN: The decision to issue the order following the site visit was based on the fact that, upon the visit, what CNSC staff and the inspector witnessed was that there appeared to be a general lack of on-site in-place contingencies to prevent further releases from occurring. And the water levels were very high given that it was spring and it was a heavy rain season.

And we believed that we didn't see the implementation of the contingency plans on site to prevent any further releases and to maintain the integrity of the barriers, and we also saw a bit of a lack of communication between the contractor and the MOECC that was occurring, and that caused some concern for the inspectors and the staff on site.

MR. NEWLAND: Dave Newland, for the record.

Just to add to that, I think from my perspective as well, there didn't seem to be the level of

oversight by the Ministry that we had anticipated given the conditions that the inspectors saw on site. So we would have expected the Ministry to be -- have been more proactive.

And so that was one of the reasons why we issued the order.

MEMBER VELSHI: And I won't ask you folks to comment on that because you'll have an opportunity, I'm sure, down the road, to do that.

But my question more is you talked about all these plans and protocols that you have with the contractor. In your assessment -- because it took you quite some time to control the overflow.

Were your contingency plans adequate for managing something like this or did you need to change those?

MS FAAREN: This is Kate Faaren again, for the Ministry of Environment and Climate Change.

Since that release, yes, we have decided we need to do more work. We have hired a third party expert to undertake a review of the current site conditions as they exist now, which are different in terms of naturally-occurring water levels than was known at the design stage.

They are assessing the current site

conditions and providing recommendations going forward.

We're also in the process of developing a contingency plan specific to these barriers and how to address water management, including an enhanced barrier inspection and maintenance program.

We're taking a deeper look at how water flows within Young's Creek and how that relates to these barriers and their management.

Additionally, we are working to get our on-site water treatment system operational. As of this morning, it is my understanding that it should be operational later this week or early next. That will allow us to take water -- naturally occurring water that is impounded behind these barriers and treat it and discharge it back to the natural environment.

THE PRESIDENT: Monsieur Harvey?

MEMBER HARVEY: Question to the staff.

Have you been -- or had you been on the site before that event since -- or six years ago, you -- since the licence have been issued?

MS D'ARCY: Heather D'Arcy, for the record. I'm the project officer for the Deloro mine site.

Deloro operates under a once yearly inspection plan.

Just to clarify, the -- there are three

projects at the site that includes -- I believe MOE has covered this.

It includes the industrial and mine area. It includes the tailings area, which you've heard is now complete. And it includes the Young's Creek area.

Young's Creek area is the last to be embarked upon, for good engineering reasons. It's also, in many ways, one of the most difficult parts of the project to do. Consequently, even prior to this event, there's been ongoing plans for an increased presence at the site beyond the once yearly.

There was -- the last inspection at the site took place in August 2014 and, at that time, staff did observe some of the aqua barriers that were already in place.

MEMBER HARVEY: But everything seems to be okay. You didn't have any problems with the -- what was done on the site.

I mean --

MS D'ARCY: Heather D'Arcy, for the record.

At the time in August 2014 -- that was just before I took over the site -- I had prior familiarity with the site for many years gone by. I hadn't seen the new work that had been done.

It was my first exposure to the use of aqua barriers for dry excavation.

Coming up to the fall, as I took over the site, I expressed concern about over-wintering of the barriers. They're filled with water and, as we know, water freezes.

And this was a concern that was addressed to Ministry of Environment and Climate Change, who expressed a similar concern, and was undertaking to develop a winter management plan in consultation with their contractor.

MEMBER HARVEY: Thank you.

THE PRESIDENT: So you will recall that after the incident in B.C. of Mount Polley the CNSC were very concerned about how all our licensees keeping proper tailing management.

In fact, if memory serves, all our licensees got a little notice to review their tailing management.

So my question is, was the Deloro project one of those licensees that got this instruction, please take a look at your dykes, parameters, whatever, make sure that they don't overflow.

MS GLENN: Karine Glenn, for the record.

So the barriers that are in place at the

Deloro site, first of all, are not tailings management ponds. It's not a tailings management pond and it's not a dam. They're temporary barriers that are moveable and are meant to be temporary and moved as the zones progress.

And as MOECC described the work that has to be done and we did in our presentation as well, these barriers are just temporarily put in place. Water is removed and then, at that point, the bed is dry excavated.

So no, this site was not part of the Mount Polley. It does not constitute a site that needed one of these reviews because it does not have permanent dams in place.

THE PRESIDENT: I do not accept the legal distinction because the issue is not really what breaks down. It's whether you've got an overflow that will result in contamination.

It's not whether it comes through a dyke or tailing, whatever, because -- and I think -- I think I'm glad to see that there was kind of a notice to the communities that -- because they don't care where it came from. All they care is if it's contaminated.

And that's really what you always have to prevent, so it's the prevention side that, with hindsight, should have taken a look at this.

Mr. Harvey.

MEMBER HARVEY: Just for information, on slide 3, you indicate the direction of the flow. And it goes through two rock barriers.

So I would like to have some explanation. There is some devices, some spillway of some because if the water is going through, there is something that's not really a barrier.

MS FAAREN: Katharine Faaren for the Ministry of Environment and Climate Change.

You're correct. They are, in fact, supposed to let water through. The purpose was not to totally impound water behind them. The purpose was to slow the water down in the event of a spring freshet situation. And as water came through the upstream wetland and it slows it down because the sediment is our primary area of concern here rather than the water.

And so the rock barriers were installed in order to slow down the flow of water because it is fast-moving turbulent water that causes scour of sediments.

So that was the purpose of them, and to prevent the sediments from being moved.

Our final solution, of course, for the sediments is to remove them from the wetland entirely and put them in the long-term storage cell.

MEMBER HARVEY: So this condition did not

change after having aqua barriers to the -- to where the flow goes. The last one, the rock barrier just -- no, that's okay.

You put -- you install another aqua barrier just beside the rock barriers downstream, so the water goes through despite that.

MS FAAREN: Once we put the additional aqua barriers in, if you're talking about the ones in front of the rock barrier, that does -- I won't say entirely stop the flow. These are not plugs, if you will. But it holds back the majority of the flow.

MEMBER HARVEY: For a certain time.

MS FAAREN: For a certain time until we could test it and then institute a controlled release.

MEMBER HARVEY: Thank you.

THE PRESIDENT: Another quick round. Mr. Tolgyesi?

MEMBER TOLGYESI: I have just two.

You were saying -- the staff, you were saying that the radiologically contaminated water is coming from tailings. That's what you said. And it's coming on the left-hand side when you are looking at the picture.

It's a creek which is coming from right-hand side where there's two barriers, rock barriers.

Did you say that it's coming from other

side or creek is going up to the north and left-hand side?

MS GLENN: Karine Glenn, for the record.

So the contamination is actually -- it's not coming from the tailings. It's actually in the sediment, in the bed of the creek. And most of it is the area that we have shown as potential for higher contamination is on -- in the west arm, which is on the left-hand side of the barriers.

MEMBER TOLGYESI: So there is a creek stream also there.

MS GLENN: So we saw in the previous slide -- maybe I'll go back. You see the flow.

It's a bit of a wetland area that gets flooded, so if you see the flow of the water, there's no creek per se that comes there. This is all part of the Young's Creek wetlands area.

MEMBER TOLGYESI: Because according to your memo, what you were saying, you were talking about construction contractor Trivita Limited, and in a staff CMD there is a Quantum Murray contractor. They are two contractors.

Murray is working on this part of the creek, and Trivita Limited is working where; the mine site of where.

MS FAAREN: Katharine Faaren.

Yes, Trivita Limited is working in the industrial and mine area of the site concurrently while Quantum Murray is working on the Young's Creek area of the site.

MEMBER TOLGYESI: But you were saying also that there was -- there was a spill, right, heavy rainfall.

How you could -- how you expect to control all these site, just by aqua barriers, because you are talking always about the spills. And usually what -- you know, to prevent them, you should build a dam or barrier or use an aqua barrier.

So how you would like to control that, those spills will not go to the river and will not transport all these heavy metals, specifically arsenic?

MS FAAREN: Just to clarify, the spill that happened in the industrial and mine area recently -- sorry, this is Katharine Faaren.

The spill that happened in the industrial and mine area recently, that was a spill of clean fill material that was being brought in after an area had been excavated, so that material did not have any contaminants in it other than the fact it was soil, and that causes cloudiness, turbidity in the water.

We are -- we are managing a very large site in the industrial and mine area that is located next

to the river with some relatively steep gradients.

We do have a storm water and erosion control plan, and we do have a series of storm water control measures, including installing rip wrap and silt curtains and hay bales.

We have some locations where we have turbidity curtains in the river. However, in periods of intense rainfall, sometimes that can be overwhelmed.

We are currently working with the contractor and with some regional experts to determine how we can better manage those clean fill materials in intense rainfalls and what additional erosion control measures we could put in place to prevent even clean soil from making it to the river.

MEMBER TOLGYESI: When you look this slide number 3 or 5, whatever, this one -- when you look, it's only one discharge right below the road, okay. And you build barriers which will -- which will contain water eventually and which will rise the water level.

And I remember there was in Quebec there was one spot, one mine which they were dammed so suddenly because of heavy rains. This dam failed and there was only one discharge point like here.

And it happened that the road was moved 100 feet, few hundred feet down.

What you do to make sure that in case of -- you build all these aqua barriers and, eventually, the water will build up.

What you do -- what you expect as a safe solution that the road will remain there?

MS FAAREN: Kate Faaren again for the Ministry of Environment.

Just to clarify, these barriers are not very large structures. Their maximum height is six feet, and then they have a tendency to sink into the sediment a bit. And the water depth at Young's Creek, even with these barriers in place, is not very high.

That having been said, as I think I mentioned earlier, we are undertaking a risk review at the moment to take a look at the current circumstances in Young's Creek, and it will examine all those sorts of things.

THE PRESIDENT: And we will be looking to read your final solution when you do that.

Dr. McEwan?

MEMBER McEWAN: Thank you, Mr. President.

Can I get a staff comment because I think I heard you say that you were surprised that the water barriers would be used over the winter because they freeze and presumably get damaged and that the Ministry will

also -- I can't remember the word you used, surprise.

So why were they used over the winter, then, if both of you were concerned about it? And is it probable or possible that damaged cores led to -- I think the term you used in the EIR was collapse of the water barrier.

MR. NEWLAND: Heather D'Arcy will comment. Thank you.

MS D'ARCY: Heather D'Arcy, for the record.

Perhaps I could give you an overview from my side of the discussion that took place, and I'm sure MOE can fill in some of the details as well.

The -- just to clarify, aqua barriers are not my area of expertise. Having taken over the site and seeing them at the site and understanding that water freezes, I had a concern about them freezing.

The concern was this. The Young's Creek area is a large flood plain, a small creek. The volume changes dramatically year to year, and throughout the year as well.

The -- it's the sediments that carry the contaminants. The sediments being re-suspended are what creates a problem because they can be mobilized, then, off site.

My concern was in the construction that was taking place in the containment cell, some of the sediments had been disturbed, and they were disturbed and stockpiled. And I wanted to ensure that those sediments, having been exposed, were then protected from the environment, from wind or water erosion, that they wouldn't, with the spring freshet, be re-suspended and carried downstream.

So the aqua barriers, my question was, are these sufficient to protect it, and what about wind erosion, monitoring, some of these other things.

Also, to clarify, I don't think there was any intent that that -- originally that that material was to be over-wintered, it was due to a delay in schedule on the part of the contractor, as I understand it, and, having excavated those sediments, then had a problem that they had not anticipated with over-wintering. And that's how that arose.

So I think MOE can probably fill in a few more details on that for you on how that was addressed.

THE PRESIDENT: MOE, you want to --

MS KEW: President Binder, Hollee Kew for the record, Regional Director.

There's a few concerns that I share with this Commission, and I am concerned about the aqua barriers

right now. And because of that, we're actually reviewing all of the action that's on the site regarding those aqua barriers, are they the right engineered technology for this site.

So that's my role as the complete oversight of the project.

I was concerned to the point that I did confer with my colleagues at the Ontario Ministry of Transportation to ensure the integrity of the box culvert at Highway 7 that you see towards the bottom of your drawing there, and they assured me that there was good integrity, and with the box culvert, even if there was catastrophic failure of every dam, so that was important to make sure that we protected the health and safety of any citizens that would be on the bridge in the event of a failure.

THE PRESIDENT: Good. Thank you.

Dr. McEwan?

MEMBER McEWAN: So what does that mean going forward in terms of the aqua barriers?

I mean, what I've heard, there were concerns. They may not have worked. What does that mean going forward?

MS KEW: Hollee Kew, for the record.

Going forward, we really, at this point,

are doing contingency measures to ensure that they're still remaining stable and doing the job that they're supposed to do. But going forward on a long-term basis, we need to review the site and review the plan that is in place right now for the further remediation of the project or the Young's Creek area.

I've challenged staff that they need to convince me and our team that these are the right technology. And I will make a judgment call at that point whether or not we need to stabilize the site and re-engineer.

And at this point right now, I'm assured that we're getting the site under control, we're ensuring the protection of the environment and human health and that we are going to review those aqua barriers to see what was the exact failure of the aqua barrier at the time.

MEMBER McEWAN: So just thinking back to the culvert, it is currently protected by an aqua barrier.

On the drawing, you have an aqua barrier put in there.

MS FAAREN: No, that aqua barrier has been removed. There's nothing in front of the culvert at the moment.

As you know, we've had some quite heavy rainfalls over the past two weeks, and we made -- and after

testing, we made the decision to release the water that was being impounded behind those barriers so that there would not be a failure.

There was very heavy rainfalls, and the wetland absorbs so much water from the surrounding area it was important to release it to re-establish the natural flow of Young's Creek.

MEMBER McEWAN: So would there have been a lot of turbidity in the water that you released?

MS FAAREN: I'm sorry; could you repeat the question?

MEMBER McEWAN: So I think I heard again that one of the issues with heavy rain is that there's a lot of sediment churned up.

Would there have been a lot of sediment suspended in the water that you released?

MS FAAREN: Kate Faaren, for the OMECC.

We are doing testing currently. We do not expect any issues as a result of that testing. We were doing monitoring while it was being released and I was there myself, I did not see anything to be concerned about with respect to turbidity.

There was, in fact, a lot of turbidity within the adjacent water body. We saw that as well, but that was not associated with the work we were doing.

THE PRESIDENT: Is Staff actually, together with MOE, measuring the radiological contamination in there? Because I thought somewhere I read that it was below detection level.

Dr. Thompson?

DR. THOMPSON: Patsy Thompson, for the record.

Perhaps to provide additional context. While the plans are being made there is a protocol in place where water quality parameters, both radiological and non-radiological are being measured. There is also requirements for toxicity testing to be done.

We are working with Environment Canada in terms of following the situation. Inspectors from Environment Canada have also been on site and there is regular communication with them.

So as we get results in terms of water quality, toxicity tests, if we need to take further regulatory action, then it will be taken at that time.

THE PRESIDENT: Okay.

Ms Velshi?

MEMBER VELSHI: It is questions for MOECC around public concerns and public information.

And perhaps you can share with us what the level of concern, if any, has been expressed. And when I

got the event initial report I wanted to find out a bit more about it, and I went on your website and didn't see anything on it. And I know you mentioned your letter that has been delivered to the households nearby is on the CNSC website.

So if you can even comment on what is on your website.

And the third part is I have had a quick look at this letter, and if this what has gone out to each household -- I mean, I am no communication expert, but are these the key messages? And who reads a four-page letter with so much technical information on it?

So maybe you can comment on that as well. Thank you.

MS KEW: Thank you. Hollee Kew, for the record.

We have a public liaison committee in the area that are very receptive to our open and public communication with them. We discuss all aspects of the site, including historical relevancy of the site. As you can imagine, a gold mine in that area is very historically relevant to the members of the community there.

As for our website, we are having some difficulties with being able to post the letter, it is the wish to do that. We will still keep working on that to

ensure that happens.

In the meantime, to mitigate that it is posted on your website and we delivered door to door the letters to the residents. We have had no complaints, to my knowledge, that they thought the letter was complex in nature, but actually appreciate the transparency that we have had with them.

We will be having a public meeting in another, I believe it is the 24th of the month, to actually discuss the letter, discuss any issues, and to answer any questions that the public may have.

MEMBER VELSHI: And have they raised any concerns so far? And I know in the letter you say call me if you have any concerns or questions. Have you heard at all from them?

MS KEW: Not to my knowledge there has been any concerns raised.

The community is very aware of the issues on the Deloro Mine Site. They have a water/oil advisory. And they are very pleased that the Ontario Ministry of the Environment and Climate Change has taken on the responsibility to clean this site, and they know we take that very seriously.

And we have made tremendous progress. Even in the last few years it is actually astounding to see

the progress that has been made on the site. With the amount of money that has been invested local residents are very pleased that we are doing the work that we are doing.

THE PRESIDENT: Monsieur Harvey?

So to your last comment, the CNSC were helpful in moving forward this file? It is a leading question.

--- Laughter / Rires

MS KEW: Hollee Kew, for the record.

They were very helpful in getting this letter on the website.

THE PRESIDENT: So let me ask you something in the long-term. Your licence runs out in 2016. This is a gold mine with some processing of nuclear. It is really not a nuclear facility here. You know, we have an old program called institutional control, we do it quite a bit in Saskatchewan where a mine gets remediated, it gets to the level in which we are quite comfortable passing the process.

Are you planning any of this? Because the way I see it, there is other contaminations here that are more serious than radiological. So are you planning to get us off your back so to speak?

MS KEW: Hollee Kew, Regional Director, for the record.

We have welcomed the partnership with CNSC on this project. We do take our regulatory responsibility very seriously. And, as you can imagine with the Ministry of the Environment and Climate Change, we regulate this site as well.

So we look forward to continuing to work with CNSC until that time that you feel it is comfortable for us to remove that license and take on the care and control ourselves.

THE PRESIDENT: Thank you.

Mr. Jammal?

MR. JAMMAL: Ramzi Jammal, for the record, the Chief Regulatory Operations Officer.

Just to add to your comments, sir. I had a discussion with the Deputy Minister and the Assistant Deputy Minister of the MOECC, and the plan is to establish a protocol in place.

As you mentioned, the radiological is a by-product of original refinery functionality. And once the MOECC provides the information, the scientific data, that the substance is below exempt quantity or it meets requirements, as you mentioned, in other provinces, institutional control or care and control in Ontario, the Deputy Minister and the ADM agree to establish such protocol and provide the scientific basis with respect to

the one regulator will takeover that site.

And from my discussion with the Deputy Minister, there is enough commitment from the Province of Ontario to be the regulator overseeing this and meeting the requirements of the CIPA, CEAA, or the CNSC.

THE PRESIDENT: Okay, thank you. Go ahead.

MS McGEE: I just wish to acknowledge for the record that the document that President Binder and Commission Members were referring to is a June 11, 2015 document from the Ministry of the Environment and Climate Change that was just provided to the members during this discussion, and it is entitled, "Update on the Deloro Mine Site Cleanup Project."

This document will be added to the Commission's record on this item. And for the clarity of the record, confirmation that this document is already publicly available somewhere.

THE PRESIDENT: Okay, thank you. Thank you very much.

Okay, we will now take a 10-minute break, coming back at 4:30.

--- Upon recessing at 4:20 p.m. /

Suspension à 16 h 20

--- Upon resuming at 4:32 p.m. /
Reprise à 16 h 32

Verbal update on
Montreal Neurological Institute (MNI)

THE PRESIDENT: Okay, we are back.

Here is where I ask if there are any verbal updates and, Monsieur Régimbald, I understand that you have some updates.

The first item is Montreal Neurological Institute and I understand that Mrs. Chugtai -- I don't know if I'm pronouncing it properly -- will join us.

Alors, Dr Chugtai, est-ce que tu peux bien m'entendre?

Hello? Montreal, anybody?

MR. BAILLET: Yes. Hello. This is Montreal here. Are you looking for Dr. Soucy maybe, Jean-Paul Soucy?

THE PRESIDENT: I'm looking for Dr. Chugtai -- Chugtai.

MR. BAILLET: Oh, I think it's Mr. Chugtai who is the Director of Administration and Finance at the MNI.

This is Sylvain Baillet speaking here.

I'm the Interim Director of the McConnell Brain Imaging Centre at the MNI where we have the PET Unit.

THE PRESIDENT: Okay. Thank you.

MR. BAILLET: Mr. Chugtai could not stay after 4:00 p.m. He apologizes. So I'm here with other representatives of our Unit.

THE PRESIDENT: Okay.

Alors, Monsieur Régimbald.

M. BAILLET : Allô. Bonjour.

M. RÉGIMBALD : Merci.

Bonjour, Monsieur le Président, membres de la Commission.

My name is André Régimbald, Director General of the Directorate of Nuclear Substance Regulation.

With me today are:

- Ms Kavita Murthy, Director of the Accelerators and Class 2 Facilities Division;

- Mr. Abdul Alwani, Senior Project Officer in Ms Murthy’s Division; and

- Ms Melanie Rickard and Ms Adelene Gaw, who are both Dosimetry Specialists in the Radiation and Health Sciences Division.

This is an update regarding the event that happened on January 12, 2015 at the Montreal Neurological Institute, where a technician, a nuclear energy worker,

working on processing fluorine-18 in a hot cell handled a large quantity of this radioisotope without shielding and as result was exposed to relatively high dose rates.

According to the technician’s claim, it appears that the dose resulted from a failed attempt by him to manually transfer a quantity of fluorine-18 between two hot cells following an error in the automatic transfer of the radioisotope.

CNSC staff communicated preliminary details of this event to the Commission Secretariat by email in February and March 2015.

The Montreal Neurological Institute, or MNI, is licensed by the CNSC to operate a cyclotron facility used for producing medical isotopes and, in particular, fluorine-18, which is synthesized into fluorodeoxyglucose, or FDG for short, for injection into patients for medical diagnostic purposes at the MNI.

It should be noted that there are a number of uncertainties in the nature of how the event unfolded due to the fact that the worker communicated several different accounts of the situation.

So the following presents the information as best understood by CNSC Staff at this time.

So on January 12, 2015 there were two productions of FDG scheduled to be carried out at the MNI.

The first one was successfully carried out in the upper hot cell and shipped at 1:00 a.m. in the morning.

The second production was scheduled for shipment later that morning and had to be carried out in the lower hot cell since the upper hot cell had already been used that day and could not be used again soon, according to protocol, due to the remaining residual radioactivity.

The incident occurred during the second FDG production when the technician set up the synthesis of FDG in the lower hot cell. The technician started the transfer of ^{18}F from the cyclotron but forgot to switch a valve so that the ^{18}F would go to the lower hot cell. Therefore, the ^{18}F went to the upper hot cell, which was not supposed to be used as it had residual radioactivity from the previous use, as I mentioned earlier.

