Canadian Nuclear Safety Commission

Commission canadienne de sûreté nucléaire

Public meeting

Réunion publique

October 11th, 2017

Le 11 octobre 2017

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
Dr. Sandy McEwan
Dr. Soliman A. Soliman
Dr. Sandor Demeter
Mr. Rob Seeley

Commissaires présents

M. Michael Binder
Dr Sandy McEwan
M. Soliman A. Soliman
Dr Sandor Demeter
M. Rob Seeley

Assistant Secretary:

Ms Kelly McGee

Secrétaire-adjointe:

Mme Kelly McGee

General Counsel:

Ms Lisa Thiele

Avocate générale :

Me Lisa Thiele

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Ottawa, Ontario / Ottawa (Ontario)

--- Upon commencing on Wednesday, October 11, 2017
at 3:07 p.m. / La réunion débute le mercredi
11 octobre 2017 à 15 h 07

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 interpretation. Please keep the pace of your speech relatively slow so that the interpreters are able to keep up.

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

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

La transcription sera disponible sur le site Web de la Commission dès 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 our website for a three-month period after the closure of the proceedings.

As a courtesy to others in the room, 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 those joining us via webcast.

I would like to start by introducing the Members of the Commission.

On my right is Dr. Soliman A. Soliman; on my left are Dr. Sandor Demeter, Dr. Sandy McEwan and Mr. Rob Seeley.

We have heard from the

Assistant-Secretary, Kelly McGee, and we also have with us here at the podium Ms Lisa Thiele, Senior General Counsel to 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 revised agenda published on October 10th, 2017 for the complete list of items to be presented today and tomorrow.

The Minutes of the August 16-17, 2017 Commission meeting will be presented to the Commission for their approval at a later date.

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

CMD 17-M40.B

Adoption of Agenda

THE PRESIDENT: With this information, I would like to call for the adoption of the agenda by the Commission Members, as outlined in Commission Member

Document CMD 17-M40.B.

Do we have concurrence?

For the record, the agenda is adopted.

CMD 17-M43

Submission from CNSC Staff

THE PRESIDENT: The first item on the agenda for today is the Status Report on Power Reactors, which is under Commission Member Document CMD 17-M43.

We have representatives from Bruce Power, NB Power and OPG in attendance, and also others from OPG by teleconference.

So let's test the technology.

So from Pickering -- Pickering, can you hear us?

MR. SEGUIN: Yes, President Binder. Paul Seguin for the record, Operations Manager, Pickering Generating Station.

THE PRESIDENT: Thank you.

And from Darlington?

MR. LEHMAN: Yes. From Darlington we have Jeff Lehman, Bob Jackowski and Boris Vulanovic.

THE PRESIDENT: Thank you.

I understand that, Mr. Frappier, you will make the update. So over to you.

MR. FRAPPIER: Thank you very much. Thank you and good afternoon, Mr. President, Members of the Commission.

I'm here to present Commission Member Document 17-M43, the Power Reactor Status Update.

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

With me today are Directors of the Power Reactor Regulatory Program Divisions and technical support staff who are available to respond to question on the status report.

As we have just mentioned, we also have with us licensee representatives should there be questions for them.

Please note that OPG has also prepared a verbal update on the Darlington Unit 2 refurbishment that we thought would be appropriate to give today as part of this update. So when I'm finished, they will give a quick statement.

As you will note, this CMD covers the period up to October 5th, and I would like to give a couple

of verbal updates to that at this time.

Of particular note, on October 8th, Pickering Unit 8 was shut down for a planned outage to conduct a turbine spindle inspection and Unit 8 is projected to return to service in late November.

This concludes my updates. As I said in the opening, CNSC's regulatory and technical staff and licensees' representatives are available for questions, and up to you whether you want to hear the Darlington refurbishment update right now or have a few questions first.

THE PRESIDENT: Thank you.

So let's start with Dr. Demeter.

MEMBER DEMETER: I have no questions at this time for Pickering.

THE PRESIDENT: Mr. Seeley?

MEMBER SEELEY: No questions.

THE PRESIDENT: Dr. Soliman?

MEMBER SOLIMAN: I have questions. This is for all the stations, right, I can ask any questions on that report?

Unit -- this is the primary heat transport system flow blockage. Flow blockage is a very scary name really because this is an accident scenario where we lose

the core of the reactor. But anyway, I would like to know, this accident or incident happened four days after the outage started.

THE PRESIDENT: Which unit?

MEMBER SOLIMAN: This is reactor -- they are not saying which unit here. Primary heat transport system flow blockage during maintenance outage.

MR. FRAPPIER: I believe we're talking about Pickering Unit 1 on August 20th.

MEMBER SOLIMAN: There is no unit mentioned as a matter of fact.

MR. FRAPPIER: I think the first paragraph --

MEMBER SOLIMAN: Planned outage? Okay. Anyway, how many fuel channels were affected?

MR. FRAPPIER: Pardon me?

MEMBER SOLIMAN: How many fuel channels have been affected?

MR. FRAPPIER: So I think for a bit of a summary on what the blockage was and how many fuel channels and whatnot were affected, I would ask OPG Pickering to provide us some detail.

MEMBER SOLIMAN: I have more questions on that.

MR. SEGUIN: Okay. So Paul Seguin for the record, Operations Manager, Pickering Generating Station.

So, as you noted, the event resulted in flow blockage in the heat transport system. So at no time was the fuel at risk during this event. The Operations staff responded to the condition immediately, following their approved procedures, and the temperature of the heat transport system primary coolant remained within operating limits at all times.

MEMBER SOLIMAN: My question is --

MR. SEGUIN: When a unit is shut down, the heat transport system is divided into two loops. So the question on the number of fuel channels, this is one loop, so that would be half of the fuel channels in the reactor.

Did that answer your question?

MEMBER SOLIMAN: One hundred and eighty channels have been affected?

THE PRESIDENT: The question is how many channels have been affected.

MR. VIKTOROV: Alex Viktorov for the record.

I will attempt to answer the question. Perhaps there's a little bit of misunderstanding. The flow blockage resulted from a valve being closed in the loop, so

there was no channel blockage per se, but half of the core, which is 185 channels, saw a reduction of the flow.

MEMBER SOLIMAN: Okay. So 180 channels have been affected. How many you measured their temperature? You're supposed to check 180 channels for temperature, aren't you?

MR. VIKTOROV: Correct. But note that this event happened four days after the unit was shut down, so the core was not generating power, it was at a very low residual power. The temperature was measured at the overall coolant temperature, and as you see in the text, the temperature went from 31 to 37 degrees C. It's a very low temperature. So no fuel experienced an overheating.

MEMBER SOLIMAN: But this is the PHT system temperature. I am talking about the local area where the fuel may be heated and cause a local effect. So if half the core has been affected by an accident like that, do you start the reactor without really respecting all of these channels for any local defect?

MR. VIKTOROV: OPG will be able to provide details of the assessment. But yes, it's a serious event violation of the operational policy and principles, so a through follow-up assessment will be conducted. But from the general principles we don't believe any fuel

experienced even any local defects, but OPG should be able to provide a detailed explanation.

MEMBER SOLIMAN: Okay.

MR. SEGUIN: Paul Seguin for the record.

So the temperature increase, 31 degrees to approximately 37 degrees, that is based on the highest increase in channel outlet temperature. All of our 390 fuel channels are instrumented on the outlet, so we have temperature indication for all of those channels. So that was the highest, not the bulk system temperature but the highest channel outlet temperature response.

MEMBER SOLIMAN: Okay. How do you make sure that there is no local effect on certain fuel channels if you have 180 fuel channels that have been affected and you measure the temperature of the PHT system away from the local areas? You're talking about overall, I'm talking about localized inspection in order to start the reactor. The flow blockage is very serious because the decay heat is still there and it can cause damage to some of the fuel channels if they are on the core of the reactor -- the middle. So what exactly happened?

MR. FRAPPIER: Gerry Frappier for the record and I'll get OPG to provide perhaps some additional details.

I think it's important, like we were just sort of saying, to understand that what we're talking about is during maintenance a valve being put in the wrong location. So we had a few minutes of reduction in the cooling capacity. As noted, the temperature in -- none of the fuel channels saw a temperature above 37 degrees C, which is still a very acceptable fuel temperature.

And then as far as exactly why they ended up with valves that were in the wrong position, I would let OPG talk about what their root cause analysis has found so far.

MEMBER SOLIMAN: Thirty-seven degrees is the temperature of the PHT system. I'm talking about the local temperature you measure, which is the pressure tube, for example. What is the temperature of the pressure tube itself which is adjacent to the fuel? This is a local effect more than a global effect. So if you measure the pressure, you measure the temperature of the PHT system away from the core overall. This is overall, but I'm talking specifically you should inspect the core for any damage.

MR. MANLEY: Robin Manley, for the record, for OPG and I'm going to ask Paul Seguin as the Ops Manager to clarify anything that I get technically wrong, but I'm

going to try and cast sort of a high-level framework here. And again, Paul, please jump in and correct me if I get it wrong.

So when we have our 390 fuel channels, each of which is instrumented on the outlet, that means we're actually measuring the temperature at the outlet of each fuel channel. So it's not away from the fuel channels, it's not some bulk temperature measurement far away, it's actually at the outlet of the reactor. So the normal operating temperature of the reactor -- and again, Paul, correct me if I'm wrong -- I think we're in the order of 290 degrees Celsius. So we're down at 31 as we're shut down; 37 degrees is a very, very large delta from the normal operating temperature. So that swing of 6 degrees, you can see, is really a dramatically small amount compared to what we would normally operate under. Of course, the fuel is capable of taking a temperature much higher than 290 degrees.

So we're talking about an extremely small change in temperature. And we didn't have flow blockage on individual fuel channels so you weren't going to get individual elevated temperatures on any given fuel channel anyway because you didn't have a blockage there.

So Paul, at that sort of high level

framework, have I done anything terribly technically wrong or anything you would like to expand upon?

MR. SIGUIN: Paul Sigouin for the record.

No, that was technically accurate, Robin.

MEMBER SOLIMAN: The temperature you're talking about is the average temperature or the temperature of the average of all the temperatures of the affected channels reflected on the PHT. I am talking here about local effect. You might have some of the fuel overheated and that is reflected in one channel and you do not expect that channel and you saw the reactor in a few months and you have a problem.

MR. MANLEY: Well, respectfully I disagree with you.

MEMBER SOLIMAN: Okay.

MR. VIKOTOROV: Alex Viktorov for the record.

