Canadian Nuclear Safety Commission

Commission canadienne de sûreté nucléaire

Public meeting

Réunion publique

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Le 7 avril 2016

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

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

Commission Members present

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

Commissaires présents

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

Secretary:

Mr. Marc Leblanc

Secrétaire:

M. Marc Leblanc

General Counsel:

Ms Lisa Thiele

Avocate générale :

Me Lisa Thiele

TABLE OF CONTENTS

Ottawa, Ontario / Ottawa (Ontario)

--- Upon resuming on Thursday, April 7, 2016,
at 9:04 a.m. / L'audience reprend le jeudi
7 avril 2016 à 9 h 04

CMD 16-M10

Opening Remarks

M. LEBLANC : Bonjour, Mesdames et Messieurs. Bienvenue à la continuation de la réunion publique de la Commission canadienne de sûreté nucléaire.

We have simultaneous translation -- or interpretation, I should say. Please keep the pace of speech relatively slow so that the interpreters have a chance to keep up.

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

We would ask that you please identify yourself before speaking so that the transcripts are as complete and clear as possible.

The transcript will be available on our website by the end of next week.

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

proceedings.

Please silence your cell phones and other electronic devices.

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

President Binder.

LE PRÉSIDENT : Merci, Marc.

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

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

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

I would like to introduce the Members of the Commission.

On my right is Monsieur Dan Tolgyesi. On my left are Dr. Sandy McEwan and Ms Rumina Velshi.

We just now heard from our Commission Secretary, Monsieur Leblanc. We also have with us Ms Lisa Thiele, Senior General Counsel to the Commission.

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

The agenda was approved yesterday. Please refer to the agenda 16-M11 for the complete list of items to be presented today.

Mr. President.

CMD 16-M15

Status Report on Power Reactors

THE PRESIDENT: The first item on the agenda for today is the Status Report on Power Reactors, which is under Commission Member Document CMD 16-M15.

I understand that representatives from OPG, Bruce Power and NB Power are in attendance ready to answer questions.

I am also informed that Monsieur Sigouin will provide us with an update regarding the nuclear emergency management coordination committee, as was discussed during the December 17, 2015 Commission Meeting.

Mr. Howden, why don't you start us.

MR. HOWDEN: Thank you.

Good morning, Mr. President, Members of the Commission. My name is Barclay Howden. I'm the Director General of the Directorate of Power Reactor Regulation.

With me today are our Power Reactor Program Division representatives plus technical support staff who are available to respond to questions on the

Status Report on Power Reactors, which is presented in CMD 16-M15.

The document was finalized on April 4, 2016. As reported, there was one notable event that occurred in India on March 11th, 2016. Unit 1 of the Kakrapara Atomic Power Station, known as KAPS, India's designed 220MWe Pressurized Heavy Water Reactor, incurred a leak from its heat transport system.

As part of the international collaboration under the MOU between the CNSC and the Atomic Energy Regulatory Board, known as the AERB, we have been in frequent contact with India's nuclear regulator during and after the incident.

Dr. Binder has reached out to the Chairman of the AERB to request continued bilateral interactions. We look forward to learning any relevant lessons and having meaningful discussions with our counterparts in India.

The Chairman of AERB confirmed his commitment to continued cooperation as the investigation progresses and Mr. Jammal will be meeting with AERB representatives next week in Vienna to discuss further.

This concludes the Status Report on Power Reactors.

I would now like Mr. Sigouin to provide his update regarding nuclear emergency management.

MR. SIGOUIN: Thank you.

Good morning, everyone. My name is Luc Sigouin. I'm the Director of Emergency Management Programs at CNSC.

I'll provide the Commission with an update on the staff review of the Ontario Planning Basis document that was discussed at the Nuclear Emergency Management Coordinating Committee.

As we discussed at the Darlington hearing in Courtice, the Office of the Fire Marshal and Emergency Management, OFMEM, has undertaken a review of the Provincial Nuclear Emergency Plan, that they call the PNERP, and in particular a review of the Planning Basis.

In late November, CNSC staff received a copy of the PNERP Planning Basis Discussion Paper from the Office of the Fire Marshal and we began our review.

In early December, the Office of the Fire Marshal organized a meeting of the Coordinating Committee, which is a multi-stakeholder meeting involving provincial and municipal government staff as well as operators and some of the primary federal partners, to discuss the Emergency Plan update and the Planning Basis Discussion Paper in particular. CNSC staff attended this meeting and actively participated in discussions with the stakeholders.

Staff completed its review and formally provided comments to the Office of the Fire Marshal in mid-December.

In general, staff's view was that the Discussion Paper was an excellent foundation to the process and that it could be strengthened. We provided constructive comments to the OFMEM and they have agreed to consider our comments.

As well, CNSC staff has offered to assist OFMEM in the scientific and technical work that is required to inform the Planning Basis and this offer has been accepted by OFMEM.

Staff will be meeting with the Fire Marshal's team in mid-April to discuss, among other topics, the preliminary results of our analysis and we expect to provide the Office of the Fire Marshal with the information that they require no later than the end of May.

Although this additional work may have delayed some of the early milestones set by the Office of the Fire Marshal, CNSC staff believe that the additional analysis will strengthen the Provincial Nuclear Emergency Plan and we understand that OFMEM is still planning to complete the Plan review, including public consultations, by the end of this calendar year.

CNSC staff use the updates to the Provincial Nuclear Emergency Response Plan as a continuous improvement activity and that the current emergency plans in place in Ontario provide for adequate protection of

residents.

Thank you.

THE PRESIDENT: Thank you.

So let's get into the question period, starting with Monsieur Tolgyesi.

MEMBER TOLGYESI: On this emergency management, you were saying that there is the participation of the Fire Marshal, provincial and CNSC, and you were mentioning municipal participation. Does every municipality delegate a person on that committee, which means that there will be lots of municipalities, or there is a kind of municipality representative?