The technician apparently tried to save the batch by using a syringe to transfer the liquid ^{18}F from the conical reservoir of the upper hot cell and inject it into the conical reservoir of the lower hot cell.

He opened the hot cell while high radioactivity was present, which is something prohibited by procedures established on the MNI licence.

In trying to inject the liquid he cracked the conical reservoir of the lower hot cell when he tried

to open it for the injection.

After failing to transfer the ^{18}F to the lower conical reservoir, he transferred the liquid ^{18}F from the syringe into the lower hot cell to simulate the spill and disposed of the syringe.

He then called his supervisor to report a spill in the hot cell.

The technician indicated that he washed his hands prior to working on the FDG batch, put on his gloves, but forgot to put his ring dosimeter on again. He also claimed his whole body dosimeter fell off during the incident.

Furthermore, the technician could not confirm whether he was wearing his electronic personal dosimeter, or EPD, at the time of the exposure or if the EPD was in fact turned on.

Following the incident, the technician realized that the dose he received while manipulating the ^{18}F in his attempt to transfer it from the upper hot cell to the lower hot cell was not measured by his dosimeter. He allegedly tried to reproduce the exposure a few days later by irradiating his dosimeter using some approximations without consulting or informing anyone.

This resulted in his dosimeter recording a dose of approximately 106 mSv, which is higher than the

annual regulatory limit for a nuclear energy worker of 50 mSv.

Due to the above-mentioned actions and lack of clear information provided by the working regarding the nature and sequence of the events, it was difficult to accurately estimate the worker's dose.

For example, the lack of reliable dosimetric information, precise information regarding the amount of ^{18}F in the syringe, the duration of time that the ^{18}F was handled, or the distance from the ^{18}F to the worker's hands, it was necessary to make several assumptions to estimate the technician's dose.

Based on the information received from the MNI and from interviews with MNI staff, including the technician involved, CNSC Staff estimated that the whole body dose likely received by the technician was approximately 15 mSv, which is below the CNSC annual regulatory limit of 50 mSv for a nuclear energy worker.

However, the dose to the technician's left hand was conservatively estimated by CNSC staff to be approximately 1.7 Sv, which is above the annual regulatory limit of 500 mSv for the hands.

It is important to note that although the worker's dose likely exceeded the regulatory limit for the hands, he suffered no deterministic effects such as

erythema or skin necrosis. And furthermore, the estimate of dose falls below the thresholds for such effects.

The Montreal Neurological Institute reported the worker's high whole body dosimeter reading of 106 mSv to the *Commission de la santé et de la sécurité au travail of Quebec*, who followed up by meeting with MNI staff to discuss the information available and work with MNI Human Resources to discuss future work of the employee.

In response to this event, the CNSC conducted a Type 1 inspection, which is similar to an audit, of the operating and servicing activities of MNI's isotope production cyclotron facility on February 18 to 20, 2015 which resulted in 12 non-compliance items requiring corrective actions.

Two of the key findings included insufficient staff to operate the facility safely and inadequate contamination control. An Inspector Order was issued to MNI on February 23, 2015 requiring MNI to cease isotope production until minimum staff levels were remedied and improved contamination control measures implemented.

The licensee complied with the terms and conditions of the order on March 2, 2015.

On March 29, 2015 CNSC Staff received a response from MNI to their remaining open-action items from the Type 1 inspection.

CNSC Staff assessment of the licensee response is that the proposed corrective actions appear satisfactory, the main one being additional staff who are now ensuring safe operation. They have installed an area monitor in the room where the processing is being done and they have retrained staff.

All but two required corrective actions have been addressed. The final two actions relate to revisions of the Radiation Safety Manual and will be completed by November 2015.

We understand that the worker in question has been dismissed by the Institute.

On June 15, 2015 CNSC Staff sent a letter to the worker informing him of his whole body dose and extremity dose estimates. The letter also assured the worker that no health effects are expected at these doses.

CNSC Staff reviewed the information provided by the licensee on the cause and circumstances of this event and the contributing factors, and agrees that the event resulted from the fact that the technician did not follow procedures established under the CNSC licence issued to the Montreal Neurological Institute to deal with unplanned situations of this nature, combined with other deficiencies identified in the implementation of the radiation safety program at the Institute.

In conclusion, CNSC Staff is satisfied with the corrective measures taken or proposed to be taken by the Montreal Neurological Institute to prevent reoccurrence of a similar event.

However, although this event appears to be an isolated case, CNSC Staff will maintain regulatory focus on this licensee and will conduct an inspection later in the fall to verify the effective implementation of the corrective measures.

CNSC Staff does not plan to provide further reports to the Commission on this matter unless circumstances require it in the future.

Before closing, and if time permits, we would like to show you a few pictures, including pictures of the hot cells where the incident happened so as to give you a better understanding of the situation.

And I can ask Ms Murthy to go through the slides and provide information.

Thank you.

MS MURTHY: Good afternoon. Kavita Murthy, for the record.

These are just a few slides that will give you a picture of the situation as described by André Régimbald.

So the facility, which is the Montreal

Neurological Institute cyclotron facility consists of a main vault, which is called the cyclotron vault, which is a shielded room in which the cyclotron itself is located.

The cyclotron is marked with a green circle in this picture. It produces fluorine-18 by bombarding oxygen-18 enriched water target with a proton beam.

Fluorine-18 is transported to the isotope processing labs, highlighted in pink, so it can be used for the production of fluorodeoxyglucose, or FDG.

The lab where the incident occurred is the middle room, outlined in red. Basically what happens is the fluorine-18 produced in the cyclotron is transported from the cyclotron to the hot cell. The process of synthesis is automated and takes place in the middle room outlined in red, as I just said.

The synthesis module is placed inside the hot cell outlined in green in this room.

The hot cell is a shielded chamber used for the production, manipulation, dispensing of radiopharmaceuticals and it is very commonly used in nuclear medicine.

The synthesis module is an automatic system, a black box essentially for preparing the ^{18}F labelled FDG and is a commercial unit that is sold by GE

Healthcare and very widely used in this sector.

This is a close-up of an FDG synthesis module similar to the one that is in place at the Montreal Neurological Institute.

The conical flask that André mentioned in his presentation is the flask that you see in the red square. There is a close-up also of that and essentially what we are trying to show in these pictures is where we believe the worker tried to get access to the ^{18}F by puncturing the conical flask. Thank you.

MR. RÉGIMBALD: Thank you very much. This completes our presentation and we are available for questions.

THE PRESIDENT: Okay. Let's open it up. Questions? Dr. McEwan...?

MEMBER McEWAN: So it's very hard to guard against stupidity, which clearly this is, but it's my sense that techs will only operate like this in the absence of a really lax safety culture within the department in which they are working. So I would really like to be assured that you are convinced there has been a turnaround in the safety culture. More importantly, that you will be monitoring this change not just once later in the year, but this is going to be a constant process, because this is perhaps the most egregious example of odd activity by a

professional that I have ever seen.

So I am concerned that the safety culture in the past was not strong and I would like absolute convincing that it has been turned around.

MR. RÉGIMBALD: I will ask Mrs. Murthy to provide the information on that.

MS MURTHY: Thank you for your comments. It was acknowledged during the inspection that took place -- it was a detailed audit which included a review of the program in place. Some of the deficiencies that we identified are similar to what you have said, is that there has to be a culture where people feel they can operate safely.

The reason we issued the order to the Institute and asked them to immediately suspend production until they had sufficient staff was an immediate measure that we took to make sure that people did work safely. The safety system, the safety devices we asked to them to install in order to make sure that people work safely and the training we asked them to give staff were also results of that, but those were immediate measures.

The longer-term measures arose from the 12 findings we had following the Type I audit. Those are being monitored. We are planning to continuously monitor this facility. The six-month visit, the inspection that

has been planned is just the first step. And so, yes, we agree with you that there is a concern and we will make sure that this facility does not slip again.

MEMBER McEWAN: So I guess just one follow-up question on that.

So the misdirection of the ^{18}F to the upper hot cell means that there would have been a production run lost, so therefore the tech would have been responsible for the loss of that production run. What would be the consequences within the hospital for that tech of losing a production run because of a mistake that he made and would those consequences -- could those consequences have been severe enough that they would actually have made him think that what he did was a good idea, to try and hide it?

THE PRESIDENT: Maybe we should allow the Montréal Neurological Institute to answer that question.

DR. SOUCY: Yes. I don't know how to handle this. Jean-Paul Soucy here. I might try to go ahead with this. Is it okay with the group from the Neuro if I do?

THE PRESIDENT: We cannot see you, so whoever wants to speak to this, please feel free.

DR. SOUCY: Yes. But it's just that I'm also not with the rest of the group. I'm calling in from another site. So if everybody is okay with it.

First of all, I would like to remind everyone that our PET facility has been in operation for something like close to 35 years now and we have never had an incident like that. So indeed it is a serious incident, nobody is denying it, and we have taken it very seriously.

I don't know if I would say that it's a symptom of a lax attitude towards radiation safety and radiation protection in general. That being said, I can assure you that everybody at the unit was really taken aback by this event because, as Dr. McEwan has mentioned, you know, there is no reason why the employee should have tried to do that fearing any kind of retribution. I mean failed batches happen. It's something that everybody knows about. They happen sometimes because of equipment failure. They happen sometimes because of procedure failures or because of human error.

And human error has happened, well, I won't say regularly, but, you know it does happen and there has never been any kind of sanction taken against any employee for an error of the nature that has just been described. I mean there was no reason for the employee to expect any kind of disciplinary measure. I mean if he had to repeat it, we failed in the same way. Then a discussion would have taken place.

But there was no reason for any kind of

fear from that perspective. I can assure you that there was never an incident where an employee has been pressured to do things that were not acceptable or were not following procedures to save a batch in any way. That just does not happen at our place.

THE PRESIDENT: Okay. Thank you.

Dr. McEwan...? Ms Velshi...?

MEMBER VELSHI: What I find particularly puzzling is the second part of what the technician did. So fine with the cover-up, but when he tried to estimate his dose and what he came up as an estimate is what got reported officially and I just find that so puzzling.

I mean how could he even be allowed to simulate what had happened and how can whatever numbers he came up with be shared with the regulator and the provincial regulator? It just doesn't add up to me, so maybe help me understand this.

MS MURTHY: Kavita Murthy, for the record.

When the employee realized that the badge that he was given was not on him when all this occurred, later on he planned to irradiate his badge separately. And because badges are sent back to the dosimetry service provider for reading that is when -- when the reading came back that is when the high dose was discovered on the badge.

MEMBER VELSHI: Sorry. So when the high dose came, people thought that was from his initial exposure or did they think this was part of the simulated estimate?

DR. SOUCY: If I can intervene again -- Jean-Paul Soucy here -- we had no idea there had been a simulated exposure by that time. We were not aware of that. It took us a while to really discover that because we kept getting conflicting reports from the employee.

We never understood that during the first days that he had tried to reproduce some kind of exposure that according to him might have been similar -- could have been similar to what he actually was exposed to. We had no clue about that. They certainly didn't tell us about it. And he was not permitted to do that. He did it on his own. I mean we were shocked.

MEMBER VELSHI: I'm sorry. He is the one who then during the interview said that's what he had done?

DR. SOUCY: He finally, yes, admitted that's what he did, after repeated questioning.

MEMBER VELSHI: Okay, thank you.

MEMBER HARVEY: Was the employee a new employee or how long had he been working for the lab?

DR. SOUCY: Dr. Massarweh, maybe, would be able to --

DR. MASSARWEH: I haven't got the question.

DR. SOUCY: How long had [this employee] worked for us?

DR. MASSARWEH: He worked for five years. Five years. He was an experienced employee. So if something happens after five years that is something we can't explain.

MEMBER HARVEY: So he was well-informed of the procedure and he had the proper training to do that task?

DR. MASSARWEH: Yes, he was trained and he was actually for four years in the production. The last six months he was doing both, quality control and production.

MEMBER HARVEY: Thank you.

THE PRESIDENT: Anybody else? Let me ask you some -- so how often does the CNSC do inspections of that nature? I mean they have been running for 35 years, as we heard. How many times did you find major deficiencies?

MS MURTHY: Kavita Murthy, for the record.

This was the second -- in the last 10 years this was the second Type I inspection. The last inspection of this facility, apart from the one that was

done in February, was done in the year 2010, so it was five years ago. It is longer than our normal frequency of inspections, but we had -- this facility had been operating -- it's a relatively small facility. It has been operating safely for an extended period of time.

With regard to other facilities, do we find these sorts of problems, by and large no, we do not find this sort of problem. This, in my opinion, is a very unique situation.

THE PRESIDENT: So this is really a one-off kind of issue with you. As Dr. McEwan said, there is no cure for doing silly things. So in your audit you did find some deficiencies that you want them to implement, what kind of nature -- don't give us all of it, but the major deficiencies that you think that require attention now?

MR. ALWANI: Abdul Alwani, for the record.

The audits, when we came to audit, it was a coincidence that we were trying to do the audit because the facility needs the audit and at the same time the incident accelerated the action. The finding from the audits are not clearly related to anything that's with the incidents, so the first one was the lack of resources, but that is not directly translated to what they have, is that the task that the person is doing is not a stressful task

so it's the backups that they were missing in this case.

And another finding is with regard to the oversight of the licensee on the radiation safety of the facility, it's not that strong. When we did the audits we had in our mind exactly what Dr. McEwan was thinking, it's just with -- the safety culture is deficient, whether there is a fear of failure of production. So we interviewed all the individuals involved in the team and we found that completely this is an isolated case among the others.

And the person who did this, he knew the procedure very well. But he was, during the interview with him, talking about problems that he has in his life and that it's about stress that he is going -- which has nothing to do with the work.

THE PRESIDENT: So my final kind of a question. So now, if memory serves, we are seeing incidents in hospital more often. Are you planning to change frequencies and intensity of some of the inspections in the future?

MS MURTHY: Kavita Murthy, for the record.

Certainly for cyclotron isotope production accelerators, which is mainly cyclotrons, we have seen a shift from a purely research facility that operated and serviced one hospital to more a production facility where they are producing large batches of FDG because there is a

greater demand for FTG in the community now. So there is certainly a paradigm shift in how they operate because they are no longer operating just for the hospital.

So we in the regulatory program for isotope production accelerators will pay much closer attention now to how they handle large batch production, how they manage with running the cyclotron longer, for longer hours.

The inspection program, the frequency of inspections is once every -- a Type I inspection every five years and a Type II inspection every two to three years. I feel that is still an appropriate frequency. We do have the ability to go more frequently whenever events are reported, whenever there are major changes and we continue to do that, just as we will do for this situation.

So we don't need to overhaul the entire program in order to do this, but in light of an incident like this, we do increase focus on the sector where we feel there are problems emerging or there could be problems emerging.

THE PRESIDENT: Mr. Tolgyesi...?

MEMBER TOLGYESI: You were saying, Mr. Alwani, that there were some personal conditions which -- fatigue or whatnot, personal problems. So when you look around right now, it's more and more you face persons with

personal believing or conditions which they do act or do they do actions with consequences. So how we could detect and prevent that it will happen?

MR. RÉGIMBALD: André Régimbald here.

I think for this particular situation our inspection found that there were some deficiencies in management oversight. So perhaps if there is better control of operations that could detect early signs of situations like this and with the comments made earlier on the safety culture that could address of this, but I don't know what else.

Abdul...?

MR. ALWANI: Abdul Alwani, for the record.

I think that this is really an isolated case. I have been doing that for quite some time and I have never seen situation like that. When it comes to the interview, we had an interview with the technician for almost two hours and he was talking about so many things that have nothing to do with work and its -- we asked about his previous work and whether he was a good performing employee. He was a very good performing employee, but it becomes delusional sometimes and he -- so that --

THE PRESIDENT: Okay. We have to move.

Montréal, do you want to add any last comment?

DR. SOUCY: Well, we are certainly going to consider this as a serious wake-up call as to the state of our employees. There is obviously a limit to the kind of psychological follow-up you can install. I mean you cannot just force people to undergo regular evaluations from that perspective, but we are a small group and we will be more careful about trying to pick up any sign of distress or things like that in employees, for sure.

THE PRESIDENT: Okay. Thank you. Thank you very much.

Mise à jour

Centre hospitalier universitaire du Québec

LE PRÉSIDENT : Monsieur Régimbald, vous avez aussi une mise à jour au sujet du Centre hospitalier universitaire de Québec.

Des représentants sont disponibles par vidéoconférence.

Dr GARON : Oui. Yes, we're there.

LE PRÉSIDENT : Monsieur Ouellet, est-ce que vous nous entendez bien?

DR. GARON: Yes, Mr. Ouellet is here.

My name is André Garon. I'm the Medical Director of Hospital Services in the CHU de Québec. Mr.

Ouellet is with me, attending this meeting.

THE PRESIDENT: Okay.

DR. GARON: Just let me please present to you some other members who join me: Mr. Carl Côté, Mrs. Janelle Morrier and Mrs. Pascale St-Pierre.

So we're available to answer your questions.

LE PRÉSIDENT : Merci beaucoup, mais avant les questions, c'est monsieur Régimbald qui a la parole.

Dr GARON : O.K.

Dr RÉGIMBALD : Merci, Monsieur le Président.

Alors, encore une fois, je m'appelle André Régimbald. Je suis le directeur général de la Direction de la réglementation des substances nucléaires.

Je suis accompagné de :

- Mme Karen Mayer, agente de projet de permis dans la Division des permis de substances nucléaires et d'appareils à rayonnement;

- M. Henry Rabski, directeur de la Division de l'inspection des activités autorisées;

- M. Peter Fundarek, directeur de la Division des permis de substances nucléaires et d'appareils à rayonnement; et

- M. Diego Estan, agent de radioprotection

dans la Division de la radioprotection.

Alors, ceci est une mise à jour concernant un événement survenu au Centre hospitalier universitaire de Québec impliquant l'usage non autorisé d'une substance nucléaire, du technétium-99m, par la compagnie Pro Rayons-X, dont les détails préliminaires ont été communiqués par courriel au Secrétariat les 26 et 27 mars dernier.

Tout d'abord, le Centre hospitalier universitaire de Québec (ou le CHU de Québec) est titulaire d'un permis de la CCSN l'autorisant à posséder et à utiliser des substances nucléaires, dont du technétium-99m, à des fins thérapeutiques et diagnostiques. Ayant une demi-vie relativement courte de 6 heures, le technétium-99m est un radioisotope couramment utilisé en imagerie médicale pour l'étude des fonctions métaboliques d'organes dans le corps humain aux fins de diagnostics.

La disparition du technétium-99m a d'abord été signalée à la Commission canadienne de sûreté nucléaire le 3 mars 2015 par le personnel du CHU de Québec qui s'est aperçu qu'il manquait une fiole de technétium-99m dans une armoire d'entreposage de produits radiopharmaceutiques de son département de médecine nucléaire. Le centre hospitalier a pu déterminer que la fiole était manquante depuis le 1er mars 2015.

L’enquête du CHU de Québec a permis d’établir que c’est une employée de la compagnie Pro Rayons-X, une firme privée d’experts-conseil située dans la région de Québec, qui était responsable du retrait non autorisé du technétium-99m.

L’employée en question avait retiré le technétium-99m à l’insu du CHU de Québec afin de mener des contrôles de blindage de rayon X pour le compte de Pro Rayons-X dans différents hôpitaux, cabinets de dentistes et autres cliniques au Québec et au Nouveau-Brunswick.

Le technétium-99m est utile pour ce genre de travail puisque son énergie de décroissance radioactive est similaire au seuil supérieur de l’énergie produite par les appareils à rayon X, donc utile pour vérifier le blindage radiologique.

La quantité de technétium subtilisée le 1er mars 2015 se situait autour de 740 MBq, soit plus de sept fois la quantité réglementaire de 100 MBq, et nécessitait un permis de la CCSN pour en avoir la possession et en faire usage. Ni l’employée, ni Pro Rayons-X ne détenait et ne détiennent toujours pas de permis de la CCSN pour la possession et l’usage de substances nucléaires. Ces activités ont donc été effectuées de façon non autorisée et contraire à la *Loi sur la sûreté et la réglementation nucléaires* et ses règlements d’application.

D’après l’information du CHU de Québec, Pro Rayons-X avait obtenu une clé du Centre hospitalier de l’Université Laval en 2000 pour y effectuer certains travaux, ce qui a permis à la compagnie d’avoir accès à un local du département de médecine nucléaire du centre hospitalier où le technétium-99m était entreposé. Aucun membre du personnel en poste aujourd’hui au CHU de Québec n’était au courant de cet arrangement.

Le personnel de la CCSN a mené sa propre enquête pour vérifier de manière indépendante l’information recueillie par le CHU de Québec. Après avoir interrogé le personnel du centre hospitalier et l’employée concernée de Pro Rayons-X, nous avons aussi conclu que Pro Rayons-X était responsable du retrait non autorisé du technétium-99m des locaux du centre hospitalier à sept occasions en 2014 et 2015, et que la compagnie était responsable de la possession, du stockage, du transport et de l'utilisation non autorisé de cette substance pour effectuer des contrôles de blindage contre le rayonnement pour son propre compte, et à ces sept occasions.

Après examen de toute l’information recueillie sur cette affaire, le personnel de la CCSN a estimé les risques radiologiques encourus par l’employée de Pro Rayons-X comme étant faibles puisque l’employée a manipulé le technétium sur de courtes périodes et n’était

pas toujours en contact avec le technétium. De plus, il est peu probable que d'autres personnes aient pu être exposées de façon importante puisque l'employée avait toujours le technétium en sa possession.

Puisqu'elle effectuait des contrôles de blindage radiologique sur des appareils à rayon X, elle portait un dosimètre dans le cadre de son travail. D'après les renseignements fournis par l'employée, son dosimètre personnel n'a pas indiqué de dose reçue en lien avec l'usage du technétium. Le personnel de la CCSN estime tout de même que la dose reçue est vraisemblablement inférieure à la limite de dose annuelle de 1 mSv pour un membre du public.

Par contre, l'employée n'avait aucune formation concernant la manutention, l'entreposage et le transport de technétium-99m, ne portait pas tout l'équipement de radioprotection nécessaire et n'avait pas d'équipement ni de formation pour faire face à des situations d'urgence comme un déversement ou la perte du technétium-99m.

La CCSN a demandé au Centre hospitalier universitaire de Québec de s'assurer que Pro Rayons-X ne possède aucune autre clé et n'a pas accès aux autres hôpitaux du réseau du CHU de Québec, ce qui a été confirmé par le personnel du CHU de Québec, confirmant également que

l’employée de Pro Rayons-X lui avait rendu l’unique clé qu’elle possédait.