It's correct that it is the coolant temperature that is reported but it's reported at the exit of each channel. It's not somewhere. It's right at the exit of individual channels. So the 37 degrees is a maximum coolant temperature but at the most affected channel. So it's right at the exit of the channel. The temperature of the water, heavy water is measured, and in

its only experience increased from 31 to 37 degrees.

Again, there might be local effects within the channel. We believe it's extremely unlikely because no change happened with the geometry of fuel. The normal operation at high power, the fuel operates at closer to 300 degrees and there are no local effects. With no geometry change we don't see a reason for local effects developing at low temperatures.

MEMBER SOLIMAN: What was the decay heat, the measure of decay heat at the time of -- at the time of this accident? How high it was or how --

MR. VIKOTOROV: Alex Viktorov for the record.

Decay heat is certainly monitored and measured. It's easy to predict the level of power generated by decay. We don't have numbers handy but it's a very basic equation that allows predicting decay after four days after shutdown.

MEMBER SOLIMAN: What type of inspection and what effects has been done in order to start the reactor or to start the reactor?

MR. VIKOTOROV: The reactor is still in outage and I will --

MEMBER SOLIMAN: Yes, what type of

inspection are you going to do in order to start the reactor specifically for that, only measuring the PHT system temperature and that's it?

MR. FRAPPIER: Gerry Frappier for the record.

So I would ask Mr. Sigouin to talk about what the protocol is that was gone through. But again, we would not expect there to be any damage to fuel based on the numbers that we have seen. Having said that there would be and perhaps Mr. Sigouin could give us some details.

MR. SIGUIN: Paul Sigouin for the record.

So as was mentioned earlier, we are conducting a root cause evaluation for this event, as was also stated by others based on the temperature effect, that is the most affected fuel channel seeing an outlet temperature of 37 degrees. We have assessed that there is no potential for fuel damage or damage to any of the components of that channel.

But again, we're in the process of our root cause evaluation. That is yet to be completed. I don't expect the root cause though to be focused on any requirements for channel inspection or any further analysis if it's really focused on the root cause of the human

performance event that led to the interruption of flow in the south loop.

I can certainly give a description. If you're satisfied with the write-up in the agenda, I can certainly elaborate on what we found in the investigation so far.

THE PRESIDENT: But in the stuff documented on the third bullet it says the cause appeared to be inappropriate application of work protection. I have no idea what that means.

MR. SIGUIN: Paul Sigouin for the record. So work protection is our term for tagging out of equipment for the protection of workers that are going to work on the equipment. So it's isolation of the equipment so that it can safely be maintained.

In this event the motorized valve that was closed, the motorized valve 10 on the shutdown cooling loop 4 in the south loop, that was done under work protection. So that is the authorization that operation staff give to maintenance declaring that it's safe for their work. There was no worker safety issue with it. That valve was de-energized for the sake of the workers.

The human performance event, however, was that the alignment of the flow path in the south loop was

not appropriate to perform the maintenance that was performed.

THE PRESIDENT: Do I understand that does that mean a human mistake/error?

MR. SIGUIN: That is correct. Again, the root cause evaluation is in progress. So we are looking at all of the barriers that should have been in place to protect our heat sink and we're evaluating why those barriers were in effect of that preventing the event and we'll be producing that through that root cause evaluation.

I'll say that following the event we put in a number of interim actions in place to strengthen all of our barriers, both administrative processes and people barriers around heat sinks to ensure that our heat sinks were protected against a similar repeat event, and we'll be taking more actions from the root cause evaluation.

THE PRESIDENT: So if I understand the description here, there was an alarm that got set in the control room. At what delta does the alarm get triggered? Because I am still struggling with it's a low temperature, not significant, yet an alarm went on, right? So it is significant in that sense to trip an alarm. At what temperature increase would this alarm get triggered?

MR. SIGUIN: Paul Siguin for the record.

So the alarm isn't actually a temperature alarm. What we have because an event like -- a similar event was predicted in the design as such that we have an alarm function tied to the valves in the flow path on the heat transport system. So that if any time, at any time certain valves come off of the fully open position indication such that a flow path could be blocked in the heat transport system that immediately enunciates an alarm in the control room specifically an alarm that states heat transport flow path blocked.

So in this case that is what happened.

So that is what happened. The alarm enunciated immediately on the valve, motorized valve 10 coming off of the fully open position in the course of the maintenance. That alarm was responded to immediately by the operators.

MEMBER SOLIMAN: MV10 is a little valve between the shutdown cooling and the PHT system?

MR. SIGUIN: That is correct.

MEMBER SOLIMAN: Okay.

THE PRESIDENT: Okay, thank you.

Dr. McEwan...?

Okay, back to questions. Question? Go ahead.

MEMBER SOLIMAN: Bruce A and B, Unit 7 forced outage due to water leak on the conventional side of the station. I would like to know what -- which component was leaking and what is the reason for that leak?

MR. SAUNDERS: It was a process water leak on the process cooling water to -- I believe it was to the turbine. It was a threaded joint failure that started to leak. So unfortunately there's no alternate route to that particular cooler. So our only alternative was to bring the unit down to fix it.

MEMBER SOLIMAN: Okay, thanks.

THE PRESIDENT: I just have one question, and that is on Point Lepreau. So it says on the forced shutdown due to turbine governor valve the plant would shut down due to issues with the turbine governor. So what does that mean? You have an issue with the governor, you've got to explain what does it mean to somebody who --

MR. HARE: Sure. Michael Hare for the record.

What we had was a governor valve -- governor valve 6 -- we have four governor valves to our turbine set. These are the valves that control the steam emission into the turbine itself. Governor valve 6 started to act erratically. It would go full open and then full

closed. And based on that evolution that occurred we had to shut the station down, a weekend run on 3 valve operation, but boiler pressure swaying enough with the valve going full open and full closed that we took the unit offline because of the governor valve 6 operation.

THE PRESIDENT: So it was manually shut down?

MR. HARE: The unit we had a manual setback and then we had a manual trip of SDS1 to shut the unit down.

THE PRESIDENT: Okay, thank you.

Anything else?

Okay, thank you. Thank you very much.

MR. FRAPPIER: So Gerry Frappier for the record. So do you want to get the short little update on the refurbishment of Unit 2 of Darlington?

THE PRESIDENT: Absolutely.

MR. FRAPPIER: So perhaps our friends from Darlington could put their -- I don't know if it's Mr. Manley who is doing that.

MR. VULANOVIC: For the record it's Boris Vulanovic, Director of Operations and Maintenance for the Refurbishment Project. I will be giving the update on the unit for refurbishment today.

So an overview of the project, we are currently in Day 362 of the refurbishment of Darlington Unit 2. In terms of progress on the project we are currently 27 days of our --

THE PRESIDENT: Can you move closer to the mike, please?

MR. VULANOVIC: Is that better?

THE PRESIDENT: Not really. You have to get closer to the mike. We hardly --

MR. VULANOVIC: Can you hear me now?

THE PRESIDENT: Yeah.

MR. VULANOVIC: Okay. So for the record, Boris Vulanovic.

In terms of the update on the project, as I was saying, we are currently in Day 362 of the refurbishment of the Darlington Unit 2 reactor. That currently puts us 27 days ahead of our committed schedule. We are, with respect to the project, tracking on budget in terms of performance.

We are in the reactor disassembly phase of the project and we have just recently completed the removal of the feeder pipework as part of the primary heat transport system providing coolant to the channels. This work was completed without any contamination control events

or issues. As well, no alpha contamination control or issues too.

As well, we have managed the appropriate shipments of all the associated wastes with this work. The current worker dose is projected on target for the project as well.

We will be progressing now through the initial cuts and we have made them on the pressure tubes in preparation for moving into the next phase of reactor disassembly which will have us removing the end fitting assemblies, and then the pressure tubes themselves.

I'm at the end of the update and I'm available for any questions.

THE PRESIDENT: Questions? Anybody?

So any surprises? I want to hear from OPG. Aside from the fact that you are ahead of schedule, always a surprise in the nuclear sector, but any surprise on operation and, staff, your inspection, any observation about this inspection that is going on?

OPG...?

MR. VULANOVIC: For the record Boris Vulanovic.

So we have had no surprises to date. Obviously, with respect to the execution we have had

lessons learned around the deployment of staff and tooling, particularly to managing our schedule and reliability of execution. But with respect to the condition of the major components, steam generators and reactor core, we have not had any surprises.

MR. FRAPPIER: Gerry Frappier for the record.

From staff's position -- perspective, rather, we are following this very closely of course. As you know, we have quite an inspection plan at site as well as a team here that is keeping track of activities that are going on.

At this point in time, given that it is mostly a disassembly of the current reactor, it's very focused on radiation protection and getting ready for the -- the next phase which is when they start building the reactor back together. Certainly at that point we'll have a lot of inspection points that we will be checking on to ensure testing, and as systems become available, and being turned over we will monitor that closely so at the end of the day we are sure that everything is in place the way it is designed to be.

CMD 17-M52

Written submission from CNSC Staff

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

I would like to move on to the next item which is an Event Initial Report regarding a failure of the primary heat transport pump seals, the heat transport pump seals at the Bruce A Unit 3 Nuclear Generating Station. This is outlined in CMD 17-M52.

This matter was also discussed at the August Commission meeting.

I will turn to CNSC staff, and I understand that Bruce Power will make a presentation also.

So Mr. Frappier, you still have the floor.

MR. FRAPPIER: Thank you very much.

Yes, at the last meeting we had mentioned it; at the time we didn't have very much detail. We brought it to the attention of the Commission that at Bruce Unit 3 there was a failure of the primary heat transport pump seal and we had promised at the time to come back with a more complete event report which is submitted to you as CMD 17-M52.

And perhaps to help us walk through it,

given that it is fairly technical, I think Mr. Frank Saunders from Bruce Power is willing to make the presentation for you.

So, over to you.

THE PRESIDENT: Okay. Mr. Saunders, over to you.

MR. SAUNDERS: Afternoon.

So I'll just sort of step through this. You'll see in some of this at the last meeting, as you said, but just to refresh your mind, this is the pump here, pump motor on top, pump itself down below.

It doesn't really show you here, but this is it right here in the plant, is the top of containment. So the pump itself was inside containment. The motor is outside containment.

This piece here we call the pump stool. In essence, it supports the motor, and allows us to align and fasten the motor in place.

A little more arrangement there, but that was really what kind of what I wanted to get at.

Between the pump and the motor is this area here where we have the coupling that couples the motor shaft to the pump shaft.

This is actually what it looks like in the

plant. Two PHT pumps. There are some motors you see here in the foreground and then you just see the top of the motors in the background.

And then just to look at the diked area where the water leaked to, water really goes to two places. It starts going to D2O collection and then if there is more than that can handle it, builds up in this diked area. Filled about 20 percent of this diked area in this case.