MR. SIGOUIN: Luc Sigouin for the record.

The municipalities that participate in this Coordinating Committee are what Ontario refers to as the nuclear host municipalities. So it's the municipalities that have Class I nuclear facilities in them that require emergency planning arrangements. So it's Durham Region for Pickering and Darlington, the Kincardine Region for Bruce Power, and Deep River-Laurentian Hills Region for Chalk River. So those are the three municipalities or regions that are represented on the committee.

MEMBER TOLGYESI: I will have one question, Mr. President. This is regarding -- may I talk about Point Lepreau?

In Point Lepreau's update, the before last

paragraph is saying that because they have been generating public interest, NB Power reported the event to the CNSC. So if it was not generating public interest, it will not be reported to CNSC? Is there somebody from...

THE PRESIDENT: Who is speaking from -- go ahead, please.

MR.NOUWENS: Jason Nouwens for the record.

So if I understand your question correctly, your question is why we would report it to CNSC and --

MEMBER TOLGYESI: What you are saying here, it looks like you reported it because it was generating public interest. So if there is no public interest, what type of accidents or events are you reporting?

MR. HOWDEN: Mr. Tolgyesi, I can answer it because this is a regulatory requirement in Reg Doc 3.1.1. We have a whole pile of -- not a whole pile, a list of reporting criteria, but we do have a general clause that speaks about something that may generate public interest.

So in this case, two fire departments from two separate entities offsite came to the site, and so when that occurs in a local rural community like this, that generates interest because they're going to the site and so the expectation with that is that it would be reported to us to make us aware of that in case we got questions.

At the same time there is a requirement, a

separate requirement for proactive disclosure by licensees to keep the local communities informed. Point Lepreau exercised that as they normally do when these types of events occur.

MEMBER TOLGYESI: So say that there will be no – not necessarily public interest. Because two fire departments were present or called to the site, it is not an event which is serious enough to be -- you know, to report to CNSC.

MR. HOWDEN: Barclay Howden speaking.

So if that was the case, then the licensee would have to go to the criteria in 3.1.1 and look at the event reporting criteria. So they would have to assess what the impacts were on the site. Perhaps this is a little misleading. I think probably this event, the fact that it was setting off fire alarms would have generated a report anyways.

And we cast it more in the public interest sort of here but I would have to double-check in terms of the 3.1.1 reporting whether they report it under separate criteria too. Your point is...

THE PRESIDENT: Well, let me try to understand. So not all events are reportable and particularly if there is no safety involvement at all and there is no public interest, then it's not necessarily reportable? And, you know, yes, we have a list of, what, 65 kind of events, but still you need to use some common

sense as to when you report. This one, there was no safety concern but there was public interest because sirens and fires were there. So that's the way I interpret what this message was intended to say.

MR. HOWDEN: That is correct.

THE PRESIDENT: Okay. Thank you.

Ms Velshi.

MEMBER VELSHI: Thank you.

My question is to OPG around the Unit 4 steam generators. So is there anything unique about steam generators 11 and 12 and what is significant thinning?

MR. KNUTSON: Mark Knutson, Plant Reliability Senior Manager for OPG for Pickering, for the record.

Boilers 11 and 12, there are differences in when they were installed in the same year, but to reason why this degradation has been seen, no difference is noted presently. The interaction there with the thinning of the tubes is chemistry related and that's what we're going to take action on to mitigate that further degradation.

I'm not sure if that answers your question or not, but that's the -- we have done a full root cause for the last two months to determine differences between those two boilers and they are minimal.

MEMBER VELSHI: So when you say there has been significant thinning, what's the extent of the thinning and is it worrisome?

MR. KNUTSON: Well, in a routine inspection program, that's how we detected this degradation. We have, as a result of that, plugged 23 tubes on boiler 11 and 87 tubes on boiler 12 because they -- to allow us to run to the next outage, we had to remove those from service, those boiler tubes. So there is degradation on those tubes that was related to wall thinning and we did take a number of tubes out of service.

THE PRESIDENT: But you're not answering why there is a different chemistry in those two boilers than in the rest of the boilers. I thought the chemistry should be the same. So are they getting -- I don't understand -- unless they're getting a different chemical into those boilers only? What's going on?

MR. KNUTSON: Yes. So it's the investigation -- Mark Knutson for the record.

In terms of chemistry, all 12 boilers get the same feedwater from the same system. The amount of blowdowns of those boilers are slightly different. The sludge pile in the boilers of boilers 10, 11 and 12 are higher than all the rest of the boilers. So we believe the sludge pile is a housing mechanism for a crevice chemistry. We also have slightly increased organic acids on the Unit 4 boilers and we have restricted blowdown on boilers over the last two years because of piping upgrades that we were doing on the boiler blowdown system.

So those interactions have led us to

boilers 11 and 12. We have inspected all the other boilers and saw no degradation on the other boilers. So this is a balancing of chemistry. It may be a few PPM makes a difference and we're going to take action to get better control of that.

THE PRESIDENT: So you're going to fix it before you return it to service?

MR. KNUTSON: Mark Knutson for the record.

So we do have the mitigation actions to change the chemistry. In this case we'll reduce certain additives such as morpholine and in the end we will blow down at an increased rate on those boilers. We are planning for a short-term run, within one year to do a further inspection and then also possibly remove the sludge pile or work on reducing the sludge pile in the boiler. So there are three aspects. The short-term fix is chemistry control and further blowdowns of the boilers and we believe that should address the degradation mechanism.

THE PRESIDENT: So my last question on this. Do you share -- do all other operators -- does everybody else have the same kind of boilers that probably deserve an inspection with that kind of attention?

MR. KNUTSON: Mark Knutson for the record.

Pickering boilers have unique Monel 400 tubes, which is different than all other CANDUs in Canada. We are similar to CANDUs in India and Pakistan, but Pickering is unique in its tube design and tube makeup.