À la suite de cet événement, le personnel de la CCSN a envoyé un avis à tous les titulaires de permis au Québec et au Nouveau-Brunswick les informant que la compagnie Pro Rayons-X avait procédé à des contrôles de blindage avec du technétium-99m de façon non autorisée, c'est-à-dire sans permis de la CCSN. La note visait également à rappeler aux titulaires des permis qu’il est interdit de transférer des substances nucléaires à des personnes non autorisées par la CCSN.

Le CHU de Québec a déterminé que la cause profonde de cet événement était le fait qu’il n’y avait pas en place un mécanisme de révision des titulaires de clé pour les locaux de médecine nucléaire. Ceci a permis à la compagnie Pro Rayons-X d’être en possession d’une clé donnant accès à un local d’entreposage de substances nucléaires durant 15 ans sans que personne ne soit au courant. Une faiblesse dans le contrôle d’inventaire des fioles mises en décroissance a également été identifiée comme facteur déterminant.

Le CHU de Québec a pris certaines mesures correctives pour éviter qu’un tel événement ne se reproduise.

Il a d’abord modifié les serrures d’accès

aux locaux de médecine nucléaire et a établi une procédure plus robuste de contrôle des clés pour les personnes qui ont besoin d'avoir accès à ces locaux. Le personnel du CHU n'a rapporté aucune autre instance de retrait non autorisé de technétium-99m depuis cet événement.

Aussi, le CHU de Québec est en train d'établir une procédure pour uniformiser le contrôle d'inventaires pour les cinq services de médecine nucléaire de ses hôpitaux dans le cadre d'une révision de son programme de radioprotection qui sera soumis à la CCSN pour examen et approbation d'ici le 23 juin 2015.

En conclusion, le personnel de la CCSN est d'avis qu'il est peu probable que l'usage non autorisé de technétium-99m par la compagnie Pro Rayons-X durant 2014 et 2015 ait pu avoir des conséquences néfastes pour la santé et la sécurité des personnes ou pour l'environnement.

Le personnel de la CCSN est satisfait des mesures correctives prises par le CHU de Québec en réponse à cet événement et fera un suivi au cours des prochains mois pour s'assurer que les nouvelles procédures et le programme révisé de radioprotection du CHU de Québec seront effectivement mis en place.

Nous ne prévoyons pas faire d'autre rapport à la Commission sur cette affaire dans le futur à moins que les circonstances ne l'exigent.

En terminant, veuillez noter que la CCSN a émis une sanction administrative pécuniaire à l'endroit du président de la compagnie Pro Rayons-X le 2 juin dernier en lien avec cette affaire, plus précisément pour avoir utilisé le technétium-99m sans détenir de permis de la CCSN.

Ceci conclut ma présentation. Nous sommes disponibles maintenant pour répondre à vos questions. Merci.

LE PRÉSIDENT : Merci.

Avant d'ouvrir la session des questions, Monsieur Garon, aimeriez-vous dire quelques mots?

Dr GARON : Peut-être un mot, oui.

L'approche que nous avons eue relativement à cet événement est celle, d'abord, de faire un signalement obligatoire, de faire diligence quant à ce signalement-là, de faire diligence quant à l'investigation qui a été conduite à l'interne, et de prendre rapidement les mesures de court et de long terme pour chercher à éviter la récidive. Évidemment, tout ça s'est fait en collaboration avec la Commission. Nous croyons que les mesures en place seront efficaces à très long terme.

LE PRÉSIDENT : Merci.

Alors, Monsieur Harvey?

MEMBRE HARVEY : Mon premier questionnement

est à propos de... Étant donné qu'il y a eu sept événements depuis janvier 2014, comment se fait-il que la Commission a été avisée après le septième événement? Est-ce que c'est parce que personne n'était au courant? Mais certaines personnes devaient être au courant, étant donné que vous avez les dates précises où il y a eu infraction.

Ma question est : Pourquoi la Commission a été informée après le septième événement?

M. OUELLET : C'est une question à qui?

MEMBRE HARVEY : Je pose la question au CHUQ.

Dr GARON : Bien, je vais laisser monsieur Ouellet vous répondre.

M. OUELLET : O.K. Donc, la réponse est la suivante.

Donc, le premier incident où nous... Nous avons déposé un rapport en date du mois de mars. Le premier incident où on a soupçonné qu'il se passait quelque chose a eu lieu le 2 février 2015. Alors, on a entrepris des mesures. Il y a eu un incident le 18 février et le 28 février, et nous avons avisé la CCSN le 2 ou le 3 mars. Les clés du département de médecine nucléaire ont été changées vers la mi-février.

C'est seulement suite à l'inspection de la

CCSN et une entrevue entre les inspecteurs de la CCSN et l'employée de Pro Rayons-X que quatre autres événements antérieurs ont été identifiés. Ces événements ont été identifiés par la CCSN et non pas par le CHU de Québec. Point.

MEMBRE HARVEY : Merci. Ce qui veut dire qu'on ne sait pas s'il y avait eu... étant donné que les clés étaient là depuis... qu'ils avaient les clés depuis l'année 2000, s'il y a eu entre-temps depuis 2000 d'autres événements. Il a pu en avoir comme il a pu ne pas en avoir aussi.

Dr GARON : C'est André Garon.

Entre 2000 et cette année, nous ne saurions vous dire s'il y a eu une ou plusieurs occurrences de même nature.

MEMBRE HARVEY : Mais les entrées n'étaient pas contrôlées. Cette personne-là avait accès. C'est une personne qui travaillait pour monsieur Mignault qui avait accès. Elle arrivait là puis elle ouvrait la porte n'importe quand ou ça s'est passé de quelle façon?

M. OUELLET : Le corridor qui mène à la médecine nucléaire n'est pas un corridor sécurisé. Donc, à partir du moment qu'on a la clé d'un local, on peut se diriger vers le secteur de la médecine nucléaire dans le CHUL et débarrer une porte.

MEMBRE HARVEY : Et dans ce local-là, il n'y a pas de... ce n'est pas un endroit où il y a des gens toute la journée, j'imagine?

M. OUELLET : La personne venait le soir. Dans les trois événements que l'on a rapportés, la personne est certainement venue le soir.

Dr GARON : Pour subtiliser la substance là, parce qu'il est certain que ce local-là ne pouvait être accessible qu'à une personne qui a une clé, et nous ne savions pas qu'une personne extérieure au CHU de Québec avait une clé. Tout ça a été découvert ce printemps.

MEMBRE HARVEY : Merci.

LE PRÉSIDENT : Monsieur Tolgyesi?

MEMBRE TOLGYESI : Dites-moi, Monsieur -- comment il s'appelle -- Mignault, il avait la clé depuis 2000?

Dr GARON : Semble-t-il.

MEMBRE TOLGYESI : Selon les investigations, avez-vous trouvé comment il a reçu la clé, qui lui a donné la clé et pourquoi il lui a donné la clé?

M. OUELLET : La clé a été remise en l'an 2000, exactement au mois d'octobre 2000. On a les documents qui ont été déposés à la CCSN, qui sont les certificats de remise de clé qui étaient signés à ce moment-là par l'ancien chef de médecine nucléaire du CHUL

et l'ancien chef technologue du CHUL. J'ai eu l'occasion de parler à monsieur Mignault une fois à la mi-février. Il nous a dit qu'il avait accès dans le temps au local dans le cadre d'un programme de contrôle de qualité des calibrateurs de dose. Ça, c'est une information qui est plausible mais que je ne peux pas valider. Donc, c'est comme ça qu'il a reçu la clé par des voies officielles de la médecine nucléaire dans le temps, en l'an 2000.

MEMBRE TOLGYESI : Quand vous avez donné la clé pour accéder au département ou la pièce de médecine nucléaire, est-ce que... Monsieur Harvey a posé la question. Vous n'avez pas répondu.

Normalement, les isotopes radioactifs, je suppose que vous les gardez seulement dans une pièce qui est barrée. Ce n'est pas des grosses pièces. C'est des petites quantités. Est-ce qu'il n'y a pas un contenant ou une armoire qui est barré?

M. OUELLET : À cet endroit, c'est la porte qui est barrée.

MEMBRE TOLGYESI : Ça veut dire que n'importe qui qui a la clé peut accéder?

M. OUELLET : Oui. Ce local-là n'est pas le laboratoire chaud du service de médecine nucléaire. C'est une pièce connexe un peu plus près des salles de Gamma-Caméra où certaines doses sont préparées et où les

unidoses sont manipulées.

LE PRÉSIDENT : Mais pour la CCSN, est-ce que cette pratique est acceptable, de donner une clé à une personne qui n'est pas un employé de cet hôpital?

Dr GARON : La question est à nous?

LE PRÉSIDENT : Non.

Dr GARON : Non.

Dr RÉGIMBALD : Non. C'est André Régimbald ici.

Sous le permis, il y a le programme de radioprotection qui est établi. Il y a également des procédures à suivre, et les procédures concernant la sécurité matérielle sont également examinées. Maintenant, le contrôle de clé comme tel est laissé au soin du titulaire de permis pour établir un contrôle de clé efficace et aussi un contrôle d'inventaire des substances nucléaires.

LE PRÉSIDENT : Je ne comprends pas comment on pourrait accepter une procédure comme ça avant, donner la clé à quelqu'un qu'on ne connaît pas.

Monsieur Jammal?

M. JAMMAL : Oui. C'est Ramzi Jammal pour l'enregistrement.

Pour répondre à la question, ce n'est pas tout à fait acceptable. Les personnes qui doivent avoir la

clé ou bien les clés, ce sont des personnes qui doivent être autorisées et formées par des titulaires de permis. Alors, c'est une non-conformité par le titulaire de permis. C'est plutôt un indicateur qu'ils ont perdu le contrôle de leurs clés et de leur programme.

Alors, tout à fait, la réponse directe, Monsieur le Président, c'est ce n'est pas acceptable et puis ce n'est pas normal du tout. C'est la responsabilité du titulaire de permis d'avoir le contrôle à deux niveaux : le contrôle réglementaire pour gérer les sources et l'activité autorisée par la Commission et le contrôle du personnel autorisé d'avoir accès aux salles chaudes, surtout pour les endroits de radiopharmacie.

LE PRÉSIDENT : Merci.

Monsieur Tolgyesi?

MEMBRE TOLGYESI : Est-ce que la manipulation de ces isotopes... Il y a des employés qui les manipulent, c'est-à-dire qu'ils vont les chercher dans l'entrepôt ou dans cette pièce-là. Est-ce qu'on a un contrôle d'inventaire? Parce que normalement, même si la personne qui est venue la chercher le soir, quand vous utilisez... et la vie est courte, c'est six heures. Ça veut dire que les activités où on utilise le technétium sont assez fréquentes.

Est-ce qu'il y a un contrôle d'inventaire

qui permet de voir qu'un morceau ou un contenant a disparu, comme ça été fait à la fin de février, selon le docteur -- je ne me souviens pas son nom -- monsieur à Québec qui vient de parler?

Dr GARON : Oui.

M. OUELLET : Robert Ouellet.

Oui. Donc, oui, il y a un contrôle.

Donc, les vials qui ont été subtilisés étaient en fait des restants, comme presque des déchets, contenaient typiquement 50 à 60 mCi. Donc, en médecine nucléaire su CHUL, à chaque matin, un technologue de médecine nucléaire mesure l'activité résiduelle des doses non utilisées de la veille. Donc, chaque jour, le CHUL reçoit un vial de 200 à 300 mCi, ainsi que des unidoses. Là, on parle seulement des vials.

Donc, l'activité mesurée est notée dans un registre, puis les vials sont ensuite placées dans des poubelles pour décroissance en vue d'une disposition. On s'attend donc à ce que le résultat de la mesure de l'activité résiduelle d'un vial ne soit pas nul, soit plutôt de l'ordre de la dizaine de millicuries puisque la veille, il y avait 200-300 mCi et qu'il ait pu y avoir des prélèvements faits pour des injections.

Donc, le premier événement qui nous a vraiment alertés, c'est le 2 février. Le technicien a

mesuré l'activité dans le vial, et ça comptait zéro. Donc, c'est impossible. Donc, c'est comme ça que ça s'est passé.

Et oui, il y avait une mesure de... Il y a des tenues d'inventaire de tous les vials, et il y a une faiblesse qui a été rapportée et convenue avec la CCSN. C'est que le technicien quand il manipule le vial qui contient 30 à 40 à 50 mCi, le vial est très petit, la date et le numéro de série sont très petits. Donc, le technicien n'a vraiment pas avantage à prendre le temps de lire ce qu'il y a sur le vial et se fie à l'étiquette qui est sur le pot plombé. Donc, par mesure de radioprotection, le technicien mesure l'activité du vial et le remet immédiatement dans son pot plombé.

Donc, le matin du 2 février, quand il a lu zéro, le technicien a pris le temps de regarder la petite étiquette du vial. Vous voyez, le vial, c'est à peine gros comme le petit doigt là. Le numéro de série est très petit. Puis c'est là qu'il a réalisé qu'il y avait une différence entre le numéro de série du vial et le numéro de série de l'étiquette sur le pot plombé. Donc, ce n'est pas simple comme situation, et la CCSN a convenu de cela d'ailleurs dans son rapport.

Et oui, il y a des techniques d'inventaire, et là, il y a une nouvelle méthode d'inventaire qui a été discutée avec la CCSN et qui est

maintenant en place, où systématiquement les étiquettes des vials résiduels sont placées dans le registre d'inventaire. Donc, c'est une mesure qu'on fait maintenant au CHUL. Elle a le léger défaut de causer l'irradiation des mains des technologues pour une manipulation de 10 secondes peut-être.

MEMBRE TOLGYESI : Est-ce que les isotopes qui sont de faible intensité... Vous avez dit que quand c'est 10 ou 20 mCi...

M. OUELLET : Oui.

MEMBRE TOLGYESI : ...que vous les jetez dans les poubelles. Je ne veux pas croire que c'est une poubelle ordinaire.

M. OUELLET : Non, non. C'est des poubelles pour décroissance et rejet plusieurs jours plus tard. Ce n'est pas des poubelles ordinaires là. C'est des poubelles de décroissance.

MEMBRE TOLGYESI : Parce que ce que j'ai compris, c'est que la personne de la compagnie de Pro Rayons-X, elle n'utilisait pas nécessairement les éléments qui viennent d'être déposés, mais où le niveau a baissé à 60, 60 mSv? C'est ça qu'il avait besoin, lui?

M. OUELLET : La compagnie Pro Rayons-X venait chercher les vials résiduels. Dans les cas que nous, on a pu... les trois cas, on voit qu'il y avait

typiquement 60 mCi, et ça, par expérience, je peux vous dire que c'est amplement suffisant pour vérifier l'intégrité d'un blindage dans une salle de radiologie.

MEMBRE TOLGYESI : Mais ce n'est plus utile pour vous. Ça veut dire qu'au fond, cet échantillon-là, vous le mettez « dans la poubelle »?

M. OUELLET : Je ne saurais dire si la médecine nucléaire se permet de faire un patient sur un vial du lendemain. Ça, je ne peux pas l'affirmer. Mais je sais que tous les jours, il y a un nouveau vial qui arrive. Mais si le vial contient encore 50 mCi, est-ce que la médecine nucléaire pourrait y prélever, par exemple, 5 mCi pour un examen pédiatrique, je vous rappelle, au CHUL, je ne pourrais pas l'affirmer.

Janelle?

MME MORRIER : Probablement que oui. En fait, il est gardé au cas où il arriverait un incident avec la livraison.

M. OUELLET : Oui.

MME MORRIER : Comme probablement que le lendemain on se permettrait de l'utiliser si le nouveau vial n'était pas arrivé pour la journée.

M. OUELLET : Ou pour un examen de ventilation en urgence la nuit pour une embolie pulmonaire, quelque chose comme ça.

MEMBRE TOLGYESI : O.K.

M. OUELLET : Mais ça, c'est très clinique là. Je ne saurais pas dire.

THE PRESIDENT: Ms Velshi?

MEMBER VELSHI: Thank you, Mr. President. A question for staff.

From an OPEX perspective, are there any learnings here for your other licensees around access control or inventory control from this incident?

MR. RABSKI: Henry Rabski for the record.

Yes, there's always lessons to be learned and we have passed this information on to all our licensees through our newsletter and the Commission meetings, that due diligence must be maintained in terms of access and that management oversight is important, that they maintain current lists and keep the staff informed on the security measures that they have in place to protect the nuclear substances and the workers and the staff in the building.

MEMBER VELSHI: And what about better control of the sources and locking things up and not just locking the main door?

MR. RABSKI: Henry Rabski for the record.

That's an important point to take into consideration and assessing the inventories will be something that we will be looking at moving forward.

Over the past year, inspectors have been more diligent -- not more diligent but, excuse me, the inspectors have increased their oversight with respect to security provisions and they have also been trained over the last year for improving aspects of security and we will be taking these things forward with all licensees, particularly those that have inventory and many people that could potentially access or need to access those inventories, to make sure that the measures are appropriate and the security measures will ensure the safety. So we will be asking those questions and will be working as well with our security colleagues to make sure that those measures are adequate to protect the inventories.

MEMBER VELSHI: Thank you.

LE PRÉSIDENT : Monsieur Harvey?

MEMBRE HARVEY : Juste une courte question aux personnes du CHUQ.

Parmi les gens qui ont la possession de clés, parce qu'on sait fort bien que dans un hôpital il y a des gens qui font le ménage, entre autres, qui passent dans toutes les pièces, est-ce que ce type de personne possède également une clé?

M. OUELLET : Dans le cas spécifique du CHUL, il y a une nouvelle liste de titulaires de clé là qui est beaucoup plus restreinte maintenant, qui comprend les

médecins, évidemment les techniciens. Les agents de sécurité évidemment ont certains trousseaux de clés qui leur donnent accès à ces locaux-là, c'est bien normal. Et il y a des gens d'hygiène et salubrité aussi qui peuvent avoir accès à ces locaux-là.

MEMBRE HARVEY : Je demanderais au personnel si c'est la même façon de procéder ailleurs dans les autres titulaires de permis.

MME MAYER : Karen Mayer ici.

Oui, c'est assez normal avec les autres titulaires de permis que les autres travailleurs vont avoir accès, mais il faut qu'ils soient des travailleurs autorisés, pas pour avoir accès directement aux substances nucléaires, mais à la pièce pour nettoyer quoi que ce soit, des tâches comme ça.

Il faut qu'ils aient une formation de base de sensibilisation à la radiation pour qu'ils soient au courant des étiquettes pour voir de ne pas accéder certaines places. Mais sûrement, si ce n'est pas pendant les heures de travail, les substances nucléaires ne devraient pas être accessibles à ce monde-là s'ils ne sont pas sur la liste autorisée, alors qui ne figurent pas sur leur nouvelle liste de travailleurs qui ont accès à une clé.

MEMBRE HARVEY : Par ailleurs, ce type de

pièce, il n'y a pas d'armoire non plus, en plus de la clé de la porte, qu'il y aurait une armoire barrée? Ça n'existe pas ailleurs non plus?

MME MAYER : Bien, oui. Il y a toujours des pièces qui ont des armoires qui sont barrées, et puis c'est une façon de garder les substances nucléaires pas accessibles au monde. Alors, c'est une barrière physique qu'on cherche, que ce n'est pas accessible aux autres travailleurs qui ne sont pas autorisés.

MEMBRE HARVEY : C'est une barrière additionnelle qui pourrait bien servir les gens du CHUQ.

LE PRÉSIDENT : Mais tous les travailleurs doivent être employés, n'est-ce pas?

MME MAYER : Oui. Mais s'ils sont des...

LE PRÉSIDENT : Maintenant? À partir de maintenant?

MME MAYER : Oui et non. S'ils sont des travailleurs qui ne sont pas pour la compagnie directement, il faut qu'ils soient quand même des travailleurs autorisés, alors formés et que le titulaire soit au courant qu'ils vont accéder leur pièce, puis pas pendant la nuit.

M. RÉGIMBALD : André Régimbald ici.

Il faut qu'ils soient sous le contrôle du titulaire de permis pour avoir accès à la pièce.

LE PRÉSIDENT : Oui, mais c'est très

difficile d'avoir une compagnie hors de l'hôpital, d'avoir l'autorisation réelle. Moi, je pense que tu dois réviser la politique ici.

M. RÉGIMBALD : Nous allons tenir compte de ce commentaire. Oui. Merci.

MEMBER McEWAN: I have to say this conversation about keys has confused me. Would it not be normal that the hot lab or any room that has radioactivity in it would have a separate, entirely different key with a limited distribution list to the key for the rest of the department? That's certainly been the case in every department I've ever worked in.

MS MAYER: Karen Mayer for the record.

Yes, that is the normal situation in most cases. In this case as well, the hot lab was locked separately, it was an electronic lock or a card access lock, whereas it's not -- it is usually that way where the main hallways of the department are locked during the off-hours.

THE PRESIDENT: Again, I think we're all saying that there's something that you may want to think about, about who has access. The "who" is if they're not employees, I think you're raising the level of risk, as we now witnessed here.

And yes, we have to move on. The only

question that I wanted to ask is: Did anybody speak to Mr. Mignault and did you get any reaction?

MS MAYER: Not in terms of the investigation. We never spoke directly with him. He was not available at the time. He was out of the country. We spoke to the staff member. The only interaction we had was with the police, who did speak to Monsieur Mignault, and as well when the AMP was issued, the administrative monetary penalty was issued to Monsieur Mignault, we did make the phone call to make him aware that it was coming. So there was that interaction but there was no interaction other than that.

THE PRESIDENT: And we'll allow the process to unfold. Okay. Thank you.

Alors, merci beaucoup. Les gens au Québec, est-ce que vous avez des commentaires finaux?

Dr GARON : Non, absolument pas. On vous remercie. On demeure disponible.

LE PRÉSIDENT : Merci beaucoup.

Dr GARON : Ça me fait plaisir.

CMD 15-M22/15-M22.A

Consolidated Interim Status Report for Ontario Power Generation’s Darlington, Pickering and Western Waste Management Facilities

THE PRESIDENT: Okay, we are now really late and we are a bit over time here. Nevertheless we are continuing.

We will move onto the next item on the agenda, which is the presentation by CNSC Staff of the Consolidated Interim Status Report for Ontario Power Generation’s Darlington, Pickering and Western Waste Management Facilities as outlined in CMDs 15-M22 and 15-M22.A.

We have a representatives from OPG here to help us with this and we have Mr. Kim from Environment Canada who is joining us via teleconference.

Mr. Kim, are you still with us?

--- Pause

THE PRESIDENT: No. We lost our technical --

--- Pause

THE PRESIDENT: So is Mr. Kim -- in the meantime, Kelly, why don't you start the machine running.