So on August 17th, the event occurred about four. We tripped the pump at 4:18 in the morning, so early in the morning about 12 hours after we had shut the unit down for our maintenance outage.

We did go through a complex trouble-shooting process after that. This is defined in our engineering procedures. We identified many potential failure modes and slowly eliminated them or verified them, as the case may be. We engaged in multiple independent reviews. We did it with our own staff. We actually had some OPG specialists as well. We had staff from a couple of independent companies who specialize in doing this kind of work. So most of that trouble-shooting took place between 3rd August and the 15th of September.

So aside from the trouble-shooting we looked at a number of evaluations from the operations point

of view, operability evaluations. So this was really looking at the motor and the casing and the pump and so forth to make sure that they were serviceable. We did decide in the end that we would replace the motor and sent it away for forensics just to be sure.

We looked at the other pumps of course that were in the system. These pumps actually -- they ran for about 15 minutes to an hour after we shut pump 4 down to cool down the heat transport system and they didn't show any leaks. We are reasonably confident we had a good look.

We looked at vibration monitoring recommendations on the set points for the pump monitors and you will see why in a minute when I get into what went wrong here. And then we looked at a return to service plan for this when we brought it back and what kind of monitoring we wanted to do.

So since then we did repair the pump, put in a new pump, rotating elements, new seals, new motor, new couplings all in and started it up. It ran fine.

The root cause is complete. We do have the pump motor offsite for forensics. So we may open that root cause again if we find something in the motor that actually contributes to the root cause, but at this point we don't think so.

So there is a number of experiences of this in the industry. We looked at all that OPEX that was out there. We didn't find any specific OPEX that looked exactly like what happened here. We had a partial seal failure in Bruce Unit 2 in the past, but it was very much attributed to the motor and a vibration resonance in the motor. It wasn't related to the pump. We didn't see that here.

And Darlington did experience a seal failure in 2013. It was a manufacturing issue. There was good OPEX on that and we had replaced all those seals since that period of time based on that OPEX from Darlington. There was no indication that the seals were the cause of this one.

The failure though that we came up with basically looks at a couple of things. We did find that the "as left" condition from the previous maintenance that the set points, the vibration or the runout, depending on how you want to look at it, they are one and the same. So the horizontal runout on the pump motor shaft when it was coupled to the pump was set near the tolerance level that you're allowed after maintenance. This is in the order of a very small few thou, and so it was near the top of that.

Bruce A is also peculiar in that it only

has one proximity probe that does this runout measurement. Bruce B actually has two, so you're able to detect whether there is as an oval issue. The one probe is great as long as your runout is circular. If your runout is not perfectly circular then you need the two probes at 90 degrees to be able to see that properly. So we don't have an indication whether that was a problem here but one of the things we did before we went back to service was bring this pump up to modern standards on the two proximity codes and a finer detection.

So when the tolerances are tight then the clearances between the rotating and the stationary seal are obviously less than some places on the pump than they would be otherwise. There is a vibration mode you go through as you depressurize these pumps. You get some slight increase in vibration, again in the order of relatively small amounts but we do detect that when we depressurize the heat transport system that there is a little more vibration.

In this case, what was fairly clear was that we did get contact between the rotating and the -- the computer is turned up -- between the rotating and the stationary elements. And I will show you just sort of where that happened momentarily.

As that contact continued and heated up

the shaft, as the shaft heated up it bent. And the word bent you have to use with -- very advisedly here. You wouldn't be able to see it with your eye but it did deflect slightly. That increased the contact even more and, of course, as the heat increased and the bend was bigger, the seals failed.

This all happened in a fairly short period of time. In the diagnosis we started to see as we pulled off the instrumentation data later, the first signs that something wasn't quite right here started about 04:00, and the pump was tripped at 04:18. So it wasn't a very long period of time between when some of the indications started to appear, and when they happened.

The control room, of course, even though there is data being recorded on a system, doesn't see all of that detailed data. They have high temperature alarms or high vibration alarm, but they only see it when it passes the high level. In this case, high vibration and then the high leak rate is what triggered them to trip the pump.

I brought along a chart here which -- to look. So just to kind of show you how this works. You have your primary seal here, right in this little spot, secondary seal there and we call this a tertiary seal.

It's not in truth a seal, it's more like a small gap, it limits water flow. It's not a seal in the same as the other two are.

You have a number of things that are monitored. The first kind of indications that we started to see around four o'clock was some temperature changes in the water supply, and then later we seen a few -- this thing here is the inner space pressure transmitter. So, this is a pressure differential between the seals. We started to see some fluctuations in that.

The control room really wasn't seeing this, but we can pick it up off the data afterwards. And so, those were the first kind of things.

When we disassembled the pump and looked at the forensic, the obvious contact that act -- where the shaft actually bent was just in this region here, just at the top.

And so, it contacted between the rotating and the stationary parts. You can see the wear quite distinctly on it. And in the forensic, they were able to detect that that shaft was slightly bent as a result.

As the shaft bent slightly, of course, it contacted the seal parts down here. As it made contact with those parts, then the seals, which are very tight

tolerance themselves, started to be destroyed and then the leak occurs and very quickly the leak is detected by a variety of ways.

So, the extent of condition. So, obviously we looked at the other pumps to see what the issue was. All of the pumps in A and B have actually been through a unit shutdown since our last seal replacement, so there was none that was new and untested.

The post-maintenance tolerance was reviewed for all pumps and none were in the range that this one was in.

We are actually looking further at Bruce B in a little more detail just to be sure. Like I say, they do have additional instrumentation available. We actually have Unit 6 in outage right at the moment and part of that outage plan was to replace two pump seals.

Typically we see the seals -- as they start to fail, we start to see small water leakages by the seals and the like, and so we schedule a maintenance at the next outage or, if indeed it looks like it's failing quicker than that, we take the unit offline and fix it. But generally it's a slow, progressive kind of process.

So, corrective actions. Enhanced vibration monitoring installed already in Unit 3. We're

going to install it at all the Bruce A units as they come down for the next maintenance outage.

The calibration procedure and the calibration used are being updated to tighten the tolerances even farther than they have been in the past.

We are looking at the asset management plans as to how to maintain the pump rotating elements in the future. You know, they are part of the MCR asset management work anyway, but obviously, we'll be informed from this event about how we need to look at that maintenance.

We have already replaced 22 of 32 pumps at the Bruce site. This has been ongoing capital work for the last three or four years as we slowly either replace them with a new pump or take them out and rebuild them and put them back in.

And, like I say, the pump for a motor is getting some additional forensics off-site where they've got the capability to run that motor up and test, just in case there was some kind of a vibration issue in the motor which we can't see with our instruments, we get them to check. If that's the case, then that will -- you know, we will re-open the root cause and have a look at that. This motor had not been replaced yet, so this was not a new

motor.

So, summary. The repairs are complete, the unit started up fine and no issues at all. The root cause is complete, save for the possibility we might need to, if the forensics says so, re-open it. We have looked broadly at the extent of condition within the site and are satisfied that there's no outstanding issues there.

And we will consider the longer-term actions as part of our MCR work in terms of how we approach the repair of the pump.

And that's it for the slides.

THE PRESIDENT: Thank you. So, why don't we jump into the questions? I don't know if we have an order here.

Dr. McEwan?

MEMBER McEWAN: Thank you, Mr. President.

Thank you. That was very helpful.

So, this is really a one-off, it's not been reported in any of the other units and it's not been seen in OPEX otherwise.

How do you expect something like this? I mean, is there any predictive assay you can put in prospectively to try and identify something that happens once in a blue moon?

MR. SAUNDERS: Yeah. I think the learning from this is, I think just about how sensitive these pumps are to the set-up tolerances, so you know, and the equipment is a little older now and perhaps the -- you know, perhaps the proximity probes ought to have been replaced sooner. You can't be -- especially when you only have one, you can't be absolutely sure.

So, the real lesson learned out of this is, the pumps are very sensitive to the tolerances they're set at, so the set-up is important. We need to make sure that the calibrations on the probes and the functioning of the probes is checked every time that we do it and so forth.

So, we don't see anything here that looks like a trend, that looks like it would be a progressive failure. There certainly is no indication of damage to the shaft, there's no fractures in the -- well, I should say other than the damage caused by the rotation, no fractures in the shaft, none of those kind of things which you would perhaps suspect because of age and wear, we didn't see any of that.

THE PRESIDENT: Who is next? Dr. Solimon?

MEMBER SOLIMAN: Thank you very much.

It's a very good presentation. I have two

questions. The first one is, this misalignment would create out-of-balance force and this out-of-balance force is dynamic in nature, it depends on the spin and the weight and it will create a clearance, as you said. So, if there is a clearance it is out of balance, out of balance would create a dynamic out-of-balance force.

That out-of-balance force is not taken into consideration in the original design of the pump. So, how we consider that force on the -- or what will be the effect of that new force which is not taken into consideration during the design of that pump into the existing one today?

MR. SAUNDERS: Yeah. I'm not sure I can answer that question in its entirety.

But, of course, the run-out measurements are intended to limit that out-of-balance, right. We do, also, balance the pumps as we bring them up. So, whenever we disassemble a pump to put a seal in or whatever, we do actually balance the pump to make sure that that momentum that comes, as you say, from the pump being out of line is within certain tolerances.

So, there are two tolerances you have to match there. One is the run-out itself and the other one is the vibration because of balance. So, you have to

achieve both of those things on the pump testing before you run it up. So, we tested both with manual and then with a run on the pump before we actually put it into service.

So, we do test both of those things and those limits are set by people that are more knowledgeable than me. So, that's our protection against it.

MEMBER SOLIMAN: Okay. I'll put my question in some other way. The out-of-balance force is an extra load on the stationary parts, on the coupling, on the flanges, on the bolts.

And we know, for example, that the bolts is -- when you tighten them they go into the unit. You have to -- the load always yielded the bolt and this extra load could make them drastically deformed maybe and if there is looseness in this coupling it might damage the bolts, it might damage the coupling.

So, an inspection on these parts in the video earlier, I think what you are saying has been done and no damage has been observed. That's what you're saying?

MR. SAUNDERS: That's right. I thought you were talking about in future. But, yes, for this we did forensic exams on all of those parts and cut the shaft and various things to look for any kind of internal damage

as well.

So, yeah, the forensics, we looked at both the coupling, the bottom of the motor shaft, the pump shaft itself and the coupling itself and those are all replaced in this, but yeah.

MEMBER SOLIMAN: So, you done the inspection, but in order to record that force you need -- and what this force effect on the stationary structure, you need to produce some documentation such as stress analysis or whatsoever, designer needs a design with this load.