It's the alloy used. However, we will be and have been sharing that OPEX with other CANDU in Canada.

THE PRESIDENT: Thank you.

MEMBER VELSHI: So does this require you to look at Unit 1 boilers again before you would have planned to have done so?

MR. KNUTSON: Mark Knutson for the record.

Unit 1, we did look at the history of our inspection program. The recent inspection shows that Unit 1 does not have a sludge pile. And we have inspected the same tubes and same tube area with no indications. Every two years we do inspect half of the boilers and we will continue to do that on the next Unit 1 outage. So right now we have differences with Unit 1 that are not the same as Unit 4 and that's why we believe we will run that Unit till the next outage.

MEMBER VELSHI: And how many boiler tubes do you need to plug before you say this is not acceptable?

MR. KNUTSON: In a boiler there's 2600 tubes and from a heat sink transfer of heat you can go to 600 to 700 tubes to be plugged. At that point it would start seriously affecting heat transfer of that one boiler and it may have an impact on full power operation as you get above that.

MEMBER VELSHI: And my last question really is more on is this something that could have or should have been anticipated?

MR. KNUTSON: Mark Knutson for the record.

We are introspectively looking at what else would we have done in terms of our sampling regime to be able to monitor that over the previous years and that will be part of our root cause response as we start up this unit. We will likely increase the sampling regime to possibly detect any abnormality sooner in terms of organic acids, but right now the only indication we have is the organic acids were slightly elevated over the last two years.

MEMBER VELSHI: Thank you.

THE PRESIDENT: Just a final question on that one. I understand that you are asking for an extension of life for Pickering to 2024. So this thinning will not put this idea in danger?

MR. KNUTSON: Mark Knutson for the record.

We clearly have to address this issue. Right now it doesn't affect the operation of the unit, but if we -- we have to mitigate to keep as many boiler tubes in service as possible and that's what we're working towards.

THE PRESIDENT: Thank you. Dr. McEwan...?

No questions. M. Tolgyesi...?

Ms Velshi...?

MEMBER VELSHI: I have a couple.

So one is on the India incident and I know that you're going to have more discussions on this. Is

this one of those leak before break incidents that we hear about for a fuel channel?

MR. HOWDEN: Barclay Howden speaking.

Mr. Jammal can provide more information if necessary. The exact cause isn't exactly known, it appears to be leak before break. The important thing is to try to determine what the failure mechanism is.

This plant was re-tubed about five years ago, so that unto itself creates even more concerns and the concern is to understand whether it was a pressure tube leak or a fitting leak or something like that and that's what they're working towards.

I'll ask Mr. Jammal if he wants to add a bit more. He's been in direct contact with the Indian authorities.

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

At this point, I have nothing to add until we find out what really the cause is. We know the fact that the leak has occurred at the bellows and we're looking at the determination with respect to the leak before break and the capacity of detection.

The system's operated as they were designed to do so. There was no manual intervention to shut down the system and that's the information we've got to date.

So most likely, as in the President's

letter to Mr. Bhardwaj, we will be sending staff to India in order to gain the lessons learned and the key point here is post-refurbishment and re-tubing to determine the root cause and then assess our own with respect to the industry in general and the CANDU.

MEMBER VELSHI: Thank you. Yeah, I just want to acknowledge, I think that's an excellent plan that you have from learning from that.

My other question was on the Provincial Nuclear Emergency Planning basis document. And we have had extensive discussions at our many hearings around stakeholder involvement, and not the stakeholders that you had mentioned, but the public involvement.

And I know that CNSC had made a commitment that would try to facilitate earlier engagement rather than later and so what the update that you've given so far says that that's going to happen later on, you know, after you've had some meetings and so on, and I'm not quite sure whether that was in the spirit of what we had heard that we were going to do or what the expectation was.

So can you maybe elaborate on the public engagement early enough, if the plan is still to have the revision done by the end of your -- when is that going to happen and does that give sufficient time for engagement?

MR. SIGOUIN: Luc Sigouin for the record.

Our understanding of the situation is that the Office of the Fire Marshal is still committed to doing

engagement with public stakeholders, with the public.

My understanding is that they haven't reached a point yet where they have enough information to have meaningful interaction and quite likely that that would not be the case until we have finished providing the information to them at the end of May.

We have -- as I mentioned earlier, we have a meeting with them scheduled in mid-April and at that point we will reinforce the expectation of the Commission to have public engagement earlier rather than later and we could have more information on that available for you at that time.

MEMBER VELSHI: Thank you. I look forward to that.

THE PRESIDENT: Let me add. So I thought that the original plan was in May of this year that they will have approval by Cabinet of the new planning base. Sounds to me like this is dragging out a lot longer than expected.

So am I right; because by the end of the year, calendar year, does that include going to Cabinet and getting political approval?

MR. SIGOUIN: Luc Sigouin for the record.

So our understanding of the timeline is that it does include final approval at whatever highest level they require.

As I mentioned, there have been delays

associated with getting the planning basis right and I think OFMEM's approach of ensuring that they get it right as the basis for the rest of updates for the plan is the correct approach and we will have more information on their revised schedule in light of the time it's taking to getting the planning basis correct.

THE PRESIDENT: I would hope that this committee, the quarterly committee will insist on having a schedule, you know, with time and target dates, et cetera, so everybody knows what the game plan is, including the public consultation.

And the other thing is, remember at one time it wasn't clear that they were going to do public consultation and we said that we will do public consultation if they don't.

So I don't know whether that's got clarified.

And the other question is, does the plan will include evacuation and returns?

MR. SIGOUIN: Luc Sigouin for the record.

I'll answer the last part of your question, sir, and Mr. Jamieson has some information on the public consultation.

Our understanding of the review of the plan is that it will include reviewing their protection strategy, their concept of operations, which includes when to evacuate or when to shelter and the CSA N1600 standard

on emergency management that has been revised recently includes requirements for the emergency plans to identify transitioning into the post-emergency, post-accident state.