MS McGEE: Thank you.

The public was invited to comment in writing on this item. A *Notice of Participation at a Commission Meeting* was published on April 28, 2015 and the public had until May 28th to file written submissions. The Commission received two written submissions, one from the Power Workers Union and a second from the Canadian Nuclear Workers Council.

The members will have an opportunity to ask questions on the submissions filed by the interveners after the presentation by CNSC staff and OPG. Thank you.

THE PRESIDENT: Thank you. Okay, Mario, just do we have a connection with Mr. Kim from Environment Canada?

--- Off microphone / Sans microphone

THE PRESIDENT: Okay. We will see if he can join us later on.

So I will turn the floor to Dr. Newland to make the presentation from CNSC Staff as outlined in CMD 15-M22 and 15-M22.A. Please proceed.

DR. NEWLAND: Thank you.

Good afternoon, Mr. President and Members of the Commission. My name is Dr. David Newland, Acting Director General of the Directorate of Nuclear Cycle and Facilities Regulation.

I am accompanied today by Ms Karine Glenn,

the Director of the Wastes and Decommissioning Division; Ms Shona Draper, Regulatory Project Officer Responsible for the Darlington Waste Management Facility; Ms Lenora Makin, the Regulatory Project Officer for the Pickering Waste Management Facility; and Ms Shirley Oue, the Regulatory Project Officer for the Western Waste Management Facility.

We are here today to present the regulatory oversight report for the Ontario Power Generation's Waste Management Facilities for the reporting period from July 2010 to December 2014.

Before we begin, for the record I would like to correct an error in the CMD. In section 4.3 of CMD 15-M22 the value for OPG's consolidated financial guarantee should be $15,453 million or $15.453 billion.

THE PRESIDENT: A small error, isn't it?

--- Laughter / Rires

DR. NEWLAND: Yes, exactly. We apologize for that. I will now pass the presentation to Ms Glenn.

Thank you.

MS GLENN: Good afternoon, my name is Karine Glenn and I am the Director of the Wastes and Decommissioning Division at the Canadian Nuclear Safety Commission.

There are four classes of radioactive wastes in Canada. These are uranium mines and mills waste,

low-level radioactive waste, intermediate level radioactive waste and high-level radioactive waste. We will not be discussing uranium mine and mill waste in this presentation because this type of waste is not generated by Ontario Power Generation and is therefore not managed at any of its three facilities. I will provide more information about the other three classes of waste later in this presentation.

This map provides you with an overview of the facilities where radioactive waste is managed in Canada. Approximate overall inventories as of December 31, 2013 were 383 million tons of uranium mine and mill waste, 2.4 million m^3 of low-level waste, 35,000 m^3 of intermediate level radioactive waste and over 2 million used fuel bundles which constitute high-level radioactive waste.

The responsibility for the safe management of waste rests with the waste owners, in this case Ontario Power Generation or OPG. The CNSC is responsible to ensure that the nuclear waste management facilities and the associated activities are safe and meet the applicable regulatory requirements.

The CNSC accomplishes this through a robust compliance verification program which includes onsite visits, inspections, follow-up activities and desktop reviews. Designated inspectors verify compliance

against the *Nuclear Safety and Control Act*, the associated *Regulations* and the license conditions using a risk informed and performance-based approach. I will now provide an overview of the three ways to management facilities owned and operated by OPG.

These are the Darlington Waste Management Facility located at the site of the Darlington Nuclear Generating Station; the Pickering Waste Management Facility located at the site of the Pickering Nuclear Generating Stations and the Western Waste Management Facility located at the site of the Bruce Nuclear Generating stations.

Low-level radioactive waste is waste with radioactive content above exemption levels established in the Regulations. Clearance levels and exemption quantities are low risk activity levels specific for each isotope below which radioactive material can be released unconditionally outside of regulatory control.

Low-level radioactive waste does not generally require shielding and may be -- may require isolation and containment for up to a few hundred years. This waste can be further classified as processable either through compaction or incineration or as non-processable.

Some examples of low-level waste include mop heads, paper towels, but also larger items such as steam generators from the refurbishment of the units at

Bruce site as shown on the picture on the right. All low-level waste from the Darlington, Pickering and Bruce sites is safely stored after transport at the Western Waste Management Facility.

CNSC requires all licensed facilities to implement waste management programs. OPG has implemented waste reduction and diversion programs at all its installations. In addition, waste generated in nuclear areas but that is likely not contaminated is segregated and later surveyed. If the waste is found to be clean or non-radioactive, the material can be unconditionally released for conventional disposal or recycling.

CNSC staff review OPG's waste management programs as part of the regular oversight of all OPG nuclear facilities.

Intermediate level radioactive wastes has levels of radioactivity that warrant shielding during handling and storage, but typically generate little or no heat in the long term. This class of waste is not processed and includes such items as reactor components from refurbishment, as well as used filters and resins from the water filtration of used fuel pools. All intermediate level waste from the Darlington, Pickering and Bruce stations is safely transported to the Western Waste Management Facility where it is stored above ground or in

in-ground containers, as shown in the photo on the right.

The only exception is the intermediate level waste from the reed tubing of the Pickering A Nuclear Generating Station, which is safely stored on-site above ground and the Pickering Waste Management Facility as shown in the photo on the left.

High-level radioactive waste consists of used nuclear fuel which is long-lived and requires shielding and long-term isolation. Used fuel is first stored in pools at the nuclear generating stations. After a cooling period of at least 10 years, the used fuel is then transferred to dry storage containers and moved to dedicated buildings at the waste management facility located next to the station where it was generated.

Dry storage containers are freestanding containers constructed of steel and concrete that provide shielding for the radioactivity and allow for heat dissipation from the radioactive decay of the used fuel. These containers are also certified by the CNSC as part of transport containers for used nuclear fuel. NWMO, the Nuclear Waste Management Organization through the Adaptive Phase Management Process, is implementing a long-term management solution for used fuel.

CNSC oversight includes inspections, follow-up and desktop reviews. Over the inspection -- over

the reporting period -- pardon me -- CNSC staff completed 20 inspections at the Darlington Waste Management Facility, 17 at the Pickering Waste Management Facility and 16 at the Western Waste Management Facility.

The performance rating methodology used in this report was established in 2010 and it is the same that is used for all other CNSC regulated facilities. It is based on multiple sources of input such as inspections, follow-ups and desktop reviews.

The rating of each safety control area integrates operational and technical information and performance is assessed against safety objectives and criteria. For this oversight report, CNSC rated OPG's performance in all 14 safety and control areas as satisfactory or above for all three waste management facilities over the reporting period.

Four safety control areas were rated as fully satisfactory. These are operating performance, safety analysis, conventional health and safety and security. Over the reporting period, no member of the public and no worker received a radiation dose over the regulatory limit of 1 mSv per year and 50 mSvs per year, respectively. In fact, the dose to the public was consistently below 1 percent of the regulatory limit, while the dose to workers was consistently below 5 percent of the

regulatory limit.

The frequency and severity of conventional health and safety injuries to workers was minimal. There were no radiological releases to the environment above the license limits at any of the three facilities and OPG complied with its license conditions with respect to Canada's international obligations. Overall, CNSC staff concluded that OPG operated the Darlington, Pickering and Western Waste Management Facilities safely.

As mentioned previously, the Regulatory Oversight Report was available to the public for written interventions for a period of 30 days from April 28 to May 28, 2015 and notices of the meeting were sent to Aboriginal groups located in the surrounding area of the waste management facilities. Two submissions were received and both were in support of CNSC staff's conclusion that OPG continues to operate its waste management facilities safely in accordance with the *Nuclear Safety and Control Act* and its associated *Regulations*.

CNSC requires that all major facilities maintain a public information program and disclosure protocol. OPG implemented a program that was reviewed by CNSC staff who concluded that this program meets all the requirements of CNSC document RD/GD-99.3. Under this program OPG reports significant events to the public,

documents and response to public concerns and inquiries. OPG also maintains a website and is active on several social media platforms such as YouTube and Twitter.

Following the Fukushima Daiichi incident, the CNSC developed an action plan. In addition to requiring a review of the safety cases for the nuclear generating stations, including used fuel pools, CNSC also directed OPG to re-examine its safety cases for the waste management facilities. This review did not discover any significant issues, but OPG did identify additional improvements and enhancements such as purchasing satellite phones for all its facilities.

CNSC staff have reviewed and are satisfied with OPG's implementation of these improvements to date. CNSC staff will continue to incorporate operational experience and lessons learned of events at other facilities worldwide into its regulatory oversight of waste facilities in Canada.

As per the Fukushima Action Plan, licensees were requested to complete an analysis of the structural integrity of the used fuel pools. CNSC found that the structural integrity analysis of used fuel pools at Canadian nuclear generating stations was acceptable. The analysis predicted some leakage at elevated temperatures. However, this is well within the makeup

capability that has been implemented and thus ensuring fuel cooling is maintained during an accident. Furthermore, dry storage containers have been confirmed to withstand an extreme event.

As mentioned earlier in the presentation, low and intermediate radioactive waste is routinely and safely transported from the Darlington and Pickering sites to the Western Waste Management Facility in packages that meet the CNSC regulatory requirements. In addition, used fuel and dry storage containers is transferred from the nuclear generating stations to the dedicated fuel storage facilities at the adjacent waste management facility using a specially designed vehicle called the Liftking, as shown in the picture on the slide.

Annually hundreds of shipments of radioactive materials safely take place in the nuclear generating stations. CNSC concluded that OPG's packaging and transport of waste is safe.

I will now pass the presentation over to Ms Shona Draper.

MS DRAPER: Thank you, and good afternoon. For the record, my name is Shona Draper and I work as a Project Officer within the Waste and Decommissioning Division at the CNSC. I am the Regulatory Program Officer responsible for the Darlington Waste Management Facility.

The Darlington Waste Management Facility is located adjacent to the Darlington nuclear generating Station on the north shore of Lake Ontario. Approximately 14 percent of OPG's radioactive waste is stored at this facility.

Currently the only class of radioactive waste stored at the Darlington Waste Management Facility is high level waste. The figure shown on this slide is an aerial view of the Darlington site. The Commission approved the operation of the Darlington Waste Management Facility in December 2007. The facility is contained within its own protected area and currently consists of one processing building and one high level waste storage building. A second storage building for high level waste and a storage building for intermediate level waste are currently under construction.

The Darlington Waste Management Facility loaded and stored its first dry storage container in 2008. Therefore, the oldest container stored at this facility is seven years old. The service life of a dry storage container is 50 years. The current storage design capacity of this facility is 483 containers.

When the second storage building for high level waste becomes operational the storage design capacity of the facility will be 983 containers.

As of June 12, 2015, 396 containers were stored at the Darlington Waste Management Facility. Each year approximately 60 containers are processed and stored at this facility. With the current storage design capacity of 483 containers, the facility could process and store approximately an additional 1 1/2 years worth of containers without further construction. With the future storage design capacity of 983 containers after the second storage building for high level waste becomes operational, the facility could process and store approximately an additional 10 years worth of containers without further construction.

Following public proceedings, the Commission issued a 10 year renewal for the Darlington Waste Management Facility license from March 13, 2013 to April 30, 2023. This license utilizes standardized license conditions. As a companion to the license, CNSC staff issued a License Condition Handbook for this facility in March 2013.

OPG reported six minor events to CNSC staff that occurred during the reporting period at the Darlington Waste Management Facility, averaging approximately one event per year. These consisted of two events related to fire protection and four events related to security.

The first fire protection events occurred in the first quarter of 2011 and was an unplanned loss of fire water supply. The second occurred in the third quarter of 2013 where the fire panel for the Darlington site was in bypass mode for the Darlington Waste Management Facility.

After the review of these events, CNSC staff concluded that no adverse effects on the health and safety of workers, the public or the environment resulted from these events and that OPG's actions in response to the events was acceptable. All events are now closed.

CNSC staff rated the radiation protection safety and control area for the Darlington waste management facility as satisfactory for the entire reporting period. Annual dose to the public at the boundary of the Darlington site, which includes the annual dose to the public attributed to the nuclear generating Station and the waste management facility was consistently more than 1000 times the regulatory limit of 1 mSv per year throughout the reporting period.

Since workers are monitored individually, dose information is available for OPG personnel working at the Darlington Waste Management Facility. Throughout the reporting period, the average annual dose to workers was 0.3 mSv or less and the maximum annual dose to workers was

1.7 mSv or less, well below the regulatory limit of 50 mSv per year, not to exceed 100 mSv over five years.

With respect to conventional health and safety, no incidents were reported to the CNSC during the reporting period for the Darlington waste management facility. CNSC staff rated the conventional health and safety, safety and control area as satisfactory for 2010 and fully satisfactory for the remainder of the reporting period.

CNSC staff rated the Environmental Protection Safety and Control Area for the Darlington Waste Management Facility as satisfactory for the entire reporting period.

Please note that there was a typo on this slide that has been corrected for today's presentation. The units for the particular derived release limit an action level should be becquerel per year as seen on this slide, not becquerel per litre.

OPG monitors controlled airborne emissions from the Darlington Waste Management Facility through weekly samples of the processing building stack. Airborne emissions from this facility are bounded using the derived release limits that were developed for the Darlington site. Action levels for airborne emissions were also developed for the Darlington site. Both limits can be seen on this

slide.

Throughout the reporting period, OPG took over 230 samples of the processing building stack and found detectable amounts of gross beta gamma in only one sample. All other stack samples taken were below the minimum detectable activity. The stack sample that had detectable amounts of gross beta gamma had a reading of 1.3×10^3 Bq which is only slightly above the minimum detectable activity and is a small fraction of a percent of the action level.

OPG monitors controlled liquid releases from the Darlington Waste Management Facility through stormwater samples that are taken on a weekly basis. Similarly to airborne emissions, liquid releases from this facility abounded using the derived release limits that were developed for the Darlington site. The derived release limits for gross beta gamma and tritium can be seen on this slide. Action levels for liquid releases were also developed for the Darlington site as shown on this slide. Throughout the reporting period, OPG took over 230 stormwater samples that were all well below the action levels and also consistently below 37 Bq/L for gross beta gamma and 1850 Bq/L for tritium. In comparison, the drinking water standard for tritium is 7000 Bq/L.

The Darlington Waste Management Facility

license authorizes OPG to construct three additional storage buildings for high level waste and one storage building for intermediate level waste. Currently, OPG is constructing one storage building for high level waste and a storage building for intermediate level waste. Before construction began for these buildings an environmental management plan, a construction and verification plan and project design requirements were submitted by OPG to CNSC staff for review and acceptance. Before operation begins a commissioning report for each building will need to be reviewed and accepted by CNSC staff.

I will now pass the presentation over to Ms Lenora Makin.

MS MAKIN: Good evening. For the record, my name is Lenora Makin. I am a Project Officer with the Waste and Decommissioning Division at the CNSC. I am the regulatory project officer responsible for the Pickering Waste Management Facility.

As previously mentioned, the Pickering Waste Management Facility is located adjacent to the Pickering Nuclear Generating Stations on the north shore of Lake Ontario. Approximately 32 percent of OPG's radioactive waste is currently stored at the facility. Almost all of this waste is used nuclear fuel and the remaining small portion is intermediate level waste

resulting from the re-tubing of the Pickering A Nuclear Generating Station.

The photo on this slide shows an aerial view of the Pickering site. The Waste Management Facility was planned in two phases. Phase I became operational in January 1996 and is located within the nuclear generating station's protected area as shown on the right of the image. Phase I consists of the processing building, storage buildings one and two that have design capacities of 187 and 469 dry storage containers, respectively, and the re-tube component storage area for the interim storage of intermediate level waste from the re-tubing.

With the exception of periodic inspections, monitoring and maintenance, there have been no operational activities in the re-tube component storage areas since 1993. Phase II is located within its own protected area on the Pickering property site as indicated by the dashed lines on the top left of the image. Phase II consists of storage building number three which was constructed in 2009 and has a capacity of 500 dry storage containers.

During the license period, OPG plans to construct a fourth storage building for used fuel dry storage within the Phase II area. The Pickering Waste Management Facility loaded and stored its first dry storage

container in 1996. Therefore, the oldest containers stored at the facility is 19 years old.

The current storage design capacity of this facility is 1,156 containers. When the fourth storage building becomes operational, the storage design capacity of the facility will be approximately 1,800 containers. As of June 12, 2015, 760 containers were stored at the Pickering Waste Management Facility. Each year approximately 50 containers are processed and stored at this facility.

With the current storage capacity of 1,156 containers, the facility could process and store approximately an additional seven years' worth of containers without further construction. With the future construction -- with the future storage capacity of approximately 1,800 containers after storage building number four becomes operational, the facility could process and store approximately 19 years' worth of containers without further construction.

A renewal for the Pickering Waste Management Facility license was issued by the Commission for a 10-year period on April 1st, 2008, with an expiry of March 31st, 2018. In December 2012 the license was amended to include OPG's revised preliminary decommissioning plan. The preliminary decommissioning plan was updated following

its required five-year review by OPG. By the end of 2016, CNSC staff will restructure the Pickering waste management facility operating license to a new format to incorporate standardized license conditions and will issue a License Condition Handbook.

During the reporting period, OPG reported six minor events to the CNSC that occurred at the Pickering Waste Management Facility, averaging approximately one per year. These consisted of two security-related events, one pressure boundary code noncompliance, one instance of environmental samples not being completed as per the scheduled frequency, a snow removal vehicle not being monitored as per OPG's procedures, and a change in monitoring sampling frequency without consulting the licensing basis documentation.

After the review of these events, CNSC staff concluded there are no adverse effects on the health and safety of workers, the public or the environment resulting from these events and that OPG's actions in response to the events are acceptable. All events are now closed.

CNSC staff rated the radiation protection safety and control area at the Pickering Waste Management Facility as satisfactory over the reporting period.

Annual dose to the public at the boundary

of the Pickering site, which includes annual dose to the public attributed to a nuclear generating station and the waste management facility was consistently significantly below the regulatory limit of 1 mSv per year throughout the reporting period. Since workers are monitored individually, dose information is available for OPG personnel working at the Pickering Waste Management Facility.

Throughout the reporting period, an average annual dose to workers was 0.2 mSv or less and the maximum annual dose to a worker was 1.3 mSv or less. As well, well below the regulatory limit of 50 mSv per year, not to exceed 100 mSv over five years.

With respect to conventional health and safety, no incidences were reported to the CNSC at the Pickering Waste Management Facility. CNSC staff rated the safety and control area has satisfactory for 2010 and fully satisfactory for the remainder of the reporting period. CNSC staff rated the environmental protection safety and control area as satisfactory for the entire reporting period.

OPG monitors controlled airborne emissions from the Pickering Waste Management Facility through weekly samples of the processing building stack. Airborne emissions from this facility are bounded using the derived

release limits that were developed for the Pickering site. Action levels for airborne emissions were also developed for the Pickering site. Both can be seen on this slide.

Throughout the reporting period, OPG took over 230 samples of the processing building stack and found detectable amounts of gross beta gamma and only five samples. All other samples taken were below the minimum detectable activity. The stack sample that had the highest detectable amount of gross beta gamma had a reading of 7.8×10^3 Bq, which is only a small fraction of a percent of the action level.

Active liquid waste from the Pickering Waste Management Facility is not directly released to the environment, but pumped to the Pickering nuclear generating station’s active liquid waste system. Through quarterly reports -- through quarterly operation reports, OPG provides information on the active liquid waste that is pumped from the waste management facility to the nuclear generating station, including the volume of the waste pumped and the tritium and gross beta gamma activities.

Over the reporting period, active liquid waste pumped to the nuclear generating stations remains within the license limits. The direct releases to the environment are controlled by the station. Phase II of the Waste Management Facility, which comprises of storage

building three, has its own groundwater monitoring program. As part of this program, the samples taken by OPG on a quarterly basis were consistently well below the action level of 3.0×10^{11} Bq per year over the reporting period.

The current license for the Pickering Waste Management Facility authorizes the construction of one additional storage building for dry storage containers. In addition to this, OPG plans to replace the current processing building with the new processing building, which will enhance productivity. CNSC staff are anticipating a license amendment request by the end of this year in this regard.

I will now pass the presentation over to Ms Shirley Oue.

MS OUE: Thank you, and good evening. My name is Shirley Oue and I am a Senior Project Officer in the Waste and Decommissioning Division at CNSC. I am also the Regulatory Program Officer Responsible for the Western Waste Management Facility.

The Western Waste Management Facility is located at the site of the Bruce nuclear generating stations on the east shore of Lake Huron. All of the waste generated at the nuclear generating stations operated by Bruce Power is sent to OPG's Western Waste Management Facility for processing and storage. In addition, low and

intermediate waste from both the Pickering and Darlington sites are sent to Western for processing and storage. Approximately 54 percent of OPG's waste is stored at the Western Waste Management Facility.

This slide shows an aerial view of the Western Waste Management Facility. This figure is a correction to the one in CMD 15-M22. The protected area for the Western used fuel dry storage facility is bounded by the dashed line. The Western Waste Facility contains storage buildings for low-level waste, intermediate level waste and used fuel, as well as other processing buildings such as the Waste Volume Reduction Building.

The low and intermediate level waste storage area has been receiving waste since 1974 and has a storage capacity of up to 120,000 m^3. The current inventory of low and intermediate level waste is 98,132 m^3, therefore based on a volume of 2,640 m^3 received per year, and this is based on the average of waste volume received over the past five years. This waste storage area has approximately eight years to reach the design capacity for low and intermediate level waste.

The Western license was amended in 2002 and OPG constructed storage buildings for dry storage containers for used fuel. The Western facility loaded and stored its first dry storage container in 2003. Therefore,

the oldest container stored at this facility is 12 years old. The life design of a dry storage container is 50 years.

The current design capacity of this facility is 2,000 dry storage containers. The current inventory is 1,038 containers. Each year approximately 130 containers are processed and stored at Western. With the current capacity the facility could process and store approximately an additional seven and a half years of containers.

A renewal of the Western Waste Management Facility license was issued by the Commission for a 10-year period from June 1, 2007 to May 31, 2017. The Commission further amended the Western license with the revised decommissioning plan and associated financial guarantee on December 19, 2012. By the end of 2016, CNSC staff will restructure the Western Waste Management Facility operating license to the new format. The new format will incorporate standard license conditions and have a companion License Conditions Handbook.

Reportable events. During the last five years, OPG reported 21 minor events at the Western Waste Management Facility to the CNSC, averaging approximately four events per year. These consisted of events in the following areas, and I will give an example of each. Nine

were related to emergency management and fire protection, specifically three in emergency management and six in fire protection. For emergency management, in one case the public address system loudspeaker volume was manually lowered.