It is not a big effort, but to keep record that this happened and the effect of that on the structure is A, B, C.

MR. SAUNDERS: Sorry. Yes, we brought in a specialist to do those kinds of analysis for us and, yes, that's all recorded as part of the root cause and that root cause will be sort of formally issued roughly in the next couple of weeks, assuming we don't find some forensics on the motor itself that cause us to change it.

So, yeah, we've done the analysis, we looked at all the potential impacts. In the end, part of the reason we decided to replace the pump motor as well was a sort of just in case, right. Well, maybe it didn't cause the event, but maybe it was damaged by the event, maybe

there's a bearing that's about to fail or whatever, right.

So, we did the analysis -- the specialist did the analysis for us, looked at all the data, gave us the indications of what they thought was the worst case scenario. So, yeah, we did all that.

MEMBER SOLIMAN: Okay. Second question is, I understand also that you are doing destructive and non-destructive inspections. I think I read that somewhere.

What type of destructive and non-destructive tests and what -- if you've done it, what is the conclusion up to this minute?

MR. SAUNDERS: Yeah. So, the non-destructive tests were fairly obvious, right. We're looking for damage, looking for bending or bows or, you know, those sorts of things, looking for anything that -- you know, measuring tolerances and the like. So, the non-destructive testing I don't think is anything that would surprise you.

Because there was OPEX in the past that -- in terms of from some of the North American pumps, so issues with shaft cracking and other things, the destructive tests were actually about cutting apart sections of the shaft, looking for yields or looking for

areas where there might have been an indication that the shaft itself was weak or cracked, and we did not find any indication at all that there was any yield internally in the shaft.

So, the damage was all on the outside of the shaft, it wasn't -- it didn't look like it started from a crack on the shaft, nothing that we could find anyway.

So, that's really the difference between destructive and non-destructive there. The one is you measure what you can see, and the other one is you cut it open to see if there's anything on the inside that you didn't see. Now, most of that was done through Kinectrics, and we have detailed records.

I don't personally admit to having read all those records, but there are engineers there who have done that.

MEMBER SOLIMAN: Thank you very much.

THE PRESIDENT: Mr. Seeley?

MEMBER SEELEY: No questions.

THE PRESIDENT: Dr. Demeter?

MEMBER DEMETER: Just a clarification.

You measured the volume as 30 drums. I take it that the number of drums needed to contain the spill was 30. And just to get a sense of volume, that's

all I want to get.

If -- thank you.

MR. SAUNDERS: So 6,000 litres, for the record. I forgot to push the button.

MEMBER DEMETER: Thank you.

THE PRESIDENT: So that actually brings me to my question.

So I'm trying to get a sense on safety sensitive failure for pump is. I thought that all pumps would have an alarm in the control room immediately.

Like I don't understand why it took 6,000 whatever it was -- 6,000 litres before it detected.

MR. SAUNDERS: So that's not quite the right conception. The -- it didn't take that long to detect it. We detected it almost right away and we tripped the pump.

We were still, at the time, at seven mega Pascals of pressure in the heat transport system, so they had to bring the heat transport system pressure down to one mega Pascal before the leak stopped, so what you're measuring is the amount that leaked between the time they tripped the pump and they got the pressure down to one mega Pascal.

THE PRESIDENT: But is there an alarm in

the control room that indicate this?

MR. SAUNDERS: Yes.

THE PRESIDENT: On all your pumps?

MR. SAUNDERS: Yes. Yeah. There are several alarms in the control room, but the primary one is -- the leak protection and high vibration are the ones that sort of get your attention.

Also, on the motor, there's blinding high temperature.

So the ones that really get your attention, blinding high temperatures on the motors because that is indicative of a failure and might lead you to a fire if you're not careful. Vibration on the pump indicates something seriously wrong. It shouldn't -- shouldn't exceed certain high vibration temps. And certainly Vitol collection tank increase quickly is an indication.

If you notice in that diagram, there's a lead off to Vitol collection. If that suddenly starts to move quickly, that's an indication that something is significantly astray with the seals, but the operators operated pretty quick on that and shut the pump down.

Lots of detail recorded in the system that you can go back and look at, but the control room tends to

have alarms that work on a limit, right, so a high temperature limit or a high flow limit or whatever.

So the -- really, the leakage here didn't have anything to do with shutting the pump down. That was the time it takes to depressurize the heat transport system.

THE PRESIDENT: And how often do you replace those pumps?

MR. SAUNDERS: The pumps themselves -- the pumps themselves have not been replaced. You know, those pumps, the way the bearings are built in the pumps, they're water type of bearings, water pressure.

There is no sort of end-of-life date on the pump itself. The motors are more apt to be replaced more often, and we're replacing the motors now.

The major component replacement has those pumps in the work. What wasn't decided yet exactly is what the repair strategy was, so obviously this is going to help us decide what the repair strategy is.

As a minimum, they were going to be pulled out and inspected and checked. You know, obviously this is going to cause us to rethink whether we should just simply pull them out and put new ones in because we want to run for another 40 years, and replacing these things online is

inconvenient and somewhat expensive, so our -- I suspect, in the end of the day, our strategy will be simply to have the new cartridges there, take that one out, put a new cartridge in and move forward.

THE PRESIDENT: Is that what you meant by the longer-term action --

MR. SAUNDERS: Yes.

THE PRESIDENT: -- being considered?

MR. SAUNDERS: Yeah. It's part of our asset management program. We have end of life on all of these components and processes and that, so this builds in a repair.

So we for sure are going to inspect them, and likely we're going to overhaul them, but you know, we would be -- we would take this into consideration now and reflect that in the plan.

THE PRESIDENT: Staff, does anything in your inspection that changed or learned as a result of this incident?

MR. FRAPPIER: So Gerry Frappier, for the record.

So certainly when this event happened, the CNSC conducted a Focused Inspection on the event to take a look at whether Bruce responded appropriately to the event,

as we were just saying, given the amount of water and that. Also looking at their plans for investigation to make sure it's an appropriate -- they're conducting appropriate investigation and then, very importantly, to take a look at what the -- any doses to workers out of the incident and emissions to the environment.

And from that, we found that there was -- there was nothing that exceeded regulatory limits and that we were happy that they're conducting the investigation properly.

We are still reviewing the root cause analysis and we'll also be looking at some of these longer-term actions to see whether we concur 100 percent with them.

THE PRESIDENT: Okay. Thank you.

Any other -- okay. Thank you. Thank you very much.

CMD 17-M53

Written submission from CNSC Staff

THE PRESIDENT: The next item is the Event Initial Report regarding an exceedance of Beryllium Occupational Exposure Level for two workers at BWXT Nuclear

Energy Canada.

This is outlined in CMD 17-M53, and we have representatives from BWXT here in attendance.

But first I will turn the floor to CNSC Staff.

Ms Tadros, I understand you're going to make the presentation. Over to you.

MS TADROS: Yes. Thank you, sir.

Good afternoon, Mr. President, Members of the Commission. For the record, my name is Haidy Tadros, and I am the Director-General of the Directorate of Nuclear Cycle and Facilities Regulation.

With me today are my colleagues, Ms Kavita Murthy, Director of the Nuclear Processing Facilities Division, and Mr. Julian Amalraj, Senior Project Officer of the same division.

We are also supported by technical staff from the Directorate of Environmental and Radiation Protection and Assessment and the Directorate of Safety Management to answer any questions the Commission may have.

As indicated, we are here to take any questions the Commission may have on the Event Initial Report, CMD 17-M53.

By way of a brief introduction of the

event, on August 22nd, 2017 the licensee, BWXT, discovered that incorrect respirator cartridges had been used by workers performing maintenance work in the Beryllium Operations Area of the BWXT facility in Peterborough, Ontario.

The licensee undertook a root cause investigation and submitted a final report to the CNSC on September 21st, 2017 detailing the root cause investigation into the incorrect use of the respirator cartridges and the filters that were used with the respirators.

The root cause investigation revealed some serious process failure of systems relied upon for safety that could have resulted in an occupational exposure limit exceedance for beryllium for two workers.

Since then, CNSC Staff have conducted on-site follow-up inspections on October 4th and 5th, 2017 and can confirm that BWXT is taking action with regard to the proper use of personal protective equipment.

CNSC Staff will continue to monitor the licensee's corrective actions through routine oversight activities.

The details of the event, CNSC Staff's actions and licensee's actions are captured in the Event Initial Report, and staff are available for any questions

at this time.

THE PRESIDENT: Thank you.

So let's -- unless you want to make a statement now, or are you just waiting for questions?

MR. MacQUARRIE: I would like to make a statement.

THE PRESIDENT: By all means. Go ahead.

MR. MacQUARRIE: It's John MacQuarrie, and I am President of BWXT Nuclear Energy Canada. I'm joined this afternoon by five of my colleagues from BWXT, Mr. Jon Lundy, Vice President of Business Services, Mr. David Snopek, who's Director of Environmental Health and Safety and Licensing, and Mr. Ted Richardson, who is the Director of Fuel Manufacturing Operations, and Sandi Rheubottom, who is an Environmental Health and Safety Specialist supporting that operation, and Ms Amy Connell, who's our occupational health nurse.

We hold the health and safety of our employees and the public and the environment as our primary mission at BWXT, and so we view the exposure of our employees to beryllium in this event as a significant failure of our management system. We're particularly concerned by the repeated nature of the exposure.

Our system is based on a defence in depth

type of system and, you know, are most important defences here are our engineered systems, in other words, how our facility is designed to protect our workers as well as our administrative safety controls, the procedures that they follow.

As well, the behaviours of our people. We are dependent on them to be -- to be vigilant in how they do their work and follow our procedures. And our after action revealed a number of weaknesses in some of those defences, particularly in our administrative controls and in our human performance program.

And so as a result of that, we are taking the corrective actions -- various corrective actions to improve those defences.

In addition to correcting our procedures, we are also working on improving our human performance program and our nuclear safety control program, which we believe will help strengthen the behaviour aspects here that we saw that are concerning.

My personal observation of our facilities -- and I'm relatively new to this operation, as of about a year ago, but my personal observation is that there is a healthy safety culture at our licensed facilities in Peterborough and Toronto. Nevertheless, we

know we can do better, and so our goal is to continue to strengthen our various operations to make sure that they are as safe as they can be.

We have, through our extent of condition investigation, determined that there are some other areas in our system that are related to critical to safety items that need some work, and so we are working through that.

I would say we are looking at the design of our facility to see what we can do to improve that. It's something that we're undertaking. We haven't identified anything that we feel we can do at this point in time, but it is something that we are committed to exploring to make sure that we've done our best.

Thank you for the opportunity to make some remarks.