I'm not sure that the province is ready to undertake the full activity of developing the post-accident recovery plans. They're focused right now on updating the emergency plans and including that transition of how they would go to recovery.

I'll let Mr. Jamieson offer some additional information on the consultation that the province is planning.

MR. JAMIESON: Terry Jamieson, Vice-President of the Technical Support Branch.

We're in constant communication with OFMEM on this and, as Mr. Sigouin has said, we will have much more information after our meeting which will take place a week from tomorrow.

In the last telecom that we had with OFMEM they feel they're still on track within their overall schedule for the end of the year and I'd like to emphasize that that schedule includes 45 days of public consultation which is mandated by Ontario law.

THE PRESIDENT: Is Health Canada involved in this consultation?

MR. SIGOUIN: Yes, Health Canada is involved in the process.

THE PRESIDENT: Because, as you know,

right now there is a protocol, an old protocol about post-event and getting back and it's very debated internationally post-Fukushima about what the solution is. We've got to get a Canadian position on that.

And, you know, I'm very concerned that if they don't come up with -- if the province doesn't come up with one, we will have to, with Health Canada, have to articulate what the current policy is.

MR. JAMIESON: That's understood, Mr. President, and we're working --

THE PRESIDENT: So somewhere after May we should be able to get a full detailed plan about what's going to happen and when.

MR. SIGOUIN: That's correct. In regards to the update to the nuclear emergency response plan, that's correct.

THE PRESIDENT: Okay. Thank you.

Anybody else want to jump on this?

All right. Thank you. Thank you very much.

The next item is the event initial report regarding the worker that was injured at the Bruce B Nuclear Generating Station as outlined in CMD 16-M18.

THE PRESIDENT: I understand that Mr. Jeff Stevenson is joining us via teleconference.

Can you hear us, Jeff?

MR. STEVENSON: Yes, I can. Thank you.

THE PRESIDENT: Thank you.

And I guess we're first going to hear from Bruce Power and I guess, Mr. Saunders, you are going to share with us some insight into what happened.

Over to you.

CMD 16-M18.1

Oral presentation by Bruce Power

MR. SAUNDERS: Yes, that's correct. Frank Saunders for the record.

I'm just waiting for the presentation here. Okay.

So to start with, just a quick view of the generator and what it is and what was involved in this particular event.

You can see the white in the centre here is the rotor of the generator. It turns on a large axle you see sticking out both ends, we usually refer to that as the bore, but in essence it's an axle. It is hollow in the centre.

When this generator is operating it's full of hydrogen, the hydrogen is the cooling medium in the generator and the hole in the centre of the rotor, though, is protected by seals and hydrogen is not supposed to actually get into that area.

The nature of this work is really based on the lifetime of the generator. There's a requirement that

in the first 20 years you need to take the rotor out and do an inspection of the bore and you're really looking for metal condition and general condition of the rotor. That was last done on this Unit 8 generator in 1999.

And then about the 30-year mark you typically overhaul the rotor, the electrical components on the rotor, and also do another inside inspection. And, indeed, that was what this work was all about.

So just a little better look at the rotor. So that area in white, this is what it looks like in real life. This is a rotor, Unit 8 rotor. You see the two pieces sticking out which, you know, one end connects onto the turbine which turns the generator to produce the power.

And as we said here, it's forged from an alloy of steel, it's hollow bored along its complete length and blanked at both ends. The rest I think I've already talked about.

So the basic work plan, remove and purge hydrogen from the generator, so clean it out, remove the rotor from the generator, drill out the rotor bore plugs on the generator rotor to allow an internal borosonic inspection. That's just the tool you put down, sort of like, same idea as a boroscope, only it's an ultrasonic type of tool which really looks for any kind of wear or metal fatigue on the rotor, so that you're just looking for issues.

Inspect the bore, re-install the bore plug and then rewind the rotor. And that last bit, the motor -- the rewinding is still in progress, should be finished shortly.

So this is the actual set-up for the work. You see on the picture on the left the rotor sitting on its stands and you see the yellow tarp on the left-hand side of the rotor. The picture on the right is actually a close-up of that tarped area. The yellow material is really just to collect the swarth from the drilling operations. So as you drill, the filings come out, they drop down on that pan at the bottom which is simply there to collect them.

This picture was actually taken after the event and you'll see that there's some damage to the yellow material, it's kind of come loose on one end. That was a result of the event itself.

But the drill you see attached to the end is actually how you drill out the end plug, so it's a relatively simple hook-up. It's a drill mounted on the end, a mechanical maintainer operates the drill, another mechanical maintainer provides lubricant. You know, basically an oil/water mixture that you put on the end of the drill to allow the drilling to proceed.

This just gives you a closer look at it so you understand what the bore plug is. The picture on the left is the -- this is the flange that actually connects to the turbine. In the very centre is actually the bore plug. That's the -- you see the holes and then in the middle

there's a little plug, that's actually the bore plug. And top right-hand picture is the same end piece of the generator with that plug removed after it's drilled out, and the bottom right picture is just an enlargement of the bore plug. And it's essentially a piece of steel, you just simply drill it out when you want to empty the bore.

And so what the mechanical maintainer was doing in this event was drilling out that bore plug. And all that does is, as I say, allow you to put a tool in there that you can insert down the length of the rotor and look at the condition on the inside of the metal.

So what actually happened here: In reality, the seals that protect the inner bore from hydrogen weren't entirely successful here, so some hydrogen did leak into the inner bore of the generator. When the generator is purged, it does not purge this area because the seals actually protect it from the purging as well and so, there was hydrogen in there on the one to the people doing the work.

When the mechanical maintainer drilled out the bore plug, of course, this creates heat as the drill moves on the metal and as it broke through to the inside it was exposed to the hydrogen atmosphere that was on the inside of the bore and there was a jet of flame that shot out the bore plug hole, lasted a few seconds, but of course, that's all it takes.