An example of a fire protection event is the fire detection impairment caused by the presence of objects in the beam path. Three events were related to radiation protection.

As an example, there was a reverse airflow from the incinerator room and waste processing room, which is Zone 3, to the amenities building hallway in Zone 2. Three were related to safeguards. One example is the failure of safeguards remote monitoring equipment. Three events were related to operating performance. In one case, picketing during a legal strike disrupted staff arrival and departure for four hours.

Two events were related to physical design and specifically in pressure boundary, one which involved overdue relief valve replacements and the other involved an undersized release valve. And there was one security event.

CNSC concluded that no adverse effects on the health and safety of persons or the environment resulted from these events and that OPG's actions in

response to the events were acceptable. All events are closed.

CNSC staff rated the radiation protection safety and control area at the Western Waste Management Facility as satisfactory for the entire reporting period.

Annual dose to the public at the boundary of the Western site, which includes the annual dose to the public attributed to the Bruce Nuclear Generating Stations and the Western Waste Management Facility was consistently more than 100 times below the regulatory limit of 1 mSv per year throughout the reporting period.

Effective dose. Please note there was a typo in the previous version of this slide which has been corrected for today's presentation by removing the word "average" in the title.

Workers at Western are monitored individually. Therefore, dose information is available for personnel at the waste management facility. For the reporting period, the average annual dose to workers was 0.1 mSv or less and the maximum annual dose to workers was 1.8 mSv or less below the regulatory limit of 50 mSv per year, not to exceed 100 mSv over five years.

Over the reporting period, OPG reported two minor conventional health and safety related incidents at Western. In the first case an employee was struck by a

pallet frame. This was not a medically treated injury, but associated work was halted by OPG for further investigation and assessment to minimize reoccurrence.

In the second incident, an employee was exposed to a weld arc resulting in eye irritation that required medical treatment. Following medical treatment the employee was able to return to work immediately. To prevent reoccurrence, OPG has since revised work procedures and signage. Both incidents are closed. CNSC staff rated conventional health and safety as satisfactory for 2010 and as fully satisfactory for the remainder of the reporting period.

With respect to environmental protection, CNSC staff rated OPG's performance at the Western Waste Management Facility as satisfactory for the entire reporting period.

Different from the Darlington and Pickering waste management facilities, Western has its own facility specific derived release limits and active levels for airborne releases. Additionally, Western has samples taken on a weekly basis for carbon-14 and iodine-131. During the reporting period, airborne releases were consistently below the action levels and consistently below 1 percent of the derived release limits. Western's more extensive monitoring program can be attributed to the fact

that it is the only OPG Waste Management Facility where processing of waste such as incineration and compaction takes place.

This slide depicts airborne releases as a percentage of the derived release limit for the four main substances being monitored at Western.

As for airborne limits, Western has its own facility specific derived release limits and action levels for controlled liquid releases. OPG monitors waterborne effluent leaving Western at six sample stations on a weekly basis and analyses for tritium in gross beta activity. The results of individual sample stations are then combined and reported as a total monthly emission.

There were 54 monthly emissions over the reporting period which were compared to the monthly action levels and derived release limits. Six of the 54 samples were above the action limits for gross beta, three in 2011 and three in 2012. In each instance, however, the action levels remained below 0.03 percent of the annual derived release limit. As a result of the exceedances, OPG conducted an investigation and identified the need to reassess the action levels using operating experience to ensure that they reflect the operating practices at the Western facility. The action levels at Western were subsequently updated in 2013 to better reflect site

boundaries and conditions. Since updating the action levels, samples of controlled liquid releases have been consistently below these levels.

This slide shows the liquid effluent releases as a percentage of the derived release limit.

Groundwater protection. OPG has 20 groundwater monitoring wells at and around the Western's facility. All wells are sampled quarterly for tritium and gross beta, except for Water Sample Hole, or WSH 231, which is sampled every two weeks. Tritium concentrations in the monitoring wells have been very low, except at WSH 231, which has shown elevated tritium concentrations since the late 1990s. This monitoring well was installed in the middle sand aquifer and located adjacent to several low-level storage buildings. In 2010, OPG determined the cause of the anomaly to be air and/or vapour transferred from inside the low-level storage buildings through the electrical cable ducts into the electrical manhole. After OPG implemented the corrective measures in 2011, results at WSH 231 have indicated a declining trend. CNSC staff continues to review the results of this monitoring well in addition to other monitoring results to ensure the safety of OPG's operations.

This figure shows since 2011 tritium concentrations at the monitoring well 231 to be slowly

declining. Specifically, the average concentration steadily dropped from 48,800 Bq/L in 2011 to 34,000 Bq/L in 2014. The red line is a curve-fitting trend. OPG continues to monitor this trend to verify the effectiveness of the corrective actions. Additionally, CNSC staff continues to review the results of monitoring well 231 to ensure the safety of OPG's operations.

Major future projects and initiatives. Please note there was an error on the slide that was provided previously. The last bullet from that slide has been removed for today's presentation.

During the reporting period, OPG has constructed three storage buildings for low-level waste, 54 in-ground storage containers for intermediate level waste and two storage buildings for dry storage containers. All of these additional structures are authorized by the current license.

I will now pass the presentation to Dr. Newland.

DR. NEWLAND: Thank you. I will now conclude our presentation with a few highlights from the oversight report. Over the reporting period from July 2010 to December 2014, CNSC staff have reviewed OPG's performance at its waste management facilities and have concluded that no member of the public or worker received a

radiation dose over the regulatory limit, the frequency and severity of conventional health and safety injuries to workers was minimal, there were no radiological releases to the environment above the regulatory limits at any of the three facilities, and OPG complied with the *Nuclear Safety and Control Act*, the *Regulations* and their license conditions.

Thank you. That concludes staff's presentation.

THE PRESIDENT: Thank you.

CMD 15-M22.1/15-M22.1A

Oral presentation by Ontario Power Generation

THE PRESIDENT: I am testing everybody's perseverance here, but we are going to move on to a presentation by OPG as outlined in CMD 15-M22.1 and 22.1A.

I understand that Ms Swami will make the presentation. Over to you.

MS SWAMI: Good evening, Chairman Binder and Members of the Commission.

My name is Laurie Swami, Senior Vice President for Ontario Power Generation's Decommissioning and Nuclear Waste Management. I am accountable for the safe and reliable operation of our waste management

facilities.

With me today are Lise Morton, the Director of Low and Intermediate Level Waste Operations; Val Bevacqua, the Director of Used Fuel Operations; and Marlene Ramphal, the Director of Nuclear Waste Engineering.

At OPG we have safely handled and processed the radioactive waste from all of Ontario's nuclear generating stations for over 40 years and we are very proud of this. Let me give you a few examples.

Our transportation drivers have safely transported radioactive materials for millions of kilometres. Our nuclear safety culture continues to strengthen. Our employee does remained well below limits, as do our environmental emissions.

We have applied the 3Rs through all aspects of our waste management processes and, last but not least, we have worked hard to continue to earn the public's trust through open and transparent communications.

From the outset of our nuclear program, we recognize that nuclear waste is an integral part of our business and we planned for and implemented the programs, processes and facilities for safe management of radioactive materials. As stewards of these materials, we have accountability for their care and custody and to manage our business in an environmentally, socially and financially

responsible manner.

We remain assured of our ability to protect our workers, the public and the environment, because we have full knowledge and understanding of the amount and nature of the waste materials we manage. We know how to package, ship, process and maintain safe storage of these materials. I am happy to say we have shown strong performance and continued improvement.

For the most part we will be discussing our performance over the last five years, but just stepping back for a few moments to look at our history.

We have safely transported, processed and stored low and intermediate level waste at our Western Waste Management Facility since 1974. Our highly skilled and trained drivers take the responsibility of travelling on Ontario's public roads very seriously, travelling over 3 million kilometres, or the equivalent of travelling coast to coast 500 times, with no injury to the public or release of materials.

Over the course of four decades, approximately 200,000 m^3 of low-level waste has been generated. However, through waste minimization efforts and volume reduction, we have reduced the volume to approximately 83,000 m^3 stored. At the Western facility we use an incinerator to reduce combustible waste volume by 95

percent and a compactor to reduce the waste volume by 75 percent. We have continued to minimize the waste generated at source in the stations through careful work planning, implementation of reusable materials and, where possible, diversion of the waste for recycling.

And we are not stopping here. In this reporting period, we have implemented waste minimization pilots to assess the benefits of retrieving previously-stored, older waste by opening up the bins and resorting for recycling, compaction or incineration. This approach demonstrates our environmental commitments as a company and respects and reflects public expectations.

Since beginning operation of our used fuel facilities co-located with their generating stations, we have processed and stored over 2,000 dry storage containers, the equivalent of about 10 years' generation for each of the plants.

We have done this while meeting all IAEA safeguards.

At our used fuel facilities, we have safely increased our processing rate by approximately 30 DSCs per year, and our storage capacity.

In support of Darlington refurbishment, we are well advanced in our planning of our retube waste storage building.

We are pleased to report that in 2014, we proved that we can safely unload a dry storage container to remove fuel in the unlikely event this would be needed. The biggest challenge was to remove the DSC's lid closure weld. We did this using a combination of arc gouging and grinding.

We confirm that we were successful by checking that the lid and base were, indeed, separated.

We removed a DSC drain port weld and plug, and removed spent fuel modules from a DSC while it was submerged in the irradiated fuel bay. Again, we don't ever expect to need to do this, but if we need to, we know we are able to.

Within nuclear waste, we continue to set aggressive targets to strive for event-free operation across all three facilities to effectively manage our risks. Over the past few years, nuclear waste has been adopting nuclear governance. In fact, my organization has recently implemented the OPG nuclear-wide human performance program, enabling us to focus on reducing the number of human performance events.

Using the fleet programs, we have focused on improving supervisory effectiveness, investigating and addressing low-level events and applying a more rigorous focus on event-free tools and situational awareness.

And our results have shown improvement. In the reporting period, we had two years with no event free day resets.

Finally, this year we completed a nuclear safety culture assessment where we surveyed our staff and asked them specifically to identify concerns or issues.

I am pleased that our staff actively participated and that the survey demonstrated we have a healthy nuclear safety culture where employees feel comfortable raising concerns, and their opinions are valued.

The waste facilities have continued to show strong performance in the area of radiation protection. We are proud to report that, over the course of this period, we have safely handled over 400,000 fuel bundles and managed over 14,000 m^3 of low and intermediate level waste, during which there were no recordable doses to workers that exceeded regulatory limits or OPG's more stringent administrative limits.

In 2014, OPG achieved its best safety record ever in its over 100 years of operations. We contributed to this success.

And at the end of 2014, our waste facilities had completed over one and a half million hours worked, or over 1,500 days without a lost time accident.

At our Pickering facility, which has been operating for over 20 years, we have never had a lost time accident.

As a measure of our performance, we monitor all injury rate and accident severity rates as indicators to ensure the overall objective of managing occupational hazards is met. To reflect OPG's commitment to continuously improve and challenge performance, more aggressive targets have been set for both of these indicators, and our performance has continued to better these goals.

Turning to environmental protection, we hold ourselves to high standards, and the commitment to the principles of sustainable development. We have a corporate-wide environmental management system which is certified to the ISO14001 standard. This standard requires regulatory compliance, but also drives us to go beyond that.

Our nuclear waste facilities integrate environmental management system fundamentals into daily operations and planning to ensure all impacts on the environment are managed.

Radiological waterborne and airborne emissions at OPG's nuclear waste management facilities have always been and remain well below one percent of the

derived release limit

Public dose from waste management related operations also continues to be far below one percent of the CNSC regulatory limit.

And beyond compliance, OPG works with its community partners to support regional ecosystems and environmental stewardship, and has been awarded corporate wildlife habitat certification recognition at all three sites.

Response to potential emergencies is supported by an integrated emergency preparedness program between the nuclear waste facilities, the nuclear power plants and the municipalities. OPG maintains a comprehensive, on-site emergency response capability, and we continually drill and train to test our procedures, our equipment and our people.

In 2013 and 2014, there were two potential fire events at our Western facility where smoke was observed coming from beneath the incinerator. In both cases, the incinerator was immediately placed in a safe state and an investigation was conducted.

While these were unfortunate events, we are pleased that staff responded immediately and appropriate, as we expected them to, to ensure there was no safety impact.

OPG has taken these events very seriously. Since 2014, we have not been incinerating solid wastes.

We recognized that we needed to modify the incinerator to prevent recurrence of these over-heating events. The modifications are currently being implemented, and we anticipate, after rigorous testing, that we will return to solid incineration later this year.

OPG is committed to building and growing long-term, mutually beneficial working relationships with First Nation and Métis communities whose traditional territories are, or may have been, near our waste facilities.

During the reporting period, OPG continued to work with 12 communities across the province, holding approximately 15 meetings a share to share information, to consult on issues and concerns, and to work collaboratively on issues of common interest.

The relationship continues to mature and build trust and understanding.

We acknowledge that waste operation and the future disposal of waste is of keen interest to the public. We work hard to earn the public's trust through our open communications and continuous outreach to all, regardless of their views.

On a quarterly basis, we publicly post

performance reports on nuclear waste operations along with a new quarterly report on environmental performance in an easy-to-read format. And starting this year, we have taken the step to post all waste-related reportable events each quarter.

We actively meet face to face with members of the public. This also extended across the areas of the province where our transportation vehicles travel.

Forty-five (45) presentations were given to over 700 emergency personnel in Ontario on the safe transportation of radioactive materials. We've provided 167 organized tours of our waste facilities to interested groups over the past four years.

We are proud of our accomplishments, but we are not complacent. We continue to look for ways to improve our performance while ensuring the safety of our workers, the public and the environment.

We continue to communicate our operations in an open and transparent manner and we continue to examine opportunities to reduce our environmental footprint even further.

Our results demonstrate our commitment to those principles.

Thank you, and we're available to answer any questions you may have.

THE PRESIDENT: I think this is a time for us to break for about 10, 15 minutes, maybe.

Seven o'clock. We'll come back at 7 o'clock on this clock.

--- Upon recessing at 6:46 p.m. /
Suspension à 18 h 46
--- Upon resuming at 7:00 p.m. /
Reprise à 19 h 00

THE PRESIDENT: Okay. Let's jump right into the question period. We're supposed to have Environment Canada on line, but they couldn't make it so they promised to be available tomorrow for any questions that we may want to put to Environment Canada.

So with this introduction, let me -- actually, before we do this, as per normal practice, we need to deal with our interventions.

So there's two interventions. They are written interventions.

One is -- the first one is -- let me see if I got this right.

CMD 15-22.2

Written submission from Power Workers Union

THE PRESIDENT: It's a written intervention from Power Workers' Union, 15-M22.2. And as usually, anybody just -- anybody has a question?

No questions? Okay. Thank you.

CMD 15-22.3

Written submission from Canadian Nuclear Workers' Council

THE PRESIDENT: The next one is a written submission from Canadian Nuclear Workers' Council.

Any questions on that one?

No? Okay.

So let's start the normal kind of questions to the -- to staff and to OPG, starting with Mr. Harvey.

MEMBER HARVEY: Merci, monsieur le president.

The first question is about decommissioning. It's on page 12 of 42 in your document.

My question is the -- well, in the staff document. There is two paragraphs on decommissioning.

And my question, you don't even need to go

there, I just want to know that the -- when you are talking decommissioning the waste facilities, does the operation of the nuclear reactor had to -- have to be taken into consideration because you cannot close or abandon the waste facilities if the reactor always in operation.

So my question is, how do you take that into consideration?

And then -- when you say there is a guarantee, does the -- does it take into account the fact that the -- all the stuff, all the waste, all the -- what would be produced by the closing of the nuclear reactor, how the volume of the waste would be produced will have to go -- in the waste facility, so how is that taken into account?

My question is first to the staff and then to the OPG.

MS SWAMI: Laurie Swami, for the record. Maybe I should start.

So when we consider the decommissioning of the nuclear facilities or the waste management facilities, we look at our long-term plans, consider what the waste generated would be from the nuclear facility. We consider that process as part of our long-term strategy.

We then put in place programs that would ensure that we continue to manage the nuclear waste as

effectively as we do today.

So for instance, Pickering is planned to be shut down at the end of 2020. We would continue to have nuclear -- use nuclear fuel on site. There would -- on shutdown, we would have to move the fuel out of the reactors into the irradiated fuel bays where it would stay for about 10 years.

During that period of time, we would be continuing to manage the fuel in the bay. We would be continuing to transfer fuel into the dry storage containers for storage at the site. So that process would continue.

Similarly, we would continue to generate some low and intermediate level waste, and we would continue to manage that as we do today, so there would be shipments of waste periodically from the site to the Western Waste Management facility where the intermediate level waste would be stored or the low level waste would be incinerated, compacted and stored.

At the end of the period when we would essentially be moving towards the Deep Geologic Repository, if that goes through the approval process and eventually gets built, we would then start transferring waste from the Western Waste Management Facility that's been stored into our low and intermediate level waste DGR.

For the used fuel we are, you know,

looking towards the nuclear waste management organizations, as mentioned earlier, adaptive phase management. When that process was available and the facilities were available, we would start to move our fuel from our sites to that facility.

And so there's a long-term strategy that looks holistically at the waste that's generated whether the units are in operation, whether they're shut down, and we consider that in our cost estimating so that we take that into consideration as we develop what the funds should be.

So all of that is factored into our process.

MEMBER HARVEY: What amount of the guarantee represents all those costs, or its present figure?

MS SWAMI: Laurie Swami, for the record.

It's a fully costed process, so we look at all of the costs associated with decommission. We put that into our models and we establish what the requirement is for funding that and then we set aside the funds to make sure that we have sufficient for decommissioning our facilities.

And as we -- as you know, we go through a hearing process for that process as well.

MR. NEWLAND: Dave Newland, for the record.

Just to perhaps staff's perspective on that, we get the preliminary decommissioning plans for each of our licensees for all of the facilities, we review those against our criteria, and we evaluate the adequacy of the financial amounts that have been set aside by each of the licensees.

I would also add that there are contingencies built into those financial guarantees so that if something is unaccounted for or costs more, there is a contingency there that would take that into account.

And perhaps Ms Glenn would go through some of the activities in a little bit more detail.

MS GLENN: Karine Glenn, for the record.

As part of the PDP, one of the things you mentioned is do they take into account the disposal of the waste.

So one of the things they have to do is determine the final end state of the facility will be after decommissioning and then the assessment of the financial guarantee is done against that final end state.

If the waste is not to remain on site and move to another facility, then that's included in that plan.

It's important to note that the PDP and -- well, the financial guarantees have to be revised every five years to ensure that they remain current and they are adjusted in terms of dollars and inflation at that point in time, every five years.

MEMBER HARVEY: And the -- well, the waste facility will have to -- may have to be maintained until there will be a solution or -- I mean, there is a place to send the used fuel, in fact, to the --

MR. NEWLAND: Dave Newland, for the record.

Yes, indeed.

THE PRESIDENT: Mr. Tolgyesi?

MEMBER TOLGYESI: This is regarding the waste storage containers.

You said that in 2013, 63 of them had welding issues and all will be repaired in 2015.

What about dry storage containers prior to 2013? Were they all inspected using, I don't know, this ultrasonic testing, or what you do for them?

MS SWAMI: Laurie Swami, for the record.

I will ask Mr. Bevacqua to provide more details on the specifics of the 63, but our dry storage containers are routinely reviewed to ensure that they meet the standards of the QA program that we have in place.

And I'll ask Mr. Bevacqua to specifically address the 63.

MR. BEVACQUA: Val Bevacqua, for the record. Thank you for the question.

Specifically to answer your question on prior to the weld wire issue that led to the 70 -- 63 weld inclusions that we discovered, how were they inspected, they were inspected using the same process, a phase ultrasonic testing. And they all passed prior to being processed and sealed and placed in storage.

THE PRESIDENT: Dr. McEwan.

MEMBER McEWAN: Thank you, Mr. President.

On page 58 of the OPG report, you're talking about your transport, and at the bottom of that page in the last paragraph, you discuss one accident that occurred in this reporting period where the vehicle was rear-ended.

So what are the processes that the driver would then go through, and how do you ensure that those processes are actually followed and there are no risks to the public?

MS MORTON: Lise Morton, for the record. Thank you for the question.

So the processes that we follow and we did follow in this particular incident, the driver -- the

drivers are very well trained, and we review them with -- on continuing training, we review the response with them routinely.

So the drivers have a list of contacts that they are to call. Obviously, one of the first ones is the police, but they also then reach out to their line supervision, who have immediate contact with the drivers at all times.

There is a fan-out process that then occurs as well that involves calling the -- there's a transportation emergency response number that goes directly to the Pickering shift supervisor, and they can invoke the transportation emergency response plan. That then has another fan-out.

So in this case, the driver responded exactly as we would expect, and as he is trained to do. He made all of those phone calls to his line supervision, to the police. The police did attend the scene in this particular incident. We did invoke the transportation and emergency response plan as a conservative measure, as a precaution.

And so the police deals with obviously the other driver, taking statements, et cetera. And we then also send immediately other OPG personnel to attend the scene as part of the transportation emergency response.

And a lot of that is precautionary action that we took in this case. For example, there was no visible damage to the vehicle in any way.

But we still followed our transportation emergency response and we had people like Radiation Protection, Public Affairs and others attend the scene.

MEMBER McEWAN: So for anything like that you would assume -- I mean, you would assume the precautionary principle and you would send a full team to look at it and do the appropriate monitoring.

How rapidly could that response be mounted if it was a more serious accident?

MS MORTON: Lise Morton, for the record.

The province is divided geographically into zones with transportation emergency response teams able to respond within the zone.

So, for example, Bruce Power manages a zone that ranges to approximately Orangeville from the Bruce Station, Pickering Station manages most of Southern Ontario, and then Chalk River also has a team that can respond in that area of the province.

So the response time can be quite rapid, and that is what we found in this particular case. We had people on the scene I believe it was within 45 minutes.

THE PRESIDENT: Thank you.

Ms Velshi?

MEMBER VELSHI: Thank you, Mr. President.

This is on Slide 5 of Staff's Presentation, and it is on waste volumes and waste sources. And the question I will ask Staff first, and then maybe OPG can add to that.

So one is I know for me it would be helpful if we would use the same units for waste inventory so it allows better comparison between what comes from uranium mines and high-level waste.

But more importantly, certainly for the low, intermediate and high-level waste, if there was any benchmarking information that can allow comparison. And I don't know whether you do volume per megawatts of electricity generated or something that shows how well are we at managing our waste, and is that done?

MS GLENN: Karine Glenn, for the record.