THE PRESIDENT: Thank you.

So let's go into the question session starting with Mr. Seeley.

MEMBER SEELEY: Maybe just with respect to the number of workers affected, two workers, but one seemed to have more exposure than the other.

Is that -- maybe you could just take us through how you concluded that -- the number of workers and how many exposures happened with respect to the two

different workers.

MR. SNOPEK: David Snopek, for the record.

We have -- for the operation that the PAPR respirator, this type of respirator is used -- it is for an infrequent operation. We have -- when we deploy this respirator, we have personal air samples that get taken during that work. Some of this work, there's other parts of this work that are done under work permit, so we have records of who used the respirator and, for the most part, air monitoring results associated with that work as well.

So we're confident that we know that we have two workers and, as you've mentioned, one individual on one instance and the other individual on 14.

That second individual does the -- primarily does this work, and he does most of this type of work, and that's the reason why.

THE PRESIDENT: Thank you.

Dr. Soliman.

MEMBER SOLIMAN: Thank you very much.

I have question about the exposure limit spread between the province and what we apply here. This is -- this is a question for the staff.

The exposure limit is .05 microgram per metre cubed. This is a CNSC request -- or limit. The

Province of Ontario is 2 microgram per metre cube. This is 40 times high.

I would like also -- I look into the internet about beryllium to get educated about this material and so on, and I discover that the Department of Labour in the United States has put a report as early as -- it will be -- it will come into effect in May 2017 -- came into effect in May 2017 which limit the exposure at .2 microgram per metre cubed of air average over eight hours and 2 microgram per metre cubed of air over 15-minute sampling time.

So the question to the staff, is it time to come on line with other regulators in the United States and others regarding this exposure limit?

MS MURTHY: Kavita Murthy, for the record.

With regards to BWXT as a facility that is under a CNSC licence, they are subject to the requirements of Canada Labour Code, and specifically to the Canada Occupational Health and Safety Regulations which uses the American Conference of Governmental Industrial and Hygienists limit, occupational exposure limit, which is what is referenced in the manual that BWXT has for beryllium exposures.

You're right. The current provincial

limit is 40 times higher, but that limit is going to align with the ACGIH number as of January 2018.

We have -- in our regulations, we do not have a limit specific to beryllium or any chemical hazards. We do expect licensees to follow the most stringent limits that are in place and to follow in respect for what is in place in Canada Labour Code. This is the most stringent limit, but -- that they could have, and that's what they've been following.

MEMBER SOLIMAN: I think that is the time to line up our regulations with the most -- because this is very costly. If you look at the exposure limit and apply the Ontario or the limit in the United States which is in force right now, it might not be a problem. So it is costly for the -- for all the investigation and all of this.

So I am not saying that you change anything immediately, but I am recommending that we look at all the regulation and take steps in the future.

MS MURTHY: Thank you. Kavita Murthy, for the record.

As I said, our reference goes back to the regulations that are set in the Canada Labour Code. They have a reference to the ACGIH levels, and basically what

that means as ACGIH modifies its limits, those limits will be lowered or changed as appropriate.

We don't have a limit specified. We will follow whatever Canada Labour Code references as a limit.

THE PRESIDENT: But I still don't understand, okay.

Dr. Soliman also mentioned a time element here. I -- it doesn't compute in my mind, and maybe I can get the licensee here, the difference between 2 and .05. Is there a difference in time here that we're talking about or in magnitude? Because he mentioned 15 minutes versus something else.

And I don't understand -- so you quoted some organization. Are they -- are they consistent with the American, or not?

MS TADROS: So Haidy Tadros, for the record.

So yes, sir, they are. They are, actually, the American Conference of Governmental Industrial Hygienists, and they have published the threshold limit value that is currently in use by the Canada Labour Code and also reflected in BWXT's LCH through the CNSC's licence.

So the actual -- the body that put out

these values are the American guidelines that are being used here.

Perhaps, as you mentioned, BWXT can fill in, even from a health effects perspective. I do get Dr. Soliman's point about the costs, but from a health perspective, beryllium has been found to have health effects. And I'm sure we can look at it from a safety perspective.

There are -- taking the most stringent is the most safety effective way that we can ensure worker safety at this point.

THE PRESIDENT: But I'm still want to hear, is there time element associated with those limits? Is it a day, per hour, per 15 minutes?

MR. SNOPEK: Dave Snopek, for the record.

I think your question is in relation to the .05 micrograms per metre cubed versus the 2.0 micrograms per metre cubed.

Both of those, the first being from the ACGIH, which is referenced from the Canada Labour Code Regulation, is an eight-hour time-weighted average, as is the Ontario limit that is specified in Regulation 833. It's also an eight-hour time-weighted average.

So they are comparable.

THE PRESIDENT: So how can they be so different?

MR. SNOPEK: Dave Snopek, for the record.

I can -- I can comment that the Canada Labour Code referenced limit prior to approximately 2009, which referenced ACGIH as it does now, was at the 2.0 level. ACGIH lowered their level in approximately 2009 and, by reference, our level -- or limit, rather, was lowered at that time.

THE PRESIDENT: Okay. I'll leave it at that and maybe we'll get some clarification from some experts here.

Who's next here?

Dr. Demeter.

MEMBER DEMETER: Thank you. That was helpful.

So I looked at the two filters, the incorrect and the correct. There's some minor differences in what they filter out, and the big difference being the lack of a HEPA filter in the incorrect filter.

Are there any other chemical pollutants that would also be of concern for individuals that didn't have the correct filter other than beryllium?

MR. SNOPEK: Dave Snopek, for the record.

No. In that area, there -- the primary particulate of concern is certainly beryllium in the area. There's not another.

There are acids used in the area, but the filter that was used is capable of filtering those. It was the particulate piece that was the miss in this case.

MEMBER DEMETER: Thank you.

THE PRESIDENT: Dr. McEwan?

MEMBER McEWAN: Thank you, Mr. President.

I'm still trying to understand -- if I can go back to the concentration of beryllium.

So we have one individual -- and let's just stick with the one individual that had 15 exposures. Can you calculate what a probable cumulative exposure and inhaled particulates would be over those 15 exposures?

MR. SNOPEK: Dave Snopek, for the record.

It's difficult to calculate an accumulated exposure. We know in this case of the one individual it was 14 instances. In 13 of the 14 instances, we know what the concentration was. We were unable to calculate a cumulative exposure based on those.

THE PRESIDENT: Okay. But maybe this is a time to explain to me what is the consequences of getting into, I don't know, scarring of lung tissue and chronic

beryllium disease? What does it mean and is that individual is suffering from any of that?

MEMBER McEWAN: Sorry, can I just add to that? Is there a dose response relationship in the likelihood of getting a beryllium-related disease with repeated exposures?

MR. SNOPEK: Dave Snopek, for the record.

I can answer that and, if necessary, draw upon our occupational health nurse to perhaps add some detail. There are both acute and chronic concerns associated with repeated exposure to beryllium.

In the case of chronic exposure, one of the first reactions that occurs is an allergic type reaction as a precursor to any development of disease. One of the tests, the main test that we use for all of our beryllium workers is to do a test for this allergy. We do that to monitor and make sure that we identify those personnel that may become sensitized and have the potential later to develop disease so that we can take action at the time.

So in response to this event, we did that, an additional test. It's called a beryllium lymphocyte proliferation test. We did that in this case, and in both cases it came back as not sensitized. We are taking

additional action over the next two years to keep these two individuals on an increased frequency for that test, instead of where they would normally get an annual test they're going to be getting an every six-month test for the next two years.

Right now, we don't have any indication that there is any disease or any consequence to these two individuals.

MEMBER McEWAN: So the lymphocyte test is a good predictive biomarker of the likelihood of developing disease consequence?

MR. SNOPEK: Dave Snopek, for the record.

Yes, I believe that it is. I'd turn to Amy Connell to see if you'd want to make any additional comments to that, Amy?

MS CONNELL: Amy Connell, for the record.

Yes. In order for chromic beryllium disease to develop a precursor is beryllium sensitivity. So the best screening tool for healthy workers, healthy beryllium workers, is to have this beryllium sensitivity test completed.

So, as Dave had mentioned, as part of a routine screening they are tested annually anyway, but as a result of this exposure we've upped the testing to every

six months.

THE PRESIDENT: Is that a blood test? What kind of a test is it?

MS CONNELL: Amy Connell, for the record.

Yes, it's a blood test.

MEMBER McEWAN: So for these two workers there is really quite a robust biomarker of risk, is that the summary?

MS CONNELL: Sorry, can you repeat the question?

MEMBER McEWAN: So for each of these two workers you have a robust biomarker of the risk of developing problems in the future (i.e. if they get a change from a negative lymphocyte-based test to a positive lymphocyte-based test, that would then put them into a higher risk category of requiring monitoring and observation?

MS CONNELL: Amy Connell, for the record.

So if they do develop a confirmed positive sensitivity to beryllium, that essentially would be considered a precursor or placing them in a higher risk category of developing the disease. It doesn't necessarily indicate that they've developed the disease, it just places them in that higher category of high-risk bracket.

So we have a fairly robust program in terms of if we have a worker that develops a confirmed positive sensitivity to beryllium, they would be removed from any further exposure and then they are sent on to a specialist for routine monitoring for the disease development.

MEMBER McEWAN: Thank you.

THE PRESIDENT: So let me ask you something, and this is at staff. Before it was BWXT, we knew about GE. But this is the first time I hear about beryllium. So were such activities not conducted by the previous owner? Why didn't we hear about beryllium before?

MR. AMALRAJ: Julian Amalraj, for the record.

Beryllium has been, it's one of the hazardous substances, and the activities associated with the beryllium has always been under licence for GE Hitachi. We haven't talked about it because the focus has been more on uranium. But we have maintained regulatory oversight over an associated activity related to nuclear fuel bundled manufacturing and beryllium operations have been seen as oversight under the licence.

THE PRESIDENT: So they were, staff, you know, people working at GE Hitachi, were they annually

checked for beryllium?

MR. AMALRAJ: Yes. Under the beryllium safety manual the current program in terms of monitoring and oversight in terms of the workers have always been there.

THE PRESIDENT: So over the years, GE Hitachi has a long long history, we never ever got a positive reaction?

MR. AMALRAJ: I think the licensee can answer that question.

MR. SNOPEK: Dave Snopek, for the record.

We have had positive tests in the past for the sensitization. At that point, as Ms Connell had indicated, it's a precursor and we take appropriate action for those personnel and we remove them from further potential exposure to beryllium. I believe we have two personnel in that category and we've taken that action for those two personnel.

THE PRESIDENT: You keep on monitoring them?