The worker himself was transported to the hospital, spent about six days in the burn unit and has been home ever since recovering.

And this was deemed to be a critical injury in terms of the *Occupational Health and Safety Act* because the individual was burned on a reasonably significant area of the body. So it was, indeed, a serious injury, no question about it.

We did, of course, report it both to the MOL and the CNSC as required and we have since completed the root cause and the detailed report was submitted to the CNSC last week.

A little bit of background on this task that becomes kind of significant in the root cause. This task was performed in both 2013 and 2014, in fact, the same mechanical maintainer was involved in both of these tasks on two different units, of course, Unit 6 and Unit 7.

Prior to 2013, this task has been done entirely by General Electric as a contractor. So we started pulling some of our staff to support GE in 2013.

So there was a divided responsibility between Bruce Power and GE to do this work and that kind of became significant as a contributor to this event.

Bruce Power staff were providing what we designated as support staff, sort of support staff to GE, so we did not have a specific work plan or specific procedure, we were assigning staff to work with GE under

their direction to do a particular task.

There was a technical information letter from GE warning of the possibility of hydrogen gas in the rotor. That pre-existed, in fact, this sort of condition had some sort of general known since probably the mid-80s, you know, so it wasn't unknown, it was just a very rare kind of event.

Unfortunately, our FLM/UTL and the maintainer involved were not aware. And so, you can imagine, the investigation sort of focused on how this gap occurred.

Oh sorry, first line manager and unit team leader. So it's the supervision team on the job. In old parlance we'd call them supervisors, but new names.

So the basic root cause was, of course, the fact that the seals leaked and the hydrogen was where we didn't think it would be. However, there are a number of contributing causes and they were really centred on the fact that why didn't we understand that this risk existed. We certainly had some knowledge of it, but why did we not understand at the day on the workforce, you know, on the floor that the risk existed because the precautions to prevent the injury are straightforward. This was an entirely preventable event that did not need to occur.

So one of the issues we found here in looking at our own processes is that when we're providing support tasks for vendors, we haven't been requiring any

specific detailed description of what the actual work is for our people, we've relying on the vendor to actually know what they're doing there and to direct that.

And so when our assessors, the people that look at risk and other things, look at the job, they don't actually have the detailed tasks lists in order to make those assessments. And that's a part of our process where we actually detect risk and take precautions to do with it.

We didn't actually have any formal guidance on what to do with vendor information sheets. You know, GE calls them A TIL, but other vendors call them different things, guidance or other things. We didn't actually have any formal guidance on how they should be treated.

Generally speaking, they come in, engineering reviews them, procedures are changed or guidance is changed in accordance with what's in them. In this case, though, we had no particular procedure on this work because it's not -- it wasn't normally our work.

And so there was a bit of a hole in that some of these guidances didn't have a place to live, right. And so that was an issue.

The provisions in our OPEX procedure were likewise not particularly clear on these types of information. We have, indeed, a very sophisticated operating experience program and certainly if an event happens anywhere, we track it, it's in our system, we can

look it up, we adapt our procedures, assign actions and do all that.

But there is a bit of a hole here around some of these information bulletins and things like that, in that they weren't quite stored in the same way as our normal OPEX.

There was no -- when we give our people assigned a support task to a vendor, we had no requirement for the vendor to come and participate in the task assignment to those people. So when the FOM, in this case, was briefing his staff on this work, we didn't have a requirement that said, the supervisor from GE ought to be there as well and ought to be included in that briefing. In many cases they were, but we hadn't made it a hard requirement. So that was an issue.

And in this case the vendor's practice during the main generator work was to provide the information to us when we asked for it, but not necessarily to just provide it. So we felt that was a shortcoming in that this information was known and in reality should have been flagged clearly, so that we knew it was there.

So a summary of the corrective actions, they're in a little more detail in the detailed report. I've summarized them a bit here for the sake of the overheads.

We did an extent of condition, obviously pretty quickly, because also doing this work over in Bruce

A. Bruce A units are a different design, though, they're not GE generators, they don't have this problem, there are no seals in the Bruce A generators, the bore is open to the inside of the generator, and so when you purge the generator, you purge the bore at the same time, so this is a problem specific to this particular design of generator.

We did share the OPEX with industry through COG and also directly to WANO. We did complete the root cause investigation, of course.

We have now created a procedure for this job in particular, where we now have a place that we can include the risk assessments and those things which need -- the assessors need before that work so that they don't get missed in the future.

We did do an initial review of all projects at Bruce B because this is not the only place where we provide assistance to contractors, it's not that uncommon, so we wanted to make sure there were no other risks that were hidden that we weren't aware of, and that was done and, where it was necessary, we upped the -- you know, improved the detail on the particular task so that we could be sure.

We did change our procedure in the way that we to govern contracts so that we require now contracted to provide us a detailed description of any work

that we're doing in support of them, so that we can, again, properly assess the risks and make sure people are properly briefed.

We're changing the process around these advisories and notices we get from manufacturers and that so that they do get captured in our operating experience system.

The OPEX procedure itself is being clarified and cleared up on that and the OPEX training, of course, will be changed to match that.

We're also changing the procedures that govern the interface between us and vendors to make sure that the vendors attend the briefings for staff and that all risks are identified and flagged and everybody understands the issues.

We did a larger review -- I had mentioned earlier that we did a review of the project at Bruce B, we also did a larger review of all contract work at both A and B, again, looking for other work that may have hidden risks that we weren't aware of.

And that's it for the basic presentation.

THE PRESIDENT: Thank you.

Mr. Howden, do you have any comments on this?

CMD 16-M18

Oral presentation by CNSC staff

MR. HOWDEN: Yes, thank you.