The inventories listed on Slide 5 are not specific to the nuclear power generation industry. They account for all waste generated in Canada, including nuclear medicine production and all other waste that is licensed and overseen by the CNSC.

MEMBER VELSHI: Fair enough.

So I think if we wanted to see the full picture of how much waste we need to handle, regardless of

where it is coming from, having them all in the same units would help.

My second part of the question, to allow benchmarking just for nuclear power plants, I know I would find it useful to see how much waste is produced and how does that compare with other sources?

And I know we hear from all the licensees on their activities to try to reduce how much waste they are generating. Would be kind of nice to see what that comparison looks like.

And I don't know if you have that information or whether that is readily available?

MS SWAMI: Laurie Swami, for the record.

And I think it is important to benchmark our performance in these areas, and Ms Morton does have that information and she will provide the specifics of how we are doing. But obviously, it is an area that we like to focus on. It is a cost-driver, if nothing else, and so we need to minimize our costs.

We can also speak to used fuel, if that is of interest, and Mr. Bevacqua can provide guidance on that.

MEMBER VELSHI: Thank you, that would be helpful.

MS MORTON: Lise Morton, for the record.

We actually did review this I believe, and

I am sorry I think the data is a little dated, but we reviewed this approximately three or four years ago to compare OPG's generation rate per reactor. Because there is published data available on that internationally.

And what we determined in doing that benchmark, and that is of course more of a tabletop exercise, but we did determine that our generation production per reactor unit, again it ranges of course year by year, but approximately 160-350 m^3 of low and intermediate level waste per reactor per year was very much in line with other countries with mature programs.

In particular, very closely aligned to the UK. Of course, their Magnox reactors have quite different generation rates. And again, you know, when you look at the international values it is very dependent on obviously reactor design, reactor operation, age of reactor units, et cetera.

So we do verify that information. Again, it is a couple of years old now. But beyond that, as Ms Swami explained, we also do benchmark through physical visits to various facilities; both waste management facilities, we have gone to quite a few waste management facilities in North America, and also through various exchanges either some of our nuclear power reactor staff or the waste facility staff will go to other reactors as well

and take a look at some of their practices and try to learn from them.

We recently visited Diablo Canyon in the States that is very well-known for having very low generation rates, to try to understand what they are doing.

MEMBER VELSHI: Thank you.

And on the used fuel?

MR. BEVACQUA: Val Bevacqua, for the record.

As you are aware due to the unique Canadian design of CANDU using natural uranium compared to the American and international reactors using rich uranium, we process much more fuel. And as a comparison, over 2,000 dry storage containers we have completed at OPG is greater than the entire U.S. fleet combined.

However, there are CANDUs and we are communicating with Point Lepreau, we will be benchmarking with Point Lepreau with their program. And we do speak to Chalk River as well, their process is significantly different from ours, that there wasn't a lot of value in benchmarking.

But due to our sheer volume we are fundamentally the industry leaders here and we look for opportunities when they are available, but those numbers I think will provide you with a comparison of us to the

balance of the international and U.S. fleets.

MEMBER VELSHI: And just on the waste, where does cobalt-60 waste fit in? Is that part of your intermediate-level waste or is it high-level?

MS SWAMI: Laurie Swami, for the record.

So the difference between intermediate-level waste and high-level waste in this context is whether it is heat generating or not. The cobalt-60 that we use looks similar to a fuel bundle and so is processed that way.

MEMBER VELSHI: So it will be reflected in sort of the fuel bundle numbers?

MR. BEVACQUA: Val Bevacqua, for the record.

At this time the only thing contained in dry storage container is used fuel. All the current cobalt-60 is still maintained in the wet bays at the reactor sites.

MEMBER VELSHI: So, again, I think to get a full picture of how much waste is there -- again, this is probably a comment more for staff because they probably have the information -- and similarly with tritium that comes out from the TRF, is that seen as a waste and how do we track that inventory?

MS SWAMI: Laurie Swami, for the record.

I can speak at least to the tritium. From the tritium removal facility we capture tritium on our -- I can't remember the words, I can remember the acronym -- more or less, we capture the tritium, we consider that to be a value to us as an opportunity for sales.

So at this point in time we consider it to be an asset and not a waste stream.

THE PRESIDENT: Okay. I have been sitting here patiently listening to all of this, because this is one of the mysteries, is I have been listening now for years from both proponent and Staff and the international, so please, please, clear me up. Is there a good practical definition of waste?

The Europeans have very low waste, we get low and intermediate. All of it's done because of legislation that defines fuel. So you are now talking about fuel rather than high-level waste? High-level waste can be no-fuel also.

So we need to clear this up once and for all. I am not -- I am just ranting here, not commenting to everybody. I know I have already asked Staff to get some clarity on how we are going to define waste, not by function, but by some physical measure.

You mention heat, you mention -- in your table you have a total stored activity in TBq. You know,

why is that a good measure? And if you are ever going to build a DGR and the trucks come in, how will you know that that is -- which waste is it; low, intermediate, et cetera, in a practical measurable easy way?

So operationally, you can actually determine where does it go. So anybody want to comment on this?

Staff, you want to start?

DR. NEWLAND: Dave Newland, for the record.

So I will kick things off. I think there are a number of ways of categorizing the different types of waste. And I think everybody recognizes that different countries do it differently.

The Agency is currently re-examining what is the best way of categorizing.

So I don't know whether any of Staff want to comment further.

MS GLENN: Karine Glenn, for the record.

There is a CSA standard that provides guidance. And with respect to what the President said, there is some numerical guidance involving contact dose rate and heat generation. That is CSA Standard 292.0-2014 in the annex provides some guidance with respect to that.

With respect to very low-level waste in

Canada, we consider it to be a subset of low-level waste. And so it is brought into that general categorization.

THE PRESIDENT: I really am looking for some practical way if there is a piece of, you know, any particular material that came either from decommissioning, that you can look at this construction material, pipe material, et cetera, and look at it and easily measure and determine whether it is low, intermediate, high.

And I just don't see anybody giving me an operationally easy definition.

MS SWAMI: Laurie Swami for the record.

Ms Morton is going to give you a little bit more of the practical side. However, we do have clear definitions based on dose rates coming from the various materials, so it is very clear to us. We have maintained waste logs of what this material is.

And there are many other documents where we know what the waste is, what the dose rates are and whether it is categorized as low-level waste or intermediate-level waste. And we handle that on a routine basis.

Ms Morton will give you a bit more of the specifics of the practicality of that.

MS MORTON: Lise Morton, for the record.

First, I will reiterate exactly what Ms

Glenn said, which is that OPG's use of the terms low, intermediate and high are consistent with CSA 292, I concur with that as well.

From a practical perspective we have a waste acceptance criteria document with our waste generators. And the waste acceptance criteria document clearly outlines what is low-level waste definition, what is an intermediate-level waste definition, what the typical waste types would be that would fall into those categories.

There is also accompanying the waste acceptance criteria document a waste container catalogue that very specifically identifies what the approved containers are for various waste types and what waste types can go in those containers.

Part of the integral part as well of shipping waste to us is that you then obviously have to follow transportation regulations. And that, by its very nature, is going to necessitate things, as Ms Swami indicated, such as obviously dose rate verification, meeting the regulations, you need to know if you are going in a Type A package or a Type B package, to some extent that is going to tell you if it is low or intermediate-level waste as well.

So there is a characterization that has to happen as per our approved procedures at the station end,

at the waste generator end, in order to meet both transportation regulations and our waste acceptance criteria.

So by the time it shows up at our waste site, we already know how that shipment has been categorized, we have the manifest that comes with it. So we know what we are loading off the trucks, for example, and we certainly know that something has been shipped, for example, in a Type B package and that that is intermediate-level waste.

There is very significant differences in the transportation packages used for the two. So I would say there are quite a few practical means by which, when it shows up at our door, we know what it is that we are getting.

THE PRESIDENT: But that is a very good example. So let me -- I don't want to belabour this here, this is not the time. But, okay, so you have a package and the surface dose is acceptable, but the inside may not be.

So you take this waste and with the package you can bury it just as an aside or do you have to know what is inside?

MS MORTON: Lise Morton, for the record.

I will try to answer that, I hope I do an appropriate job on it.

There is also requirements in the waste acceptance criteria though in terms of what shielding can be applied to packages, et cetera.

So, for example, in the case of a low-level waste bin, you know, you need to meet certain contact dose rates, but there is also requirements in terms of how much shielding and where you are going to put the shielding to ensure that you don't have things shifting during transportation and you don't have a hot particle somewhere in the middle.

I think that is what you are kind of asking, but I don't know if I am digressing. I apologize.

THE PRESIDENT: Okay, I will leave it at this for now.

I am back to Monsieur Harvey.

MEMBER HARVEY: Merci.

On page 36 of the Staff document:

> "Airborne releases from various facility stacks, including the incinerator are sampled weekly and analyzed for radioactive substance and particulates." (As Read)

Is this to say that if something goes wrong and there is a sudden and important release to the atmosphere that we would miss that and we wouldn't have

information about the importance of the event and the potential impacts?

Staff? Who wants to answer?

MS MORTON: Lise Morton, for the record.

So we develop the requirements for our stack monitoring in compliance with an internal document and standard OP-0031, but that is also I believe based on a CSA standard. And I apologize, that is not coming top of mind.

That end standard requires you to do MPER calculations, maximum permissible emission rate calculations. So in other words, you are structuring your sampling program based on the maximum possible emission you could emit.

Based on that, a weekly sample frequency is appropriate for these waste streams. And so, for example, in the case of the incinerator, one of the things that we do in practicality to ensure that you are not meeting emission limits is that you control the source term going into the incinerator.

So again, the waste acceptance criteria has requirements in terms of what waste from a dose rate and contamination perspective can even go into the incinerator in the first place. So that by controlling the source term you are also controlling, to some extent, the

emissions that can come out of that.

But again, all of this is calculated and based on a standard, an internal standard.

MEMBER HARVEY: But I understand if the incinerator is working properly that might be okay and very good, but if there is a real problem, does your meter take into consideration a problem, a malfunction of the incinerator?

MS MORTON: Lise Morton, for the record.

The incinerator is licensed under two licences or permits, if you will; the Canadian Nuclear Safety Commission licence obviously, and also the Ministry of Environment, Environmental Compliance Approval.

The Ministry of Environment ECA requires real-time monitoring of various parameters that would give you a much more rapid indication of any kind of combustion concern.

So, for example, you have real-time opacity monitoring, you have real-time CO2 and oxygen monitoring. So from the environmental compliance perspective and the Ministry of the Environment and the conventional contaminant monitoring in that stream, you know very quickly if you have an upset in the incinerator. You can then go back and verify, you can immediately take filter samples.

So, for example, our procedures would say that if we ever had an opacity exceedance, we would immediately go take the particulate filter samples and verify the radioactivity.

MEMBER HARVEY: At the moment you have the continuous monitoring, I agree that you have got -- I didn't know that -- well, it is impossible to know it just reading that sentence there. So something might be missing and...

Anyway, thank you.

THE PRESIDENT: Monsieur Tolgyesi?

MEMBER TOLGYESI: The OPG, on your waste management part, you are talking about pilot projects which present opportunities for processing, volume reduction, and external market. Okay, these are potential improvements.

However, there is no mention of these opportunities in the future improvements, which is the next part.

Does it mean that these projects, they don't demonstrate any potential or what is the reason?

MS SWAMI: Laurie Swami, for the record.

No, actually these pilots did show that there was good potential opportunities, the waste sorting project as an example. We were able to divert a large amount of the waste for other streams. We are still

looking at opportunities with some of our large metal components, looking for opportunities to send that for recycling or reprocessing in some way that it could be reused.

So we have identified a large number of opportunities and we continue to pursue those as part of our ongoing operations.

MEMBER TOLGYESI: But you didn't mention them in the future improvements. Oh, it is on page 53, OPG. Yes, page 53, "The result of phase management and future improvements and..."

MS SWAMI: Laurie Swami, for the record.

I see your point. I think that the future improvements was really a short paragraph just exploring that we were going to continue with those things. So I take your point, thank you.

MEMBER McEWAN: (off microphone) really helpful part of the OPG report was the diagram on page 71 explaining the process for used dry fuel storage.

What I would be interested in understanding is in Panel 7 you talk about water spray decontamination. And in multiple other panels you have clear processes that involve one or two or three different actions.

What sort of quality assurance processes

do you put in place in each of those? How are those documented? And from Staff's point of view, are they auditable, that there has been a clear delineation of process steps that can be measured?

MR. BEVACQUA: Val Bevacqua, for the record.

In Panel 7 the demonstration is water spray decontamination. It is an illustration of the dry storage container; once it is lifted out of the wet bay water there are sprays that spray the dry storage container. It is still over the fuel pond. And the idea here is for that water to remove any possible surface contamination and have it come back down into the wet bay.

After that step the dry storage container is moved onto the concrete beside the bay. And our nuclear waste operators will then perform Maslin checks of the dry storage container as per our approved radiation procedures. The dry storage container isn't going to leave Zone 3 to go to our processing facility, so we have standard procedures throughout our nuclear fleet for anything that leaves a Zone 3 to the un-zoned area. So we will follow those procedures.

In this case we will use Maslins which are a form of -- almost like a large J-cloth is the best way I can describe it. They will -- could be wiped down. It's a

very manpower intensive process, but we will wipe down the entire dry storage container and then we will then perform contamination surveys on those Maslins to check for -- so this is what we call an indirect survey and that we will do direct surveying of the dry storage container itself prior to allowing it to leave Zone 3.

This is standard procedure for anything that would leave Zone 3, not just a dry storage container, so we follow our basic program for removing the dry storage container from Zone 3.

DR. NEWLAND: Dave Newland, for the record.

So just to kick it up a level, when we look at compliance we look at the overarching management system and how that contributes to the safety of each of these processes. I will have Ms Draper talk specifically about the aspects related to the DSCs.

MS DRAPER: Shona Draper, for the record.

From an audit point of view, OPG has what's called a history docket for each dry storage container and when CNSC staff are onsite conducting compliance inspections, we take a sampling of these history dockets and review them for completeness. And also, in previous inspections CNSC staff have witnessed the loading of dry storage containers.

THE PRESIDENT: So I also found this diagram really interesting. My question is, do you have it in animation?

Do you have kind of -- you know, people don't realize what is involved and we are always looking for dissemination of information and this particular process, I think, would be a really nice thing to follow through from -- you know, right throughout even from the pool into a dry storage, so we can understand what's involved in here.

MR. BEVACQUA: It's Val Bevacqua, for the record.

So thank you for the suggestion. We do not at this time have an animation. One of the things, though, I can say we are considering is having myself or Laurie follow the staff around with a GoPro and creating a video that we could share with our staff and with the public so that explains our entire process from the loading of the fuel through the welding, through the full processing and the storage.

So it is one of the things we are considering with our public affairs department right now, but -- so we weren't considering an animation, but we are considering different ways of showing people how we do our work. We also have, as we mentioned, have had over 167

tours and very many people, parts of the public, both locally and internationally, have witnessed our process not in the bay, but the processing building and the storage building we welcome people to come and watch at any time.

THE PRESIDENT: Thank you.

MR. JAMMAL: Mr. President, it's Ramzi Jammal.

Dr. McEwan asked a question from a regulatory perspective. OPG has to submit to us the program with respect to the handling of the waste in addition to the compliance activity. So we start with the verification of the program. It's submitted to us in support of the license.

In addition to it, the procedure that is required for DSC, in addition to the radiation safety element they must meet the transport requirement onsite. So in other words, anything that is going to leave the proponent, call it Zone 3, as its going out from a potentially contaminated area they must follow very strict procedures with respect to ensuring there is no loose contamination and if there is any fixed contamination it is not going to pose any risk to the workers and the public.

So we start from the programmatic review. We approve it and then we hold them accountable to it through the compliance activity in order to ensure that

they are meeting all the requirements, onsite transport and the radiation safety element.

THE PRESIDENT: Thank you.

Ms Velshi...?

MEMBER VELSHI: Something I have omitted saying in my last round was I did want to compliment you on your excellent performance and in particular your really truly enviable conventional safety record.

Something I didn't see in either the staff or OPG's report and I may have missed is active liquid waste. From a process perspective there is talk of incineration and compaction, but does liquid get solidified as well? Is that the preferred way of handling the waste, or not necessarily?

MS MORTON: Lise Morton, for the record.

Yes. So some active liquid wastes generated in the stations do get solidified. And again, the waste acceptance criteria is very specific in terms of the solidification agents that are approved. There is one liquid form that is incinerated and that is waste oils.

So we do inject waste oils into the secondary chamber of our incinerator, but the majority of active liquid wastes that you would see generated in the stations are solidified.

THE PRESIDENT: Monsieur Harvey...?

MEMBER HARVEY: Refer to 7 of 9 of the OPG's written document, this is about the flange, the DSC base flange eliminations. OPG first identified a used fuel DSC base flange apparent elimination issue in 2010, but after that you made another study and during subsequent investigation the base material was analysed. It was found that both results had been overly conservative. So each time I see "overly conservative", it catches my attention.

So what is the difference and what has been different to say that overly conservative for the first observation?

MR. BEVACQUA: It's Val Bevacqua, for the record.

When the issue was first discovered it was discovered using our phased array ultrasonic testing. While we were examining the weld, these apparent laminations appeared on the analysis. So what we did at the time, we treated them as inclusions and we repaired them by grinding out the inclusion and re-welding it and then we would read use of phased array ultrasonic testing, verify that it met all criteria prior to processing.

However, what was noted in those investigations by the maintainers that were doing the work is that when they got to the locations they didn't find large inclusions that the phased ultrasonic array testing

was showing. So we entered into a program where we looked at the base material being supplied by the mills to our suppliers. We actually went through a process where we sliced them into very, very small sections to look and verify how large these inclusions could be. From that we used it to develop a new procedure that would identify these apparent laminations and of course that bound them in size and in that new procedure above a certain size we would perform a repair and below a certain size it would be acceptable to continue to process.

So it was through that four-year process of learning and understanding what we were seeing that we developed the new procedures and of course actual -- you know, looking at the repairs by going in and looking at the laminations and analysing the base material in a lab, slicing it in very small thin strips where what appeared on phased ultrasonic testing we could actually visually view with our eye to help develop this criteria for the new procedure.

I hope that answers the question.

MEMBER HARVEY: No, that's fine, thank you. How many containers had such a problem?

MR. BEVACQUA: I'm sorry, but I don't have the actual number of the ones with the apparent elimination and how many repairs at my fingertips, but we would be able

to provide that in short order.

MEMBER HARVEY: I don't want the exact number, but was it a small percentage?

MR. BEVACQUA: I would say that it was less than 10 percent easily, but I am guessing so I want to qualify that. But it was not a large number that was a concern for production at the time.

MEMBER HARVEY: Okay, thank you.

DR. NEWLAND: Dave Newland, for the record.

I think Dr. Jin has the answer to that.

DR. JIN: I am Dr. John Jin, for the record.

I am the Director of the Operational Engineering Assessment Division. Based on information we reviewed, the OPG found lamination in the 18 containers, 10 from Pickering and eight from Darlington.

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

Monsieur Harvey, just I would like to make one clarification. I do not want to leave this loop open.

They are not authorized to transport or use any container that has any damage to it, so we review the process with respect to what is required as a repair and then they are not authorized to use it, nor to

transport it, nor to move it if it does not meet our criteria. So if there is any damage that container is put aside until it is repaired and then they use another container that meets our requirement. So to close the loop, the proponent described the process, but the process is approved by our transport specialist and our specialist in order to ensure that the damages very minimal or not in effect at all with respect to the container's integrity.

But if there is any damage that does not meet our requirement to the container, it's not going anywhere.

MEMBER HARVEY: I thought that some of those containers were already full of a bundle. It was not necessarily empty containers that were found with problems. Is that the case or --

MR. GARG: Sorry, this is Raj Gard, the transport specialist here at the CNSC.

To respond to you, there were some containers which could be used for storage purposes, but not for transport purposes. So yes, there are some containers they are still using for storage only and they were justified and the CNSC has reviewed the justification, that a fair process and other loadings and all, but not necessarily they have been approved for transport purposes.

MEMBER HARVEY: Okay.

THE PRESIDENT: Well, maybe now is the time to ask, so what is the life of the DCS -- or a DSC, sorry. I know that people talk about 50 years, more than 50 years, 100 years, what is the projected life of -- you have some of them now that's getting pretty old.

MR. GARG: Raj Garg from the CNSC, from the Transport.

The typical life is 50 years, but the OPG's plan requires them to operate and maintain on a regular basis so they will be inspecting on a regular basis before they can be transported. They cannot be transported until they are maintained. At the time of shipment they have to meet the transport regulations, requirements, all the requirements for quality assurance of the maintenance and everything.

So right now they are predicted for 50 years, but at the time of shipment it has to be maintained at the same level.

THE PRESIDENT: I'm not worried about the transport. I'm talking about inside the warehouses. How long can they stay?

Let me put it this way, how long -- Mr. Jamal, sit down, I don't need you to -- what I'm looking for is when do you need to actually replace a DSC?

MS SWAMI: Laurie Swami, for the record.

And we have heard various people talk about a 50 year life and what we have in place is lifecycle management plan that looks at inspection programs over time and at this time we are not seeing degradation of the dry storage containers and we would anticipate that these are going to last for a considerable length of time beyond 50 years. But we will confirm that through our ongoing program of inspection and maintenance and with the intent of making sure that we don't have any degradation of the dry storage containers.

THE PRESIDENT: So, so far you didn't have to actually replace a DSC?

MS SWAMI: Laurie Swami, for the record.

That's correct, our DSC's are in very good shape and we don't anticipate that we would need to replace any of them.

THE PRESIDENT: Thank you.

Mr. Tolgyesi...?

MEMBER TOLGYESI: I have two comments, Mr. President.

One is, in the staff presentation, slide five, although it doesn't touch nuclear power plants, it should be a little clarification there, radioactive waste facilities areas. On the left-hand side you have uranium mines and tailings sites, active and inactive. And

inactive you mention Key Lake and Rabbit Lake and in active you mention key Lake and Rabbit Lake. Maybe there should be kind of specifications that it's a mine or a mill or which actually is that because it's confusing.

And my second comment is on OPG page 44 where we are talking about radiological waterborne emissions and the radiological airborne emissions. You are saying that in order to be more representative of loss of integrity events, action levels and derived release limits were revised and increased threefold in the case of radiological waterborne emissions.

In the case of airborne emissions there was some increase and decrease. These increases give a perception that they increased because of your inability to control, in the public perception could be seen, and although you were well below regulatory limits. So probably it will be useful to include regulatory limits which are not changed, okay.

Although you changed your release limits, direct release limits and action levels regulatory limits did not change. So probably it would be useful to put them in these tables, just to clarify and make sure that the perception is not because you do something worse, but limits did not change and you are well below limits. So that's it.