MR. SNOPEK: We do. These cases relate to sometime ago as a matter of fact and we continue to monitor them.

MEMBER McEWAN: (Off microphone)

MS CONNELL: Amy Connell, for the record.

The research has shown that it's a little bit unclear if once you have converted to a sensitivity if you always remain that way. It's essentially considered an allergy to beryllium. So research has shown that it's a little unclear if they're always, once they're sensitized, they always are. But within our medical surveillance program, once they're confirmed we have to have two positive lab results to have a true confirmed positive. Once they're confirmed as positive, we will treat them as positive.

MEMBER McEWAN: Idiosyncratic or is there a dose relationship; the more exposure the more likely you are to be positive?

MS CONNELL: Amy Connell, for the record.

So essentially, with beryllium exposure there are different risk factors in terms of developing a sensitivity. You could take several people exposed to the same dose, only one may become sensitized. Once the sensitivity has developed, if they continue to keep getting exposed to beryllium, that's when they're at higher likelihood of developing chronic beryllium disease.

MEMBER McEWAN: Thank you.

THE PRESIDENT: Okay, thank you. Any

questions?

So, staff, on page 6 you said if you agree with the action taken by licensees, but CNSC staff have yet to make a determination on licence action to ensure airborne beryllium particulates are minimized, bla bla bla.

So when is that going to happen?

MS TADROS: Haidy Tadros, for the record.

That is correct, sir. We have conducted the follow-up inspection October 4th and 5th, as indicated, and we've issued the Section 12(2) of the *General Nuclear Safety and Control Regulations* request for information. We have given BWXT until October 31st to provide the four bullets that you see on that page. Then once we have that information we will review the information in light of the initial and the final event report, and then staff will be able to make a determination based on the programs that are at place in BWXT.

THE PRESIDENT: BWXT, are you in agreement with all this?

MR. MacQUARRIE: John MacQuarrie, for the record.

Yes, we are in agreement.

THE PRESIDENT: Okay. You have the final word. Anything you want to say?

MR. MacQUARRIE: No, I have nothing further to add. Thank you for the opportunity to address the matter.

THE PRESIDENT: Okay, thank you. Thank you all.

Are there any other event initial reports? Nobody's coming forward with this, so I assume that there are none.

So we will take a 10-minute break while the next set-up is going on. All right we'll come back at 4:45.

--- Upon recessing at 4:34 p.m. /
Suspension à 16 h 34
--- Upon resuming at 4:47 p.m. /
Reprise à 16 47

THE PRESIDENT: Okay. The next item on the agenda is an update on the 2016-2017 Regulatory Framework Program as outlined in CMD 17-M49 and M49.A. Mr. Torrie, the floor is yours.

CMD 17-M49/17-M49.A

Oral presentation by CNSC staff

MR. TORRIE: Thank you. Bon jour, Monsieur le Président, membres de la commission.

My name is Brian Torrie, Director General of the Regulatory Policy Directorate. With me today are Ms Lynn Forrest, Director of the Regulatory Policy Analysis Division, Ms Karen Owen-Whitred, Director of the Regulatory Framework Division, and other CNSC Staff are available here as well to provide support and answer any questions you may have.

We are pleased to be here today to present our regular update on the CNSC's Regulatory Framework Program. The last update to the Commission was provided in September 2016.

Although we are regularly before you at meetings to discuss specific regulatory documents, this report provides us with an opportunity to highlight the important work we are doing to engage in broader regulatory initiatives in the federal government and to discuss our forward plans which help ensure the CNSC continues to have a modern and comprehensive regulatory framework.

Our presentation today will provide an

overview of the Regulatory Framework Program covering both an explanation of our processes and some of the highlights from the past year. We will then describe our involvement in some of the Government of Canada's regulatory reform initiatives.

There are two main elements making up the CNSC's Regulatory Framework Program. One is the structured collection of documents, which is regulations and regulatory documents we refer to REGDOCs, collectively known as the CNSC's regulatory framework. The second part is CNSC's participation in the Government of Canada's agenda for legislative and regulatory reform.

The overall goal of the program is to provide regulatory instruments that make the CNSC's expectations clear. These expectations must be adapted over time based on experience in anticipation of an evolving nuclear industry. In working towards this goal, the program takes into account Government of Canada regulatory policy guidance as well as the views of stakeholders and the general public.

CNSC Staff bring an annual report to the Commission regarding the work of the Regulatory Framework Program. The annual report we are discussing today covers the period since the last report was submitted, as I said

earlier, in September 2016.

I will now turn the presentation over to Ms Forrest.

MS FORREST: Thank you, Mr. Torrie.

CNSC's regulatory framework includes the structured comprehensive suite of regulatory instruments that are used to achieve CNSC's mandate. At the top of the pyramid you see the *Nuclear Safety and Control Act*, which establishes the Commission, sets out its mandate, and establishes its authority to regulate the development, production, and use of nuclear energy, and the production, possession, and use of nuclear substances, prescribed equipment, and prescribed information in Canada.

The *Act* authorizes the Commission to make regulations subject to governor and council approval, which set out requirements. Licensees or applicants must meet these requirements to obtain or retain a licence or certificate to use nuclear materials or operate a nuclear facility. Licenses and certificates set out more specific legally-binding requirements to which the CNSC will expect compliance.

Moving down the triangle, regulatory documents provide greater detail than regulations as to what the licensees and applicants must achieve in order to

meet the CNSC's regulatory requirements, and may provide also practical guidance on how to meet the regulatory requirements of the CNSC.

As a responsible regulator, the CNSC follows the cabinet directive on regulatory management to ensure that regulatory issues are well-defined and that the choice of regulatory approach is the most appropriate for achieving safety and security objectives.

This includes re-examining previous ways of doing things, exploring options and in cases of new or very different ways of regulating, consulting early with stakeholders through workshops or discussion papers.

The CNSC continually reviews and adjusts its regulatory framework to ensure that regulatory requirements are modern, clear, and supported by guidance where necessary, and that the CNSC is ready to regulate new and emerging technologies such as small modular reactors.

The Regulatory Framework Program is guided by the Regulatory Framework Steering Committee and the CNSC's Management Committee.

This slide shows the CNSC's 13 regulations depicted in three general categories. The regulations of facilities and activities mostly set out requirements that license applicants must meet. The regulations of general

application on the right apply to different degrees to all licensees and, in some cases, to non-licensees such as in the case for transporters of nuclear materials and substances.

The third set of regulations relate to the conduct of the CNSC's business, including cost recover and the conduct of the Commission's proceedings. The CNSC regularly reviews its suite of regulations and makes amendments as needed to ensure that Canadians and CNSC regulated parties continue to be supported by an effective, efficient, and modern regulatory framework. Ongoing reviews of regulations are described later in this presentation.

There were three categories in the previous slide, there are three general categories in this slide as well. All regulatory documents published by the CNSC are now aligned within the document framework showed on this slide. The documents are organized into three broad categories similar to the regulations.

The first outlines expectations specific to different regulated facilities and activities generally in the form of guidance on how to apply for a licence. The second provides requirements and guidance in specific technical areas according to the safety and control area framework that is also used in licensing and compliance,

and which you are no doubt familiar. The third covers all remaining areas that warrant clarity through our regulatory framework.

So within these three categories there are 26 areas, or series as we refer to them, listed above. For each series there is a list of REGDOCs to be published. For example, if you go to 2.7, Radiation Protection, below that there are two regulatory documents, REGDOC-2.7.1 Radiation Protection and 2.7.2 on dosimetry.

There are 58 REGDOCs in total published or planned under this regulatory document structure. To date, a total of 28 of these have been published.

The CNSC has a rolling five-year regulatory framework plan that outlines the plan for developing all of the remaining regulatory documents as well as for the development of regulations and potential regulatory amendments.

Regulatory issues may be identified by CNSC management or Staff, the Commission, or external stakeholders. They may stem from things such as operating experience with existing requirements and guidance, advancing technologies, issues of non-compliance due to lack of clarity, new government policies, or international events such as Fukushima, to name a few.

So regulatory analysis is undertaken to achieve a clear identification of the regulatory issue, ensure the regulatory project is aligned with the CNSC's mandate, spell out the objective of the regulatory action the CNSC might want to take, identify the expected impact on stakeholders, and determine very early in the process if a discussion paper is appropriate.

So just above the analysis box, discussion papers. They're used to obtain very early input from stakeholders, more specifically, they're used when considering amendments to REGs or creating new regulations. For example, our discussion paper in 2015; Proposal to Amend the Nuclear Non-Proliferation Import and Export Control Regulations where CNSC proposed updates to align with new international guidance.

Discussions papers may also be used when proposing regulatory oversight in an area where the CNSC has not previously exercised its authority under the *Act*. One example is a 2011 discussion paper; Implementation of Financial Guarantees for Licensees where the CNSC was proposing to extend the requirement for financial guarantees to smaller licensees to which they had not previously been applied.

Another use of discussion papers is when

the CNSC has considered exercising authority in a different manner than in past practice, such as implementing the administrative monetary penalties and when the CNSC is considering how it will regulate new or emerging technologies such as in 2016's discussion paper; Small Modular Reactors, Regulatory Strategy Approaches and Challenges.

So discussion papers are not the only form of outreach, as you can see below the analysis box, that takes place during the analysis phase. Stakeholder workshops, discussions with other nuclear regulators, dialogue with other government entities at all levels, and other forms of outreach all help inform CNSC's approach throughout the analysis and instrument development process. That's why you can see stakeholder engagement all across the bottom.

The output of analysis then is the identification of a regulatory instrument to be used, be it a new or amended regulation, a REGDOC, or another form of regulatory action. An analysis may identify such instruments that may be used to address the regulatory issue at hand, such as standards developed by the CSA group or use of other third-party standards such as ASME. These may be referenced in regulations, REGDOCs or in licence

conditions.

So since the last Regulatory Framework Program update to the Commission in September 2016 we have solicited early public feed back on the following discussion papers. *Radiation Protection and Dosimetry* sought feedback on the CNSC's proposal to consolidate a number of older regulatory documents that didn't follow the nomenclature and the current structure into two new regulatory documents on dosimetry and on radiation protection, those two I mentioned earlier.

Radioactive Waste Management and Decommissioning sought early feedback on proposals to improve clarity of the CNSC's regulatory framework for its radioactive waste management and decommissioning. The CNSC is currently reviewing its approach to regulating in this area and will be modernizing a number of regulatory documents over the next couple of years.

Small Modular Reactors: Regulatory Strategy Approaches, and Challenges was published in 2016 and the *What We Heard Report* was published recently on September 19th, it outlines the next steps in providing further clarity to the regulatory framework for SMRs.