So the follow-up is being conducted by CNSC onsite inspectors working closely with the Ministry of Labour inspectors. Jeff Stevenson who is on the line is our senior site inspector and he has a short update on the regulatory oversight that has been exercised for this event.

MR. STEVENSON: Thank you. Jeff Stevenson, Senior Power Reactor Site Inspector for the record.

As mentioned, following the event Bruce Power reported to the CNSC Duty Officer as well as the Ontario Ministry of Labour. Due to a Memorandum of Understanding between the CNSC and the MOL, site staff contacted the local MOL office to arrange for working together on the follow-up to this event. So we initiated our joint investigation the morning following the event on February 2nd.

Throughout the investigation we spoke with several groups, Bruce power and General and Electric staff, including the maintenance workers involved, their supervisors, safety personnel, work management and engineering staff.

Many documents were reviewed and Bruce Power was asked to confirm the presence of hydrogen in the rotor bore. In addition, under the *Ontario Occupational Health and Safety Act,* the scene of a critical injury cannot be disturbed until an inspector has given permission to resume work.

So together, myself and the Ministry of Labour inspector visited the scene of the event and took a couple of photographs throughout the time period following the event.

In the end the MOL released the scene back to Bruce Power on February 4th.

During the course of our follow-up it was discovered that a couple of people in both Bruce Power and General Electric were aware of the potential for hydrogen hazard in the rotor bore. As a result, the Ministry of Labour issued a stop work order to prevent the uncontrolled release of flammable substances from rotor bores on site. However, as you heard earlier, Bruce A has a different design which prevents hydrogen from being trapped inside the bore so this really only applies to Bruce B.

The stop work order will remain in place for the Bruce B units until Ministry of Labour inspector is satisfied that the appropriate measures have been put in place to ensure worker safety.

The MOL's investigation remains ongoing. They have collected most of the information they require.

However, they won't be able to comment on anything until their entire investigation has been wrapped up.

In the meantime the CNSC has received the detailed event report which provides the root cause and contributing causes to this event which Bruce Power just went over. This matches what we found in our joint investigation.

The detailed report also provides the corrective actions taken to prevent this event from happening again.

CNSC staff will continue to work with the Ministry of Labour as they complete their investigation and we will be following up on the implementation of the corrective actions through our normal site inspection activities.

That's all I have. Thank you.

THE PRESIDENT: Thank you.

So let's open up the floor for questions, Ms Velshi.

MEMBER VELSHI: Thank you. A question for Bruce Power.

What is the status of the worker?

MR. SAUNDERS: The worker remains at home and, you know, like he said he spent about six or seven days in the burn unit. He has been at home since just recovering and just waiting clearance, basically clearance from the doctor to return to work.

You know, I think, I don't want to get too far into his personal information but burns are a difficult thing and infection is always a risk. So I think the doctor is going to be cautious and make sure he is fully healed before he returns.

MEMBER McEWAN: And from a potential perspective, how bad could this have been?

MR. SAUNDERS: Well, the extent of the explosion was about as bad as it could get, I think. The injury of course could potentially have been worse. It depends on what part of your body is exposed. Most of his burns were on his hands and arms and a bit on his chest. It could have been unfortunate and had he had his face down in that general area and we could have been talking about more serious injuries.

So the extent of the injury to the employee could have been significantly worse than it was, not that it was trivial by any means. I don't mean to say that but it could have been worse. So indeed, we see this as a really serious breach of our safety protocols.

MEMBER McEWAN: Thank you. So what is the normal atmosphere inside the rotor?

MR. SAUNDERS: It would normally just be, you know, the same as in the room. So when you seal it up whatever is in there, is what's in there.

MEMBER McEWAN: Okay. Would there be a pressure differential after you have purged?

MR. SAUNDERS: No, not generally. I mean during operation the whole generator is fairly hot so you would expect there would be some pressure in there then.

MEMBER McEWAN: Yeah.

MR. SAUNDERS: But once it's out at room temperature and cool there is no reason to have a pressure differential.

MEMBER McEWEN: Okay.

THE PRESIDENT: So what is the purpose of the hydrogen? Where is the hydrogen?

MR. SAUNDERS: The whole generator is filled with hydrogen and that's actually the cooling medium for most generators. So the hydrogen goes through a heat exchanger and takes -- basically takes the heat away from the generator. We use hydrogen because it doesn’t conduct electricity. It's a single molecule essentially so from a -- it will transfer the heat and not pose a -- it's a good insulator for electricity essentially and doesn't pose any kind of arcing issues.

So that's why hydrogen is used. It's very -- it's virtually all large generators are cooled with hydrogen.

MEMBER McEWAN: So there would be no alternative to using hydrogen? It's not that something that wasn't plannable?

MR. SAUNDERS: No, hydrogen -- hydrogen is the material of choice. It's a known risk though obviously

in that you have a storage of hydrogen there in the building and it's one of those hazards which we quantify in our firefighting and other things that, you know, can contribute to a fire as well. But there really isn't anything else you can switch to in these large generators.

THE PRESIDENT: Mr. Tolgyesi...?

MEMBER TOLGYESI: Merci, Monsieur le Président.

You are saying on page 7 that hydrogen had leaked part of the seals. Could we say that if there was no leak there would be no accident?

MR. SAUNDERS: That's correct. And so the root cause was simply that the seals had leaked and that the hydrogen was there. In fact, as I had said, we did this job twice exactly the same way we did it this time and neither one of those cases were a problem.

And in fact we have done, you know, many rotors over the years and we have done it always this way. This is a timeless problem but it was obviously a latent risk that was there and it is a risk that we really should have been aware of.

MEMBER TOLGYESI: And there was no working procedure which, you know, considering in the "B", only in the "B" was the risk of this hydrogen explosion. You didn't have in your working procedures anything which will

say that when to be you remove the plug you should measure before you have some devices to measure the presence of hydrogen?

MR. SAUNDERS: Yes. Yes, indeed, there is a pressure port on these which you could remove and check for hydrogen. So it was possible to check for hydrogen.