THE PRESIDENT: Thank you.

Dr. McEwan...?

MEMBER MCEWAN: Thank you, Mr. President.

One of the things that has occurred to me as we have been talking about this and records in historical records is this facility I think has been going since 1974, or the voice management process. How do you ensure that your documentary records and your documentary evidence is sustained over that period of time? We are now, what, 40 years and we are going to be going for a long period of time forward.

If you need to go back and reference record from '79 or '82 can you do that? Could staff actually access it and audit it as well if they wanted to show some continuity of -- process continuity of care?

DR. NEWLAND: Dave Newland, for the record.

Under the *Regulations* licensees are expected to keep and maintain all relevant records irrespective of the period of time. We go in on a regular basis and ensure that such records are maintained. I will leave it there.

MS MORTON: Lise Morton, for the record. Thank you for the question.

So as I think you can surmise of course,

when we started operation in 1974 and for the first many years record keeping would have been paper-based. There was an exercise that I'm pleased to say even predates me, but there was an exercise at some point in time to convert those paper records into electronic systems. I don't know the exact time frame. I would have to go back in history as to when that was done.

We also had several evolutions over the years where we then went in for example into all of our trenches in 2006 and documented again and confirmed what the original paper records said for all the trench contents and took the visual pictures of trench contents as well so we had another record of that. So as we move forward of course everything is electronic now and just to add to what the CNSC staff have indicated.

So what is very typical we find during a CNSC inspection is that CNSC staff will randomly select a bin in a building and they will ask us for the history docket on that particular bin. That has become almost a regular part of the inspection, and we then have to go into our electronic system and show the inspectors the whole history docket on that.

And I believe our engineering group is actually now looking at the next evolution of what that waste tracking system will be because, of course, software

changes.

MEMBER MCEWAN: So it's possible to very confidently link an electronic record to a specific bin or a specific storage unit?

MS MORTON: Lise Morton, for the record.

Yes, that's correct. So for example all of the bins in the low-level storage buildings, they each have a barcode applied to them. that barcode then relates back to, again, our electronic system and, as any new waste is put into the building, a new barcode is applied, et cetera, that is a unique indicator of that particular bin. And you can also go back in the system and find out where that waste originated. For example, did it come from the Pickering station, what year did we receive it, what grid is it placed in in the building, et cetera.

THE PRESIDENT: Thank you. Ms Velshi...?

MEMBER VELSHI: Same question for both staff and OPG. What do you see as sort of the top three challenges or priorities for managing waste at these three facilities?

--- Pause

MEMBER VELSHI: Staff first.

DR. NEWLAND: Thank you. So maybe I will answer the question in a slightly different way.

I think that the key challenge not

specifically for the facilities but for the industry is to look for final solutions; that is, disposal. We do have some -- one solution in terms of DGR, but that is just one solution.

There is the APM solution for fuel, but that's only a part of the overall waste stream. So we see the challenge of getting to disposal as being the most important.

Perhaps the other one that I would highlight is appropriate use of the three “R”s and in particular the use of recycling.

The third one would be knowledge retention. It's important as we go forward, especially with the demographics of the nuclear industry as it is that knowledge be captured so that it can be passed to the next generation of engineers and so forth, and those kinds of matters become particularly important as you go to disposal facilities such as DGR and APM.

Thank you.

THE PRESIDENT: OPG didn't get a chance here.

MEMBER VELSHI: No, they will. They will.

--- Laughter / Rires

MEMBER VELSHI: You know, I mean I accept your first round because that was a given, so you have kind

of copped out in not giving me a third one.

But it was on the three Rs and the comment around recycling. And if it is a priority, how do we drive that? Is this something you measure to see how much stuff gets recycled or are you even thinking along those lines? It's a behaviour. How do you drive that if you're not measuring it?

DR. NEWLAND: Dave Newland, for the record.

So I think that staff is working on new waste regulations and guidance that will go along and support those regulations. That is something that we could build into that in a more constructive fashion than perhaps what we have considered to date. And I take your comment that I got two out of three.

MEMBER VELSHI: OPG.

MS SWAMI: I will take one of his.

--- Laughter / Rires

MEMBER VELSHI: You can take four of his but, yeah, okay.

MS SWAMI: So I think perhaps a little different then Dr. Newland, I think our highest priority when we look at the management of our facilities is ensuring that we are managing our fire solutions. We have obviously a fairly extensive process and program on fire

protection in our facilities and that is one of the risks that we see as requiring our focus and attention on a day-to-day basis. So I guess I would look at that as, what do you do day-to-day?

A little bit longer term, I would go to our human performance program. The work that we do in nuclear waste is fairly routine and so we need to ensure we have as many defences as we possibly can put in place to ensure that our employees are engaged and able to perform the work that they are tasked to do. Very important for us and very important for them as well. So, you know, I would like to take four instead of the three.

The next one, a little different I would say is an important aspect of our work is public support. We recognize that there is an issue that we are faced with in terms of managing our waste materials over thousands of years as opposed to short periods of time. We have long programs, we have a lot of work that we do very effectively, but we need to be able to communicate that to people. They need to understand what we are doing. They need to feel confident and comfortable that the programs we have put in place are effective.

And so when we talked a little bit about our 167 tours, that's really important to us so they can actually see what we are doing, as opposed to just seeing a

piece of paper that's not animated in a document. So that outreach to the public I would say is critical. And included in that outreach to the public is obviously First Nation and Métis communities I would consider in that.

For my fourth -- I kind of added to my words so I could maybe say I had five -- I think that we touched on the three Rs as an important aspect. I think, you know, you mentioned that sort of normal practice, if you will, but I think it's really looking to are there other innovative solutions? So it's not just the normal three Rs that we are talking about, but are you looking out to see if there's new techniques, something new on the horizon that we could look to as a way of either minimizing or eliminating the waste itself? That, you know, is obviously not an immediate term work program, but it would be something that we would be looking to in the research and development side of our business as opposed to the day-to-day operations.

THE PRESIDENT: Well, maybe OPG can find a clever way to recycle steam generators.

You don't have to answer.

MEMBER VELSHI: So on that innovation, is there any collaboration at an international level for R&D in this area? Or even at ground level?

MS SWAMI: Laurie Swami, for the record.

So there is a certain amount of R&D done in this area. We are looking now through work, through COG, through the Candu Owners Group to develop a little bit more structure around an R&D program for waste and of course that would expand out into the full international level. Working with -- I'm going to say AECL, CNL -- they do some work in this area and we are working collaboratively with them to set up -- and Ms Morton is involved in the early work of setting up a COG workshop in this area so that we can look at the issue and determine what else we need to do to expand, if you will, or to focus our attention in the areas that are most important to us.

So it is something that sort of on the horizon and coming. We are not fully fleshed out on that program yet, but it is certainly something we are very interested in pursuing.

MEMBER VELSHI: Thank you.

THE PRESIDENT: Okay next round. Monsieur Harvey...? Mr. Tolgyesi...? Dr. McEwan...?

MEMBER McEWAN: No.

THE PRESIDENT: I have a couple of quickies here. First of all, all reportable incidents that were mentioned in both slides, they are all published on the web, understood? I'm just trying to verify.

--- Pause

MS SWAMI: Laurie Swami, for the record.

So we have just started publishing our reportable events so why I'm not answering quickly is I'm not sure if we have just got the ones that are sort of for this year versus the ones that we talked about, the 21 that we were talking about overall.

THE PRESIDENT: I was thinking about the length of the license, the last five -- the last -- we are examining here an interim period.

MS SWAMI: Laurie Swami, for the record.

We saw that as an improvement to our program, but it is certainly something that we would be very comfortable to do, so I take your suggestion here.

THE PRESIDENT: The other question is somewhere, is in the ground water. You know, I never did understand, what was the original cause for the elevated levels? I don't understand what was the cause, the root cause?

And where did this contamination come from and whether you have been monitoring its movement? Hopefully by the time it reaches the lake it will be of no environmental impact significance. So can you shed some light on that?

DR. NEWLAND: Dave Newland, for the record.

Perhaps either Dr. Lei or Dr. Mihok could respond to that, please.

MR. McALLISTER: Good evening, it's Andrew McAllister, Director for the Environmental Risk Assessment Division. I will just hit some high level points and then Dr. Mihok or Dr. Shizhong Lei can fill in some of the details.

But with respect to environmental impacts, as you mentioned, first of all we need to be mindful that there is a very intense monitoring on this particular well relative to the other monitoring wells. As is mentioned, it's every two weeks. Further, there has been a number of studies that have been undertaken in the area so we have a very good understanding of the hydrogeology and the hydrology in the area. Thirdly, in light of that knowledge in light of how we know if tritium behaviour and movement.

It is CNSC's staff's opinion that there are no risks to the environment or to the human health. For example, there is no drinking water wells in that vicinity or in the groundwater flow path and, further, we would expect that the tritium levels in the receiving water body such as Lake Huron would be minimal at best. Though we are here talking about the Western Waste Management Facility, we have to keep in mind that this is a broader area. There was other nuclear facilities in the area.

There is a lot of monitoring that goes on. There have been various environmental assessments and nothing has indicated elevated levels of risk to biota, for example, in Lake Huron.

THE PRESIDENT: Right. I'm just looking for what was the original source of this contamination. Go ahead.

MS MORTON: Lise Morton, for the record.

So what we have concluded that the source is is the waste in the low-level storage buildings, some of which will be wetted, slightly wetted waste or there may be vapour, so there is an exchange process that's happening in the low-level storage buildings, a condensation of the tritium vapour from those bins making it down through the electrical conduits into an electrical manhole that then has a connection to the mid sand aquifer. That's what the latest groundwater -- sorry, modelling has been able to confirm for us.

THE PRESIDENT: So is it cumulative? I mean why would it start being reduced? Did you plug it? What did you do?

MS MORTON: Lise Morton, for the record.

So we did, yes. Once we started confirming that we believe that was the pathway -- what we always struggled with all the years was what the pathway

was. Once we found that pathway, then we have sealed all building sumps, we have sealed all accessible conduits in the floor and so -- sorry, I have lost track of the beginning of the question. I apologize.

THE PRESIDENT: So you plugged everything and there is a reduction in the volume and the plume -- you're not worried of the plume getting into the river -- into the lake?

MS MORTON: So Lise Morton, for the record. I apologize, yes.

So we have sealed everything that we can access. As you can understand, the buildings are full so there are probably some other penetrations that we will seal as we go through some projects in the future.

But, yes, so we believe that we have addressed the source. We are seeing a reduction. We continue to monitor, though, very closely. As CNSC staff have indicated, we still do biweekly sampling of that well.

In terms of the lake, I believe again CNSC staff has identified that. We understand the discharge path of that mid sand aquifer and we monitor all along that discharge path into the drainage ditch and we are not seeing elevated tritium levels in that drainage ditch.

THE PRESIDENT: Two quickies again. You kept talking about -- I think this was a surprise -- in

both slide presentations you highlight the protected areas. I was under the impression the security, you know, the Bruce security cover the whole territory. Is that not true? You know those, what do you call it, nuclear units, NRF, nuclear response force, do they not cover the whole facility?

MS GLENN: Karine Glenn, for the record.

Yves Poirier, Nuclear Safety Advisor at the CNSC will answer that question.

THE PRESIDENT: Okay.

MR. POIRIER: The short answer is yes. There is a nuclear response force at all three of the facilities we talked about it because there are -- but to extend it a little bit, there is a protected area that's defined for the waste facility, so there is a specific protected area for the waste facility inside of the Bruce facility for example, so the control there is the property, all of the gruesome facility. And you have a protected area around Bruce A, around Bruce B and around Western Waste.

THE PRESIDENT: So what does it mean? What's the additional -- I'm trying to understand because they were talking about something about, you know, theft of material, et cetera. Is a protected area more secure than the whole facility?

MR. POIRIER: That's correct. They meet the *Nuclear Security Regulations*, the waste facilities are described as a high security site and they have to meet all of the requirements of the *Nuclear Security Regulations* for those sites.

THE PRESIDENT: So is there any waste material outside a secure area that one can use, you know, try to acquire?

MR. POIRIER: The material inside the protected area is the high -- is described as a high level.

THE PRESIDENT: But intermediate, he can cause at least a lot of damage with intermediate. No?

MR. POIRIER: I will let OPG answer that question, but there is no securities significance to the material that's outside of the protected area. The licensee is required to conduct a threat risk assessment, so they have done that exercise on an annual basis and they continue to do so.

THE PRESIDENT: Okay, I'll take it like this. Anybody have any other question? Okay. Thank you. Thank you very much.

--- Pause

THE PRESIDENT: You can sit in front here, you don't have to wait.

CMD 15-M23/15-M23.1/15-M23.1A

Oral presentation by CNSC staff

THE PRESIDENT: So the next item on the agenda is an update on the incident involving the loss of control of a CNSC sealed source as outlined in CMD 15-M23, 15-M23.1 and 15-M23.1A and I understand that Dr. Thompson will make a presentation. Over to you.

M. RÉGIMBALD : Bonsoir, Monsieur le Président et membres de la Commission. Je m'appelle André Régimbald. Je suis le directeur général de la Direction de la réglementation des substances nucléaires.

Je voudrais vous présenter mes collègues :

- tout d'abord, Mme Patsy Thompson, directrice générale de la Direction de l'évaluation et de la protection environnementales et radiologiques;

- ainsi que le personnel de nos directions respectives, en commençant par la direction de Mme Thompson : Ms Kiza Francis, Acting Director of the Environmental Compliance and Laboratory Services;

- from the Directorate of Nuclear Substance Regulation: Mr. Peter Fundarek, Director of Nuclear Substance and Radiation Device Licensing Division; Mr. Henry Rabski, Director of the Operations Inspection Division.

There are other CNSC staff available to answer questions as appropriate.

I will turn it over now to Dr. Thompson to introduce the CMD and make the presentation.

Dr THOMPSON : Bonsoir, Monsieur le Président, Madame et Messieurs les Commissaires. Mon nom est Patsy Thompson. Je suis la directrice générale responsable du Laboratoire et du Permis consolidé de la CCSN pour l'utilisation de substances nucléaires.

We are presenting you with an update on the verbal report of November 5, 2014 regarding the loss of control of a sealed source. The sealed source had been recovered the previous day, which was November 4, 2014, and we reported that there was no impact on public health or the environment. Today we will provide you with a brief overview of the CNSC laboratory, a description of the lost source event, along with the corrective actions that have been put in place since this event.

To begin I would like to provide you with an overview of the CNSC laboratory. We are currently located on Limebank Road in Ottawa which is on the west side of the airport. We lease the space in the building from Natural Resources Canada who occupies the other half of the building. The CNSC laboratory was moved to this location in 2010 and after extensive renovations the staff

moved to that location at the end of the year. There are currently 10 staff at the lab, including the Chief Analyst who was appointed in 2014 in April and the Chief Analyst is also the supervisor of the laboratory.

The modernized laboratory substantially enhances the CNSC's capability to verify licensing compliance programs such as radiation protection, environmental protection, safeguards and emergency preparedness. A more rigorous radiation detection calibration program means that CNSC inspectors are better equipped. Ultimately the new laboratory means enhanced protection for nuclear energy workers, the public and the environment.

The laboratory has two main service lines providing calibration services for CNSC inspectors and staff and analytical services for CNSC staff as well and inspectors. The laboratory is currently in the process of obtaining accreditation to the ISO 17025 for the gamma calibration services, with accreditation of the rest of the calibration services and then analytical services to follow.

The laboratory also participates in proficiency testing exercises provided by the International Atomic Energy Agency, the National Research Council of Canada and other service providers. The laboratory has

achieved passing results for both radiological and non-radiological analysis and continuously scored as one of the top performing labs. This provides confidence in the laboratory results. To provide these services, the laboratory has two(2) CNSC licences, a consolidated uses of nuclear substances licence and a Class II facility licence for the gamma irradiator facility.

I would like to note at this time that we are here today discussing an event that occurred under the consolidated uses licence. Regulation of the licences is done by the Directorate of Nuclear Substances Regulation and that Directorate is in the Regulatory Operations Branch and the CNSC Laboratory resides in the Technical Support Branch. Featured in this slide is Laboratory Senior Analyst, Dr. Pujing Pan, and he is placing a calibration sample into a high resolution gamma spectroscopy detector.

This slide provides a visual representation of the services that the laboratory provides to the CNSC. As noted on a previous slide, the two main service lines are sample analysis and calibration services. Under sample analysis, the laboratory provides the results of the analysis of the samples that are taken from the independent environmental monitoring program, as well as those taken during inspections at licensee facilities by CNSC inspectors. The CNSC laboratory also participates in

the nuclear forensic capability development under the Canadian Safety and Security Program.

The CNSC laboratory provides the calibration services for all the radiation instrumentation used by CNSC staff, including inspectors at nuclear power plants and those in regional offices. Both the sample analysis and radiation instrumentation calibration services require the use of radioactive substances and devices. The laboratory also has an inventory of sealed sources that are used both at the lab and loaned out to internal permit holders for use outside of the laboratory. The inventory of sealed sources is quite large. There are currently over 500 sealed sources at the laboratory.

In order to use nuclear substances or radiation devices at the CNSC lab or elsewhere by CNSC staff, the CNSC has a consolidated uses licence issued by DNSR. Under this licence there is a robust radiation safety program. This program has its own internal permit system to ensure the use of radioactive substances is done in a safe and controlled manner.

There are currently two internal permit holders under the consolidated uses licence, the laboratory itself and the Emergency Management Programs Division, or EMPD, who borrow sources for training of first responders within Canada for radiological emergencies.

The event being discussed today occurred as a result of one of these off-site training sessions delivered by EMPD staff. EMPD was issued their internal permit in August 2013 after the internal permit system was established. Since receiving their internal permit, EMPD has submitted nine requests for sources for training purposes. Each training activity usually involves the use of more than one source. Those nine requests resulted in 140 sources borrowed from the laboratory. Each radioactive source request required a review by the Radiation Safety Officer to ensure compliance with the licence and the authorized users permit and associated documentation and procedures, which includes shipping, receiving, verification and storage. The source inventory database also had to be updated at each step of this process.

The event related to the source missing was initially reported verbally to the Commission on November 5, 2014. The previous day, on November 4, 2014, an EMPD staff member opened the package in Vancouver as he was preparing to deliver a training exercise. Upon realizing that the package was empty, the individual immediately contacted the CNSC lab administrator to review the source database to determine where the source had last been used. The laboratory determined that the source was previously loaned to EMPD on August 19, 2014 and it was

listed as having been returned to the lab on August 26, 2014.

Nonetheless, the EMPD staff member contacted his division to determine where the source might have been used during the August time period and advised the EMPD Director of the missing source.

After having determined that the source had been used at the Canadian Police College, in Ottawa, the EMPD staff member immediately contacted one of the instructors at the College and requested that they verify using a survey meter if a source had been left behind.

The Canadian Police College instructor phoned back within five minutes and confirmed that the source was where it was left, and that was at the base of a lamp post and shielded with bricks.

A team of CNSC staff consisting of a radiation protection specialist, a laboratory staff member and two emergency program officers were sent immediately to the College to retrieve the source. This was approximately three hours after the discovery that the source was not in the package in Vancouver.

Once the situation was under control, DNSR was notified of the event. In communication with DNSR, we understand that a notification should have been made at the

time of the discovery that the source was missing, not once the source had been retrieved.

In reconstructing the event timelines, it is clear that by not following procedures and keeping proper records, both internal permit holders contributed to the length of time the source was missing. An empty package was returned to the lab by an EMPD staff and the source was documented by the radiation safety officer as having been returned.

A partial sealed source inventory was completed in September which did not identify that a source was missing. Furthermore, the packaging and transport requirements should have identified that the package was empty prior to it being shipped and received in Vancouver.

Section 2.2 of the CMD M23.1 provides the event chronology in detail.

The following two slides illustrate the location of the source between August 19 and November 4, 2014.

So this map was provided by the Canadian Police College. It is located in Ottawa on the Rockcliffe parkway, near the Aviation Museum. The star on the top right corner of the map indicates where the sealed source remained.

The next slide has pictures of this area.

The picture on the left of the slide shows the lamp post and the parking area where the sealed source was recovered.

On the right side of the slide is a close-up picture to show the shielding that had been placed around the source when it was used for training.

This area is not accessible to the public; rather, it is the Canadian Police College and RCMP parking facilities. It is adjacent to the RCMP musical ride facilities that is also not accessible to the public.

Through discussions with the Canadian Police College, it was determined that their staff may have accessed the trucks parked near the lamp post from time to time. It was also determined that the person involved in the lawn maintenance would have likely been the most exposed individual.

CNSC staff took a number of radiation dose rate measurements at various locations with the sealed source in the configuration in which it was found. With the assumptions of a once a week lawn maintenance for 10 weeks and an estimated time of two minutes at one metre from the source, the most exposed person potentially received an estimated dose of 100 µSv, or one-tenth of the public dose limit of 1 mSv.

It was determined, therefore, that there was no impact to public health or the environment due to the source remaining in this location for in excess of two months.

In response to this event, as the licensee, I took actions immediately and throughout the last few months. The day after the event, I suspended the internal permit for EMPD. This meant that all sources would remain at the laboratory and any sources that were on loan at the time were shipped back to the laboratory.

I put in place an event review team independent of the lab staff. The independent review team, or ERT, consisted of a senior regulatory program officer from the Directorate of Power Reactor Regulation and a radiation protection specialist. They were supported by a staff member from the Office of Audit and Ethics at the CNSC to ensure integrity of the review process.

The ERT was tasked with determining the causes of the event and proposing recommendations for corrective actions. The ERT also prepared the 21-day report that was submitted to DNSR in accordance with the regulations.

On December 4th, after the 21-day report submission, I submitted a corrective action plan to DNSR.

Since this time, DNSR conducted an inspection, performed desktop reviews and met with those responsible for the licence, including myself.

A preliminary report was issued by DNSR and, after review of the preliminary report, all operations at the lab were suspended.

I determined that, before operations could continue, a thorough review of the procedures was required, along with addressing other items identified from both the corrective action plan and the inspection findings. The corrective actions will be outlined in the next few slides.

So the next four slides discuss the corrective actions which were required to address the causes of the event. All these corrective actions have been completed.

This slide identifies corrective actions related to the findings that the implementation of procedures and training needs improvement.

In order to address this, a thorough revision of the Radiation Safety Manual was completed. All of the procedures have been reviewed, updated where needed, and, a validation session has taken place for each procedure to ensure that the procedures as written will provide the necessary instructions to staff and will produce the necessary documentation and records.

This revision was done in consultation with the CNSC Management System Division as well as with the Human and Organizational Performance Division.