First, the CNSC is moving forward with amendments to the *Nuclear Security Regulations* to remove

prescriptive requirements that were established for large nuclear power plants. The plan is to replace these with objective-based requirements that will provide flexibility for new technologies to achieve the same level of security, using different approaches.

Second, the next step is to provide greater clarity on application of the graded approach in reviewing licence applications for SMRs. The CNSC is hosting a workshop on the subject on November 24th, 2017. A synopsis of this workshop will be published, and the input received will be considered as the CNSC seeks to provide greater clarity of requirements for small modular reactor applicants.

Third, the CNSC will provide greater clarity on licensing for SMRs through the publication of a Licence Application Guide REGDOC for SMRs. We are targeting publication of this document in March of 2018.

The CNSC published DIS-16-05, Human Performance, to develop a shared understanding of human performance with industry and to open a dialogue with interested stakeholders about how the CNSC considers human performance in its regulatory framework. Feedback received will inform development of a document on Human Performance.

Finally, recovery in the event of a

nuclear or radiological emergency is a broad and complex matter that will impact many levels of government and numerous emergency response organizations. To begin addressing these complexities and collect early feedback, the CNSC worked with multiple organizations to publish DIS-17-01, Framework for Recovery in the Event of a Nuclear or Radiological Emergency. This paper, which was published in August 2017, describes the measures that decision-makers may need to consider prior to, or following, the response to an emergency. The CNSC is developing a regulatory document on this matter.

Thank you. I will now turn the presentation over to Ms Karen Owen-Whitred.

MS OWEN-WHITRED: Thank you.

For the record, my name is Karen Owen-Whitred, Director of the Regulatory Framework Division.

As noted earlier, one of the instruments that can come out of regulatory issue analysis is the development or amendment of regulations.

This slide outlines the process for developing regulations and I will just run through these steps at a fairly high level.

We have broken the process into three

steps: developing the proposal, developing the package and making the regulations.

Within the first step, I want to highlight the importance of early consultation. When considering a regulatory amendment, the CNSC engages with stakeholders very early in the process, through information sessions, workshops, presentations at conferences, discussion papers, et cetera.

Based on those early consultations, a draft regulatory package is prepared, including the draft regulations, and a Regulatory Impact Analysis Statement. The Commission is briefed on the proposed changes through an in camera session. The package is finalized and all the necessary approvals are obtained.

The ultimate approval to consult on the draft is required by Governor in Council. Assuming that approval is received, the draft regulations are then published in Canada Gazette Part I, typically for a 30-day consultation period.

The feedback received through the Canada Gazette I process is considered in developing the final regulatory package. At this point, the updated proposed regulation package is presented to the Commission in order to make the regulations. Following Commission approval,

the final package is brought to the Governor in Council for approval to publish in Canada Gazette, Part II, which brings the regulations into force.

The next two slides highlight the regulatory packages on which CNSC staff are currently working.

First of all, over the past year CNSC staff have finalized amendments to the *Radiation Protection Regulations*, *Class I Nuclear Facilities Regulations*, and *Uranium Mines and Mills Regulations*. The amendments, which address lessons learned from the Fukushima accident, were published in the Canada Gazette, Part II, on October 4, 2017.

Given the changes to international benchmarks and the adoption of new radiation protection guidance worldwide, CNSC staff have determined that the *Radiation Protection Regulations* should be reviewed and modernized. Staff have also identified opportunities to improve the Regulations to clarify requirements. We are currently working with the Department of Justice on drafting the proposed Regulations and are targeting public consultation in Canada Gazette, Part I, in early 2018.

CNSC staff are also currently working on proposed amendments to the *Nuclear Non-proliferation Import*

and Export Control Regulations in order to modernize these Regulations and to align with current international guidelines for the control of nuclear and nuclear-related imports and exports. For this project, the CNSC is targeting public consultation in Canada Gazette, Part I, in the spring of 2018.

Finally, the last major revision of the *Nuclear Security Regulations* was completed in 2006. Since then there have been a number of drivers for amendments to the Regulations, such as evolving security threats, technological advances, small modular reactors and operational experience.

CNSC staff have conducted early consultations with stakeholders to obtain input into the review. In the past year the CNSC organized three workshops with stakeholders who are directly responsible for implementing security measures at nuclear facilities or responsible for the security of nuclear material. The CNSC is targeting public consultation for these amendments in Canada Gazette, Part I, in 2019.

The second regulatory instrument we manage is regulatory documents, which are described in the next few slides.

Prior to the reorganization of the CNSC's

regulatory document framework, a variety of regulatory instruments were used to clarify requirements and provide guidance. At one time there were over 150 regulatory documents in the framework library under different nomenclatures, ranging from policies to standards, guides and requirements.

A review of the regulatory document framework, which began in 2009, found that there were no regulatory gaps. Nonetheless, it was decided that the clarity of the framework could be improved by adopting a more logical structure and naming nomenclature, and by consolidating and reducing the total number of regulatory documents.

This improvement initiative began in 2013, with a five-year timeline, the goal being to complete the full migration of existing documents into the new, structured framework by 2018.

Since the last update to the Commission in September 2016, we have continued to actively clarify our regulatory expectations in various areas of the framework through the publication of REGDOCs such as the ones shown on this slide.

I won't read through the individual titles, but as you can see, this slide lists 8 of the 12

regulatory documents that have been published since September 2016, the most recent being REGDOC-1.1.3, Licence Application Guide: Licence to Operate a Nuclear Power Plant, which was brought to the Commission for approval to publish in August of this year.

Overall, CNSC staff have continued to make steady progress on our regulatory document framework modernization project and we have already achieved a framework that is clearer, more transparent and more responsive to emerging issues.

Recall that the document framework consists of a planned 26 series comprised of 58 REGDOCs. In total, since beginning the project in 2013, we have published 28 REGDOCs. In many cases, a single REGDOC consolidates information from multiple legacy documents. As a result, out of the more than 150 legacy documents referred to earlier, only 61 remain to be reviewed and converted into the new document framework. While this represents a significant accomplishment, it is clear that work remains to be done, particularly in light of the original five-year plan.

Over the course of the document framework modernization initiative, staff have encountered challenges that have affected the project timeline.

The results of the past two years indicate a steady trend of publishing 7-8 REGDOCs per year, which is fewer than originally planned. One of the reasons for this is the value that we place on stakeholder consultation. In many cases, we have increased our standard consultation period for draft REGDOCs from 60 days to 90 or even 120 days in response to stakeholder requests for more time. This allows us to better explore regulatory issues with stakeholders and ensure that all points of view are well understood. However, it can extend project timelines beyond what was planned. Furthermore, we recognize that the pace of REGDOC development can create consultation fatigue for stakeholders, which is something we try to take into account.

In addition, other operational priorities can challenge CNSC staff's ability to dedicate significant resources to support the development of regulatory documents. As a result of these challenges, the original 2018 objective has been revised.

As indicated earlier, 28 REGDOCs have been published to date out of a planned 58. That leaves us with 30 REGDOCs to be published, which will collectively supersede the remaining 61 legacy documents.

Based on our performance thus far, we have

set a stretch goal of publishing 10 REGDOCs per year over the next three years in order to complete the modernization of the regulatory document framework by 2020. While this is an ambitious goal, it includes the planned republication of certain legacy documents that have been reviewed and reaffirmed by CNSC staff, with the new framework naming and nomenclature. Since these republications involve essentially repackaging existing documents, they are developed and published relatively quickly.

While the revised plan, which is published annually on the CNSC website, maps out regulatory projects over the coming years, the regulatory document framework continues to be responsive to emerging regulatory issues, which can lead to changes in project prioritization. For example, CNSC staff are currently prioritizing regulatory documents related to SMRs.

To give Commission members a sense of what to expect from the regulatory document framework over the coming months, here are the REGDOCs that we currently plan to bring to the Commission meetings for the remainder of this fiscal year. I won't read the individual titles, but you can see that there are two planned for the meeting in December 2017 and three for March 2018.

Finally, as mentioned earlier in this

presentation, in addition to regulations and REGDOCs, there are other instruments available to the CNSC when considering how to address a regulatory issue. In this respect, the CNSC often leverages international and domestic best practices, in the form of standards, in establishing regulatory expectations.

Nuclear standards produced by the Canadian Standards Association (known as the CSA Group), are a particularly important component of the CNSC's regulatory document framework.

Nuclear operators participate with the CSA Group in its standards program to develop consensus-based nuclear-related standards for equipment and performance, to improve safety and reduce risk. The CNSC provides input to these standards and determines whether licensees must meet a standard, in whole or in part. Leveraging the work of the CSA Group is a cost-effective way for the CNSC to enhance its regulatory framework.

Over the past year, the CNSC and CSA Group continued their efforts to ensure alignment between the CSA Group nuclear standards program and the CNSC regulatory document framework program. The CNSC and CSA Group meet regularly to discuss standards and program planning.

In order to ensure transparency of

regulatory expectations, the CNSC has arranged with the CSA Group for their standards to be available to the public through the CNSC's website. Notification of draft standards issued for public review are also forwarded to CNSC's almost 4,000 stakeholders through its distribution email list.

In addition to CSA standards, we also leverage codes and standards produced by international organizations, such as the International Atomic Energy Agency, American Society of Mechanical Engineers, and the American National Standards Institute.

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

MR. TORRIE: Thank you. Regulatory reform has been an important part of the Government of Canada's agenda over the last several years, and CNSC has been, and continues to be, actively involved.

In June 2016, the Government of Canada launched public reviews of environmental and regulatory processes. These reviews are focused on;

- one, Environmental assessment processes under the Canadian Environmental Assessment Act 2012;

- two, reviewing the Fisheries Act and the Navigation Protection Act;

- and modernizing the National Energy Board.

Under the CEAA 2012, the CNSC is responsible for conducting environmental assessments for nuclear projects. For some CNSC licensees, authorizations are required under the Fisheries Act and the Navigation Protection Act.

In June 2017, the Government of Canada published a discussion paper, Environmental and Regulatory Reviews, summarizing its proposed path forward in light of the recommendations of all four review processes.

The proposed path forward includes several changes concerning environmental assessments, including a proposal to re-scope 'Environmental Assessment' to 'Impact Assessment' and to consider a broader range of factors (environmental, economic, social, health and Indigenous knowledge).

The discussion paper proposes a single responsible authority for all federal impact assessments. This means the CNSC would no longer be responsible for these assessments for nuclear projects. However, the CNSC would, of course, continue to be responsible for all matters under the NSCA, including environmental protection.

The CNSC continues to collaborate with the

federal departments and agencies leading the reviews. To conclude, since the last update of the regulatory framework program to the Commission, we have seen another busy year. The CNSC remains connected and in line with government regulatory improvement initiatives.