The issue here is really a transition issue. Like, say before 2013 this work was always done exclusively by the manufacturer, by GE in this case, and by others over at Bruce A and so we didn't have a Bruce Power procedure because we didn't do the work. So when then transition occurred and we started participating in that work we should have actually created a procedure at that point in time but we missed it.

Without the procedure there is nothing for assessors to assess or for engineers to use to place risks into place and so forth. So it was an issue that occurred during this transition that didn't get taken care of properly. It's corrected now obviously.

But those procedures are a key piece of our protection in terms of making sure people are safe. This was one we just -- just missed. Transitions are always a risk, as you know, and in this case we missed this one.

MEMBER TOLGYESI: Could it happen that even though there was no plug removal, you know, it could be a leak and hydrogen could leak and without knowing it,

and could it be some potential consequence of that leak, even though you know not necessarily in this case because you were drilling. But the leak was there even though you were not drilling.

So what could happen if the leak was more severe?

MR. SAUNDERS: Only so much hydrogen can get into the bore at any rate. So, yes, you know what you are really saying is that the seal has allowed the hydrogen to get in. They could have allowed the hydrogen to get out as well when the thing is hitting the turbine hall.

So some risk and that was accounted for in the investigation. It's not a large risk because you would be leaking out into a large volume atmosphere and there is not actually that much hydrogen in the bore. So not a sort of major risk of fire or something like that. It's really the accidental setting off of an explosive atmosphere has happened here that's the primary risk.

However, the new procedure you know requires us to check. So we will know before and we will purge it if it's there so it won't be -- either risk will be taken care of by the new procedure.

THE PRESIDENT: Ms Velshi...?

MEMBER VELSHI: You mentioned these vendor support tasks and not having been well defined which is -- so how frequently do you have these tasks? It almost looks like you are going in there, closed eyes, on what the risks

may be, at least as it sounds from this particular incident.

MR. SAUNDERS: Yeah. It's fairly frequent that we would have tasks to support vendors. Generally though they are very straightforward and very obvious and so the risks are well-known. This is one where the risk was kind of hidden, buried underneath. And so it became a problem.

We did review all those tasks, as we said, and we have changed our vendor procedures to make sure now that all those tasks are very well-defined by the vendor when they send them to us so we have that appreciation.

But in most cases we are assisting a vendor it's straight -- it's really straightforward. It's the same kind of work we do every day. So we know what the risks are.

It's the occasional one like this where the risk is less obvious and somewhat hidden and we are not experts on that area. Therefore, you know, we failed to see this one.

MEMBER VELSHI: So when you did your review of these tasks to support the vendor were there any others identified ways that we do need to develop more procedures to make sure we are doing this properly?

MR. SAUNDERS: Yeah, there were a number of tasks where we certainly increased the detail that was provided in the tasks. I don't have the exact numbers for

you. You know, probably maybe 20 percent or so. We improved the detail considerably and the tasks. In most cases they have procedures already. The real, you know the real kind of driver for the procedure is that it's something that we do all the time anyway. If there is we'll have a procedure for it. This is, as you can see, is a fairly infrequent task every sort of 20 years or so, on a particular generator. So you know the driver wasn't quite the same.

But for most things that we are doing even when we are supporting vendors, we mostly have procedures and directions on those because they are tasks that we perform on a fairly routine basis.

MEMBER VELSHI: And a quick question for staff. Are there -- I know you said Bruce A doesn't have the same issues. Do any of the other plants have that? I know you have shared OPEX but have you followed up with the others?

MR. LAFRENIERE: Ken Lafrenière for the record.

Yes, we have. The design is pretty unique from my understanding and talking to General Electric. This is a unique design for the Bruce B generators where they don't have a vent hole for the hydrogen which might accumulate in the bore. But as the licensee has indicated, the OPEX has been shared through COG and through WANO.

THE PRESIDENT: Sorry, go ahead. Dr. McEwen. No, no. Go ahead.

MEMBER McEWAN: Could I just reframe Mr. Tolgyesi's question a little bit, a naïve question but presumably heat is generated when the turbine is working and the rotor is working in the bore. Is there any risk of an in-situ explosion if enough hydrogen gets accumulated in that bore?

MR. SAUNDERS: So you were thinking through a normal operation?

MEMBER McEWAN: Just through normal operation.

MR. SAUNDERS: Yeah, I know, because I mean one of the reasons you plug both ends of the bore is just to make sure that you don’t get an active transfer of normal air in there. You don't want to get an explosive of that and so the hydrogen works because you keep it fairly pure. So inside the generator when it's operating the hydrogen is pure. You don't have any -- it won't explode when it's pure hydrogen.

MEMBER McEWAN: No, but if you have hydrogen in the bore that is released when you drew it --

MR. SAUNDERS: Yes.

MEMBER McEWAN: Do you have enough hydrogen in the bore that internal heating alone could cause it if you had enough leak inwards?

MR. SAUNDERS: Are you thinking of the actual maintenance now that --

MEMBER McEWAN: No, the normal operations. I'm not sure that I am asking the question properly.

MR. SAUNDERS: I'm not sure I quite understand it.

MEMBER McEWAN: Okay. So the cause of this accident was hydrogen getting from the atmosphere in the generator into the bore, right? When you drill the bore the hydrogen is released. So if you have enough hydrogen in the bore within inside that has not been released and if the rotor is operating and creating heat, do you have -- I mean could you have enough hydrogen accumulated because of that inward leak to cause a problem during normal operation? Yeah, if you have a spark?

MR. SAUNDERS: Yeah, I'm far from an expert on this subject but the advisories that we have from GE and that do not indicate any threat during normal operations at all. Obviously, the thing is designed to operate and they designed it this way.

MEMBER McEWAN: But it is designed not to accumulate hydrogen.