An example of a change is to enhance the sealed source control, the form used by laboratory staff when shipping and receiving sealed sources has been changed. The radioactive source loan form now requires two authorized users, usually an assistant Radiation Safety Officer and an authorized user, to sign off on the form.

This will help ensure that all steps are properly performed.

Another example is that all tasks related to radiation safety that are performed in the laboratory require review and sign-off by an assistant Radiation Safety Officer.

Once the new procedures were in place, all of the electronic and print versions of the old procedures were removed from filing systems and from workplaces to ensure that the older versions would no longer be used.

A full-day training session was held at the end of March with all CNSC staff who have roles and responsibilities under the Radiation Safety Manual, including myself, the Directors of the divisions involved, all users of radioactive materials and all administrators of databases. This training ensured that all staff are

aware of their roles and responsibilities under the Radiation Safety Program.

Training on all procedures was completed, usually one on one -- through one-on-one training sessions. A training needs assessment was completed to ensure that each staff member who requires training receives the appropriate training.

Finally, a training matrix to track all training records and refresher training dates was created to ensure that all staff and their managers can confirm that the appropriate training has taken place and can easily confirm when refresher training is required.

The second set of corrective actions is in response to both the internal review team and the DNSR inspection team findings that accountability and roles and responsibilities need to be clearer.

In the previous slide, I provided information on the one-day training session that was held to confirm roles and responsibilities. Other corrective actions that have been completed relate to the roles of the Radiation Safety Officer and the responsible managers for the internal permits.

Before the event, the Radiation Safety Officer position was performed by the supervisor of the lab, who is also the responsible manager for the internal

permit and is responsible for the day-to-day operations at the lab.

The position of the Radiation Safety Officer has now been moved to Dr. Aslam Ibrahim, who is the Radiation Physics Specialist at the lab and also the certified Radiation Safety Officer for the Class II Facility licence.

For all matters related to radiation safety, Dr. Ibrahim reports directly to Ms Kiza Francis, the Acting Director of the division. And Ms Francis is also the signing authority for the licence.

The Radiation Safety Committee was created in 2013 to provide direction and support to the applicant authority in the development and implementation of an effective radiation safety program.

The terms of reference of the Radiation Safety Committee are being revised to exclude the responsible managers from the committee. The Radiation Safety Committee membership is myself as Chair, the Director of the Environmental Compliance and Laboratory Services Division, the Director of the Radiation Protection Division, the Director of the Management Systems Division and the Radiation Safety Officer.

The frequency of meetings has been increased to provide enhanced oversight and support.

The third set of corrective actions that have been completed relate to the enhancement of management oversight. The following changes have been made.

The oversight role of the Radiation Safety Committee has been strengthened by increasing the frequency of meetings from quarterly to eight meetings this year and focusing on internal reviews and corrective actions.

The responsible managers for each internal permit are now required to approve requests for sealed sources and are required to perform their own internal review of operations under their permit within the first six months of issuance of the new permit, and periodically thereafter.

Before this change was made, the EMPD staff member requested the sealed sources directly from the lab without an approval from their responsible manager. The internal review requirement will ensure that the responsible managers have a documented review of operations under their permit, including ensuring that all required records are generated.

The signing authority, which is Ms Francis, is now the final approval stage for internal permits and sealed source requests. Before this change was made, the Radiation Safety Officer was the final approval stage, which meant that the Director was not involved in

approving these items and might not become aware of them until an update from the Radiation Safety Officer was provided.

I will also verify on a monthly basis that all persons utilizing nuclear substances under the CNSC licence adhere to policies and procedures established under the licence. There will be a record kept of every monthly verification.

This slide provides a graphical representation of some of the changes I have just described.

The responsible managers no longer sit on the Radiation Safety Committee, and the Radiation Safety Officer reports directly to the signing authority for radiation safety matters. This removes any potential conflicts between -- that may occur when the responsible manager for the laboratory sat on the Radiation Safety Committee and when the Radiation Safety Officer reported to the responsible manager for radiation safety issues.

Another important radiation safety improvement involves the addition of the assistant Radiation Safety Officer position. Two laboratory senior analysts, Dr. Nadareh St. Amand and Dr. Pujing Pan at the laboratory have been appointed to this position of assistant Radiation Safety Officer and have been tasked

with some of the day-to-day work that the Radiation Safety Officer was carrying out previously.

This slide speaks to the corrective actions that are being implemented to address a recommendation by DNSR staff during the last inspection.

Corrective actions relate to the inventory of sealed sources that are stored at the laboratory. Some of these corrective actions have not yet been completed and are in progress.

It should be noted that revision, validation and training on the procedures related to sealed source control and sealed source inventory have been completed. As previously noted, significant management oversight has been added to the sealed source control procedure.

The sealed source inventory procedure has been amended to allow the placement of a seal on packages containing more than one source. If the seal is in place during the next quarterly inventory, the authorized user is not required to open the package.

This revision will allow for the quarterly inventory to be completed in a more timely manner and will aid in keeping radiation doses As Low as Reasonably Achievable.

The two other corrective actions are in

progress will result in a reduction in the inventory of sources at the laboratory, including a reduction in exempt material and historic artefacts. These improvements will also help in reducing the time it takes to complete the quarterly inventory with better use of resources on safety significant sources -- those are the sources that are within the CNSC licence -- and ensure that the amount of radioactive material that is stored at the CNSC laboratory is appropriate for the requirements of the CNSC staff.

In other words, approximately 70 percent of the sources that are stored at the lab currently are no longer being used by CNSC staff, and so there's a plan to dispose of these sources at a CNSC-licensed waste facility.

In conclusion, the corrective actions that directly address the causes of the event have been completely implemented.

The corrective actions to reduce the source inventory of radioactive sources and historic artefacts are under way. The updated procedures and radiation safety manual will be submitted to DNSR with a request for a licence amendment.

In terms of next steps, I have requested an independent evaluation of activities carried out under licence to be completed by December 2015.

DNSR will conduct a compliance evaluation

within the next six months. DNSR will continue their annual updates to the Commission and we will be available during those updates to respond to questions from the Commission.

I will now pass the presentation back to Mr. Régimbald.

MR. RÉGIMBALD: Merci. André Régimbald here speaking.

So in conclusion, the Directorate of Nuclear Substance Regulation has completed its assessment of the Corrective Action Plan submitted by the CNSC laboratory and is satisfied that all of the important action items that are programmatic in nature have been closed. We will continue our focused regulatory oversight of the laboratory operations regarding the use of nuclear substances to ensure that all of the corrective actions are implemented effectively.

Therefore, the Directorate of Nuclear Substance Regulation is satisfied that the CNSC laboratory has taken and will take appropriate and sufficient measures to prevent the recurrence of this event and we are satisfied that the CNSC laboratory will ensure the safe use of nuclear substances by other CNSC staff.

CNSC staff does not plan to provide further updates to the Commission on this matter unless

circumstances demand it in the future. As Dr. Thompson pointed out, we will continue to report on the safety performance of the laboratory annually through our regulatory oversight reports.

This concludes the presentation, and we are available to answer questions.

Thank you. Merci.

THE PRESIDENT: Thank you.

Let's start -- open the question with Ms Velshi.

MEMBER VELSHI: Thank you.

So this is particularly disturbing given the July 2012 incident. And as I read the two CMDs from DNSR and from the licensee, it seemed like the initial corrective action plan was deemed to be not robust enough and DNSR found some fairly -- what I thought were fairly significant findings with that.

And the question that it leaves with is, is this really a learning organization? How could this have happened again after so much effort had been put in place after the July 2012 incident?

So I don't have any specific comments on the revised corrective action plan. I think looks really good.

But as you took a step back to see, well,

why did we not learn after the first incident and why was our first corrective action plan not good enough, what are your thoughts on that?

DR. THOMPSON: Patsy Thompson, for the record.

One of the findings of the event review team speaks to the culture at the lab. There's a number of highly-experienced staff who have essentially been carrying out activities under the licence for a long time.

When the corrective actions were being developed following the July 2012 event, the staff at the lab were involved in developing new procedures, developing the radiation safety manual and essentially putting us in a position where, when we submitted our licence application in 2013, the application was deemed to meet the new regulatory requirements.

We carried out, at the time, several activities at the lab to make sure that we were doing things according to procedures. We also had made a commitment to have an external review from an independent expert, which we did.

The Radiation Safety Committee at the time focused on the positive findings from DNSR inspections and from the external review, and we did not essentially dig any further.

The event review team revealed that all those staff had been involved in drafting procedures.

There was a number of procedures that, for staff, were unclear, and there wasn't the culture, essentially, of bringing those issues forward to be addressed by management.

I believe that the work we've done since the event in November has focused on making staff accountable for further actions, actually making the responsible managers to ensure that the staff under their responsibility are following procedures and records are being kept.

There was also, essentially, an assumption by managers that because staff had drafted the procedures that this was proof that they were competent to carry out those procedures, and so we weren't as diligent as we should have been on training and refresher training.

So there's a number of lessons that certainly I've learned and the radiation safety team has learned from the events in November, and we are much more systematic in essentially validating the procedures, having training.

We've had one-day training for everyone involved in the licence, not just the laboratory staff but EMPD staff as well. And I think everybody understands

that, you know, the roles and responsibilities and being accountable for what is being done under licence is serious business.

MEMBER VELSHI: Thank you.

And DNSR, as you reflected back on what could you have done to prevent this second incident from happening -- I don't know if you'd reviewed the initial corrective action plan after the first incident, but you've since done inspections on them, any learnings for you?

MR. RÉGIMBALD: André Régimbald here.

We did review the application in 2013 for the renewal of the licence. The review was done to verify that it met the regulatory requirements, both from the Act and Regulations and our regulatory documents itself. And the procedures and programs were deemed appropriate and sufficient for staff to work safely, and then the licence was issued.

There were inspections done to verify that any -- there were outstanding actions that needed to be closed and inspections were conducted, I believe, in July or August -- Mr. Rabski can provide details on that -- in August 2013.

And the inspectors found that the corrective actions were in place, what was in the documentation.

And I will ask at this point if Mr. Rabski can provide further information on other verifications that were done.

MR. RABSKI: Henry Rabski, for the record.

Yes, DNSR, following the July incident, looked at the corrective actions that were proposed by the laboratory and conducted inspections over the course of that period.

There was an inspection that was performed following up on the action items in 2012. Subsequently in 2013 the lab also participated in a desktop review and there were inspections performed. In fact, in one of the inspections that was performed, there was a sampling of the inventory and the inspectors were able to take a sampling of 42 of the 200 active sources that were being used at the time and were able to verify that they were all on location.

So from that snapshot of the inspectors review, when they were on site they did find some minor improvements, minor non-compliances, but nothing to say that there was a serious concern in the program and that it was being operated. Corrective actions were initiated by the laboratory's staff and work continued. So we did do verifications from time to time and we were satisfied through those inspections that the staff at the lab were

working safely and in compliance.

MEMBER VELSHI: I guess the concern I have is what reassurance do we have that incidents like this don't happen? Were there no warning signals? I mean this wasn't one noncompliance. It was repeated noncompliance of procedures and so -- and it's not the second incident and the follow-up. I'm really thinking about learnings from the first incident and is there a greater scope of inspections? I mean I don't know.

Were there no warning signals that -- because the issues you are addressing now are some fairly fundamental ones, whether it's on adequacy of procedures, whether it's management oversight; it’s safety culture. Those are fundamental building blocks that you have now identified as stuff that needs to be worked on. So why would does not have been identified before the incident happened?

MR. RABSKI: Henry Rabski, for the record.

The procedure that was identified that was the breakdown in this case was the internal permit process that was set up by the licensee and the management of that permit process. The details in terms of the interaction between the permit holder and the users, that's something that normally we don't inspect down to that level of detail. That's an obligation that was an obligation of the

management in setting up that use program.

They put in measures that were checks and balances to control the access and our licensing review at the time of that procedure deemed that it was adequate.

We looked at the activities on site that we normally would see when we go to visit the inspection and they didn't include the users out in the field in that particular detail procedure. That's usually left at the management level of the licensee; their responsibility.

THE PRESIDENT: Go ahead, please.

DR. THOMPSON: Ms Velshi, if I could, one of the things we have found that are common essentially between July and November and essentially the work that the Event Review Team did following the event, there's a general culture of staff relying on their expertise and expertise of others and in July 2012 for example when the sources were borrowed from the lab, the lab staff essentially trusted that the people who were borrowing the sources were experts and qualified and when sources were brought back to the lab it was assumed that people knew what they were doing and the sources were in the packages and the packages were put in storage.

The same thing happened last summer essentially. The Radiation Safety Officer was overworked. He was doing multiple functions and trusted that the EMPD

staff was a senior staff with lots of expertise and trusted that what should have been done was done and, you know, we have seen this in other licensees as well and the expectation is that it's not that you don't trust people, but you trust and verify and it's the verification that has been lacking essentially quite systematically and it's this issue that we need to address.

LE PRÉSIDENT : Monsieur Harvey...?

MR. RÉGIMBALD: Also if I can add -- excuse me, Mr. President. André Régimbald here.

There was an independent external review done, conducted at the laboratory. I believe it was in November or December 2013 or something like that, March of 2014 -- thank you -- which also concluded that the operations at the laboratory were conducted safely. So there was -- the indicators that you are pointing to, Ms Velshi, were not apparent and only through very deep search into the operations we could have picked up those signals.

LE PRÉSIDENT : Monsieur Harvey?

MEMBRE HARVEY : Merci, Monsieur le Président.

Je n'ai pas de question spécifique à poser, mais je ferais un petit commentaire, et je vais le faire en français.

Je pense qu'une fois qu'un événement comme

ça est arrivé, ou quelques événements, c'est bien malheureux, mais on ne peut rien y faire. Il faut vivre avec et il faut essayer d'en tirer profit.

À titre de commissaire -- je parle en mon nom personnel -- je pense qu'on est beaucoup tributaire de votre connaissance, de votre expertise, de votre expérience, de votre professionnalisme, et particulièrement de votre diligence puis de votre implication personnelle. Ça fait neuf ans que je suis sur la Commission, et je peux dire que j'ai été en mesure de vérifier très souvent dans nos nombreuses rencontres que tout ça existe au sein de la Commission et j'ai souvent été impressionné par les prestations des gens devant nous.

Toutefois, lorsque des événements comme ça arrivent, c'est comme un coup d'épée dans la confiance. C'est d'autant plus dur lorsqu'on met beaucoup de confiance dans les gens qui sont devant nous et d'autant plus qu'on s'est affiché beaucoup comme chien de garde du nucléaire, et un chien de garde, ça surveille. Et là, je pense que le chien de garde, il a avalé quelques os. Il en a avalé un gros.

Mais au-delà de tout ça, moi, je pense que ça doit servir comme un coup de fouet non seulement pour les laboratoires, parce que oui, là, c'est arrivé pour les laboratoires, mais pour l'ensemble de la Commission. C'est

gros, la Commission, il y a beaucoup de gens, et je pense que de la vice-présidence à aller jusqu'aux inspecteurs, je pense que tout le monde doit prendre un événement comme ça et aller un peu au-delà des critiques et en faire quelque chose de personnel, parce que ça peut arriver ailleurs si on relâche la vigilance. Bien, on est là pour ça.

Donc, ce que je souhaite, même pour moi, même pour les autres, c'est de toujours être là quand il faut être là et de faire les choses quand il faut les faire. Ce n'est pas seulement une question de procédure. C'est une question de participation personnelle. Chacun doit faire la tâche spécifique qui lui est attribuée.

Ça fait que c'est tout. Je voulais simplement... Vous n'avez pas perdu toute ma confiance, loin de là, mais je voulais envoyer le message que c'est important si on veut juste... On met des efforts immenses pour avoir la crédibilité du public, et il suffit de quelques événements pour tout perdre. C'est toujours plus rapide de perdre la confiance que de la gagner. Merci.

LE PRÉSIDENT : Merci.

Monsieur Tolgyesi...?

MEMBER TOLGYESI: Dr. Thompson, you said that, according to your presentation, the source was found where it was left when you called the police. That means that somebody knew where it was. Who placed that? I

suppose, because if he found that he knew and if he knew, how come when you brought back, you know, after exercise the one sample was only there, the other one was not?

DR. THOMPSON: So Patsy Thompson, for the record.

Mr. Tolgyesi, my understanding is that the instructor from the police college went with a survey meter and identified the source. But Mr. Luc Sigouin, the responsible Manager for the EMPD use of sources, I think, can provide more detailed information.

MR. SIGOUIN: Thank you, Dr. Thompson.

Luc Sigouin, for the record.

So Dr. Thompson is correct. So in the course of events when the authorized user recollected the details of the situation that the source had been left behind at the training session at the Canadian Police College, he contacted the instructor who was -- for whom he had delivered the training at the time.

The instructor went into the training area using a survey meter and in surveying the area was able to determine where the source was and then reported back. And then we had confirmation from the authorized user that that's where the source had been deployed during the training activity.

So we have confirmation from the user that

that's where the source had been located for the training and confirmation from the Canadian Police College staff that it had been found in the same location and then subsequently CNSC staff, when they returned to collect the source and return it to safe storage, the source was in the same location. So we are quite confident that the source remained in its same location for the duration that it was out of control.

MEMBER TOLGYESI: Should we -- you know, when you give out a kind of radioactive sample for training purposes, should CNSC be involved also that where you place that? So, you know, because you didn't know I suppose. So should you participate and to localize, I mean to place it, and after you will have a kind of opportunity or so to find it?

DR. THOMPSON: Patsy Thompson, for the record.

And so there is a requirement with the internal permit that a training plan -- if you recall the 2012 event, we had as part of the corrective actions identified that a training plan was required and there needed to be records kept in terms of how many sources, where the sources were being placed, and also records as sources were being retrieved.

And so the person who takes sources from

the laboratory is a CNSC EMPD Staff, that person takes the sources to a training facility, conducts the training, is supposed to follow the procedures, keep the records, retrieve the sources and bring them back to the lab. And at the lab there are also verifications and then records that need to be kept.

What the event review team found is that the procedures and records that EMPD staff were supposed to follow and keep were not being kept and the procedures weren't followed. So that was one of the factors that lead to a source being left behind at the police college.

And the same when the source was brought back to the lab, there are verifications that are supposed to take place to confirm that the source is being brought back, and those verifications were not done.

THE PRESIDENT: Dr. McEwan

MEMBER McEWAN: Just as I have been listening to this what I have been trying to envisage is the day. Was there anything unusual about the day? Was the training exercise difficult, complex? Was there a thunderstorm that made everybody run inside, whatever...?

Was there anything particularly unusual that would have lead to this error that would again lead to may be modifications or changes to how these exercises will be done in the future?

DR. THOMPSON: Patsy Thompson, for the record.

Could I ask Luc Sigouin, since it is his who was conducting the training, to respond?

MR. SIGOUIN: Thank you.

Luc Sigouin, for the record.

So in answer to your question, Dr. McEwan, there are a few items -- a few conditions that may have lead to this. The training session was -- you know, there were no weather-related issues or such. But the training session did end late on a Friday afternoon. And there was a single instructor, CNSC Staff, delivering the training at the time.

There were only two sources that were used at that time. But nonetheless, there was only one instructor who was there and it was at -- after a full day of training and exercise, and wrapping up activities for the end of the day.

In recognition of that, some changes that were made to the procedures for authorized users delivering training. In recognition of this, one of the fundamental changes that we have made to the procedures is that there would always be from now on two instructors who will attend and deliver training to ensure that, despite the workload or any other conditions, that there is a verification and

check to ensure that the sources have been collected.

THE PRESIDENT: Ms Velshi?

Monsieur Harvey?

Monsieur Tolgyesi?

MEMBER TOLGYESI: On your radiation manual you are saying now that applicant authority shall verify on a monthly basis that all persons utilizing nuclear substances adhere to policies and procedures.

How do you do that? You know, up to now procedures were there, but were not followed. Okay? So how do you verify that? Because it is one thing to say what to do and it is another one to do what was said.

And how you verify that I adhere to that? Because you should check if I act according to procedures.

DR. THOMPSON: Patsy Thompson, for the record.

Prior to this event the expectation was that the responsible managers were responsible for their internal permits and made sure that the authorized users followed procedures and records were being kept.

I assumed that responsible managers were conducting those activities and were making sure that, you know, procedures were being followed and conditions of the licence and of the CNSC Regulations were being followed.

Moving forward, there will be a

requirement for a report to myself once a month with essentially documented evidence when sources are being used that procedures are being followed, the records are being kept.

And I will receive those reports and I will produce a record identifying essentially that I have confirmed that appropriate measures are being taken.

THE PRESIDENT: Anybody else? Any other...?

Okay. So a couple of points. First of all, you know, in my seven years with the organization I have learned to appreciate some of our Staff, as Mr. Harvey mentioned, and their competency.

And when you are that competent and that -- feel that you know what to do, you ignore procedures.

We see this practically everywhere. I don't need to sign this, I know what to do. So the trainer would go in there, into the lab, say give me the sealed source, put them in their pocket, because there is not -- not this particular sealed source, the original, check sources, do this, and they forget.

So we should not complicate. What happened here was that as a result of 2012 the procedures you put in place were good improvements, but not good

enough. They had some deficiencies in it.

For example, there was nowhere when a source come back, open the lid, take a look inside, and make sure that the source is there.

And the two-key system was not exactly placed, because looking inside should have been done by the trainer, looking inside should have been by the receiver in the lab.

So I think those procedures you put in place now will deal with the gory little details. But most importantly, and I am a real fan of this, no more pointing the finger, the accountability is clear. And the consequences for screwing up on procedures should be very clear. And I hope that is now, as a result of all this accountability scheme, there will be consequences for not adhering to them.

That is the way I read from the new consequences. And we shall see how it works out. I sure as hell hope that we continue to do training. I think it is important to do training to first responders, to the police, et cetera, so they know how to use it. And we should not stifle our trainers because of such an incident like that.

So all of this to say that it is very unfortunate that this incident happened, because our

credibility and our brand is on the line as a regulator. But as long as you have human beings, you have the human factor, that always is -- hopefully we can minimize the uncertainty with human factors.

So anybody else anything else to say on this?

Thank you. And I think this concludes today. There will be another day tomorrow. And anything else you have to say now?

Kelly?

MS McGEE: Tomorrow's session will start at 9:00 a.m. If you borrowed an interpretation device, please return it to the reception before you leave and claim your identification card.

Thank you very much. Bonsoir.

THE PRESIDENT: Thank you.

--- Whereupon the meeting adjourned at 9:09 p.m., to resume on Thursday, June 18, 2015 at 9:00 a.m. / la réunion est ajournée à 21 h 09 pour reprendre le jeudi 18 juin 2015 à 9 h 00