We have continued to modernize the framework through the development of new regulatory documents and regulatory amendments, to ensure the CNSC's framework continues to reflect the latest developments in domestic and international lessons learned.

The CNSC's regulatory framework plan outlines a long term plan for our regulatory framework. This work plan will remain flexible and adaptable to the latest developments in federal and nuclear regulation.

We thank you for your attention and remain available for any questions you may have.

THE PRESIDENT: Okay, thank you. So let's jump right into the question period, starting with Mr. Seeley.

MEMBER SEELEY: Maybe just back to my project management days plan for the -- hope for the best and plan for the worst, so I think good progress to date on the reforms. Thank you for that. And it looks to me like the 30 remaining REGDOCs -- I hear some of those are a

little bit of reprints rather than remakes. But do you have a more detailed schedule of that plan when things come out over the remaining three years because to date of course you were showing seven to eight regulations per year, so according to my calculations that would put you late 20-21 at that same pace. So there is a bit, but you're stating 2020 you will have it all done.

So I guess my question is around planning. You know it's a pretty -- I think you're taking on quite a bit for the 30 REGDOCs over the remaining -- over the three-year period. So it's about having a very rigorous plan to manage that. So that would be my question: Do you have such a plan?

MR. TORRIE: Brian Torrie for the record.

Yes, we have a plan. We have a reg framework plan that shows all the phases of development of all these REGDOCs. There is a natural cycle of every five years of supposed to be reviewed. And what we have found, and you have seen this in the presentation is that we've only been able to do seven or eight. We had that original stretch. We were trying to get all 58 done within the five years and I think more recently we have adjusted that plan out to 2020. That plan is available on our website, and we can get you a copy if you don't have it already or it

doesn't, provide it to the secretariat.

Even though, you know, the best laid plans are often disrupted, the reg framework has been a priority and the development of these options has been a priority. But it hasn't always been the number one priority here. There is always other things that happen; Fukushima, for example, that disrupt what other staff may have to do, and we depend quite heavily on the technical experts to provide support to these REGDOCs. And then in the case of Fukushima as well, we had to develop regulations that sort of jumped the queue for our regulations.

So there is sort of those realities that go in our plan, but we found that if we push it out as much as possible that kind of keeps the foot -- the pedal to the ground as far as getting the documents out.

I don't know if Ms Whitred -- Owen-Whitred wants to provide further information on that.

MS OWEN-WHITRED: Karen Owen-Whitred for the record.

The only thing I'll add to what has already been said is, yes, the more detailed plan is published on our website, on the CNSC's external website. We publish that annually. We update it annually. And the next scheduled update to that is around November of this

year. So the plan that is on there right now does not yet reflect the updated 2020 deadline or objective.

MEMBER SEELEY: So I guess I am understanding it has set the stretch target end of 2020 for these remaining 30. You rely on a significant amount of other resources in the CNSC's departments and whatnot, so it's important to have that stretch target there in order to complete the work.

THE PRESIDENT: This was to be my going-away present.

--- Laughter

MS FORREST: Thank you for telling it like it is, sir.

THE PRESIDENT: Just so you know where it was set up. The one thing that we didn't anticipate is, as was mentioned, is that Fukushima happened and we got into regulations. And regulations are very labour-intensive governmental relations. The only thing we had to make sure is that there is no gap in the safety. So whatever they are dealing with is making sure that we update what needs to be updated.

So even though I am not going to get my gift here but I am quite satisfied with the progress made to date with this particular thing. But it's always good

to put some challenges to staff, would be my contribution to this discussion.

MS FORREST: Lynn Forrest for the record.

I just want to add to that there is no document that has not been started. In fact we have our reg framework report here and we have 63 projects underway at this point in time. So a lot of the projects were targeted to be done in 2018. So you can imagine that they are two-thirds done or three-quarters done by now, so making 2020 much more reasonable.

THE PRESIDENT: Dr. Soliman...?

MEMBER SOLIMAN: Thank you. I have questions but not a comment.

In the past we used to issue documents like "P" and "S" documents and guide and now we call this legacy documentation. So are we aiming in five years from now to find or to create one type of document which is a REGDOC, and that's all and all the others will be abandoned, so we will not issue any more policies, standards or guides or whatever?

MR. TORRIE: Yeah, Brian Torrie for the record.

Yeah, that's clearly the objective. We hope to -- well, we are doing that right now in terms of

replacing those policies, the "P"s, the "G"s, the rest of those documents within our reg framework nomenclature. So it's not that those policies are necessarily going to disappear completely, but they are going to be integrated into the new framework so it's quite clear as we are explaining in the presentation, the link to the SCAs and we would think that that should provide more clarity to everybody when they are trying to find out information on our regulatory approach.

MEMBER SOLIMAN: Thank you.

THE PRESIDENT: Dr. McEwan...?

MEMBER McEWAN: Thank you, Mr. President.

Congratulations. I mean I think it's an immense work.

How do you identify -- do you proactively identify stakeholders, because if you look at the different REGDOCs that you have published, the stakeholder populations are widely different. So do you attempt to proactively identify? Do you hope that the publications will actually bring people in?

MR. TORRIE: Yeah, Brian Torrie, for the record.

I'll start the answer here, and Ms Forrest and Owen-Whitred will hopefully back me up.

So increasingly, that's what we're trying to do. In general, we start with our subscription list, our email list, which is now up to about 4,000 people, so that's obviously not targeted, but it is one of the main vehicles for getting the word out about what we're working on.

Then we have, in the case of certain REGDOCs -- and Karen can provide further information on a couple of examples -- we have targeted emails.

So for example, when we had the Aboriginal consultation REGDOc, we targeted Aboriginal groups, especially those that were within range of some of our facilities, for their input in the document.

We also provided funding to some of those groups to participate in the review of the document.

Then we have a whole series of outreach that we do. We do what we call a CNSC 101 where we bring up these documents, and these can be targeted to communities where the Commission is appearing near facilities again or at industry events like the Nuclear Association or the COG Group as well, CRPA.

We also have links through the CSA Group.

More recently, we've been involved in the EA regulatory review, and there's a group there, a

multi-interest advisory committee, made up of environmental groups and industry, provincial governments. So we use that as a vehicle to promote our documents.

In general, too, we also, of course, put these things on the web so they're available there.

And I think Karen Owen-Whitred can speak more clearly to some of the examples of REGDOCs where we've gone through a more targeted consultation as the document evolved and we had comments coming in from different groups.

MS OWEN-WHITRED: Karen Owen-Whitred, for the record.

So I'll just add to that one specific example that we're dealing with right now.

One of the REGDOCs that we hope to bring to the Commission within the next few months that's listed on slide 18 is REGDOC 2.7.3, Radiation Protection Guidelines for Safe Handling of Decedents.

In this case, we actively identified a very different group of stakeholders from those with whom we normally interact, namely, death care professionals, crematoriums as well as provincial authorities that would have jurisdiction in this area. So that's just a recent example of where we actively reached out to a targeted

group of stakeholders to make sure that they were aware that public consultation was going on with this particular REGDOC.

MEMBER McEWAN: Have you had good feedback from that targeting, that specific targeting?

MS OWEN-WHITRED: I'll let -- Karen Owen-Whitred, for the record.

I'll let -- I'll start that answer and then I'll pass it over to Susan Fundarek, who is the office responsible for that particular project.

I would say yes, we have received -- the -- that consultation period, I believe, extends into November, so we're not near the end yet. And often we receive the most comments the day before the consultation closes. But that being said, we have already received a number of comments from that particular one.

And I'll pass it to Ms Fundarek to add more detail to that.

MS FUNDAREK: Susan Fundarek, for the record.

For this document, typically for public consultations we don't get anything, as Karen says, until the last week before the close of consultation. But in the case of this REGDOC, we received five comments already.

Two are from crematorium operators asking specific questions about the procedures for handling the ashes, and we had one question from a radiation safety officer at a cancer centre.

And someone on the Commission has provided a comment through Marc Leblanc -- I don't know who that is -- commenting on three nuclear substances that were not included in the guide at this time.

So we are setting out a reminder to all the target email list, which is over 300 in addition to the subscriber email list, and that includes, as Karen mentioned, provincial governments.

There are various regulatory boards that oversee crematoriums, so since there are several guidelines regarding cremation, we've reached out to those boards. And we have also sent a targeted email to the radiation safety officers responsible for radiation safety in medical institutions and cancer centres.

MEMBER McEWAN: Thank you.

THE PRESIDENT: Dr. Demeter.

MEMBER DEMETER: Thank you, Mr. President.

Thank you for the very good overview. There's a lot of information in it, but it's nicely packaged.

To help me understand the interface between CNSC and other agencies, I'll use the emergency planning as an example.

So there's a document you talked about the recovery, and then there's a current document of preparedness and response, so that should cover the initial and the early and the late response.

Health Canada's put out a couple of publications on food and water, also on initial event response.

How do you synergize with -- because it's all about protecting human health in the event of a disaster, nuclear in this sense. How do you synergize to make sure that you're on the same page or perhaps even have similar publications or perhaps a joint publication?

MR. TORRIE: Okay. Brian Torrie, for the record.

I'm going to ask Mike Rinker to fill in that answer, but essentially, when we get to the REGDOC development stage or even the analysis stage in the development of the documents, they rely pretty much heavily -- they rely heavily on the technical experts who have existing relationships with other parts of governments, and I think that's what Mike can speak to.

MS PURVIS: Thank you for the question.

It's Caroline Purvis. I'm the Director of the Radiation Protection Division, for the record.

So CNSC Staff is actually working in collaboration with Health Canada on the development of the Regulatory Document for what we termed as "recovery". The discussion paper was a collaborative effort as well between the two organizations, and we sought to seek pre-consultation feedback from other interested federal partners as well.

So while the CNSC is publishing the discussion paper and moving towards the drafting of the Regulatory Document, we are definitely in close collaboration with other partners.

MEMBER DEMETER: Thank you very much.

THE PRESIDENT: Thank you.

Okay. I think -- thank you for this presentation. We're looking forward to some of the products coming our way.

I'm not gone yet.

We are good.

MS McGEE: This concludes this portion of today's meeting. The public meeting will begin tomorrow at 9:00 a.m., and thank you. We thank you for your

participation.

If you borrowed interpretation devices, please remember to return them at the reception and claim your identification.

Thank you. Bonne fin de journée.

--- Whereupon the hearing adjourned at 5:33 p.m.,
to resume on Thursday, October 12, 2017
at 9:00 a.m. / La réunion est ajournée à 17 h 33
pour reprendre le jeudi 12 octobre 2017 à 9 h 00