MR. SAUNDERS: True, but you got both -- the rotor itself is sitting inside a complete hydrogen atmosphere and it's sealed at both ends. So no matter what is in the rotor when the generator is operating it's surrounded by 100 percent hydrogen.

MEMBER McEWAN: Yeah.

MR. STEVENSON: So Jeff Stevenson, site inspector. I might have something I can add to this.

So when the generator -- so the generator operates for approximately two years between outages. So with the extremely pure hydrogen on the outside of the bore with the seal leaking that's -- over the two years you would expect then that the interior of the bore would eventually contain 100 percent hydrogen as well. So it's really -- so that's above the upper explosive limit of hydrogen of 74 percent. So then the only way that it becomes an explosive hazard then is when that interior of the bore is exposed to the outside air.

MEMBER TOLGYESI: And I expect that also there should be sparks to initiate the explosion.

MR. SAUNDERS: That's correct.

MEMBER TOLGYESI: And that's what happened when you were drilling?

MR. SAUNDERS: That's correct. The heat from the drill was sufficient to ignite it, yeah.

MEMBER TOLGYESI: When you have the next rotor maintenance check? When is it expected?

MR. SAUNDERS: Next year, I believe. I don't have the exact date in front of me but we are going through -- that's the second of four at Bruce B, so there is two more to do. I expect it scheduled next year. It may be the year after, but I could get you the exact date.

And when Mr. Stevenson referred to the stop work order, that part of the stop work order is still in place. So we still don't have clearance from the Ministry of Labour to do that work on the next rotor until we satisfy them that we have it under control. So before we will do that work, that order has to be lifted.

MEMBER TOLGYESI: Now, I am asking this because on pages 12, 13 and 14 you have corrective actions. They several times, at page 12, bullet 3, procedures governing the management of contractors will be revised. On the page 13 their OPEX procedures will be revised. Training regarding OPEX will be revised. And on page 14 procedures governing the interface between Bruce and when there is -- are to be revised. Do you have any timeframe you know because if the next inspection is sometimes next year, you have to do that all before to make sure that is properly done?

MR. SAUNDERS: Yeah, there is actually a couple of things there. Yeah, it will be done a long time before we get to the next one. But we do have an interim process where we have identified what we would call a document change requirement here to do that. We have a way of putting out the interim notices and changes so that people are aware of the risks. So you wouldn't pick up that procedure today and not know that there was a changed plan and what the issue was so that you could account for that.

And these changes will occur. I didn't -- I didn't think to bring that today. I should have. But they will occur quite quickly. It won't be a very long process to put these in place.

And as I said, we did review all the current tasks and those that are coming up in the very near future as an interim step to make sure we knew what was what.

THE PRESIDENT: Ms Velshi? Dr. McEwan?

MEMBER TOLGYESI: Just one. You know, the vendors were publishing in mid-eighties you said, this technical information letter. You received that letter?

MR. SAUNDERS: Yes, we did. There has actually been two or three letters over the years. This particular letter was one that we received just about a year and a half ago. I think two years ago. It was an update to the earlier letters and it was focussed on some other things but this actual issue was still in that letter.

MEMBER TOLGYESI: So it was in possession of Bruce. So did you have any procedures that when something like this is coming it will be passed down for maintenance or to other staff or employees who are -- who perform these kinds of tasks?

MR. SAUNDERS: Yes, indeed. I mean the letter does come in. In this case a letter like this will go to engineering for review, review the letter against the

work that we do as to whether there is an application to Bruce Power. You know, at the time this got missed because we were in the transition from GE doing the work to us doing the work.

This was really -- one of the issues here is that we were taking something we hadn't done in the past and now we are starting to do it. So some of the -- some of the information we had didn't go through the process the way it should have. It got kind of isolated so that the people doing the work didn't know, right.

And this was -- this was in fact the feeling on our part that shouldn't have happened. Most of the corrective actions are aimed at making sure that that doesn't happen again.

We do get, as you might -- you know, if you got a car or anything else we get lots of advisories from manufacturers and other things about issues or concerns with equipment and we review them. Many of them don't have a direct impact. The challenge is that if they don't have a direct impact now, will they have an impact in the future? And so some of that stuff wasn't being well captured. The engineering went ahead. They reviewed it. No impact today. It's on a file. Engineers change over time and so the awareness of the issue deteriorates.

So you know some of these corrective actions are very much aimed at getting this in a database so that you can search the database when you are doing a

particular kind of work, see if there is anything relevant in there that needs to be reviewed and make sure that it gets in the system.

If we had a procedure on this and we had this, the procedure would have been amended. It would have been captured in the procedure and the procedure would have pointed to these tills as something that we needed to look at. And so the vehicle that we use normally to capture this data here wasn't present and then that was the issue.

THE PRESIDENT: So now you said that you put in a procedure that it's now automated into OPEX database or some sort that anything that will come in has to go to a data system with action dates and all that.

MR. SAUNDERS: Yeah, that's correct. The technical advisory type of letters would get reviewed and they would -- they really only kind of got added if the review suggested that it was important that they did. So what we have recognized is that things can change with time and therefore we need to put this in a database that's searchable so that even when things change with time we can still find them and understand the issue.

So we are creating that link with the OPEX database to make sure that happens. There is still some work to do to figure out exactly how to do that and make it workable but they are in the process of figuring it out.

THE PRESIDENT: You mentioned that you do this on a generator every 20 years, 30 years, whatever -- I

don't remember. So this is not a frequent task.

MR. SAUNDERS: No, it's not. It's a relatively infrequent task and, of course those are always the most challenging because your knowledge of the task is not as high and you are not as aware of the risks and stuff.

But yes, this is a fairly infrequent task. We just happen to be at that 30-year part in the life of these plants so all these generators are coming up for rewinds. So the task is fairly frequent right at the moment but there will be another long stretch of 20 years when it won't be so frequent even.

THE PRESIDENT: But you know if you generalize, presumably you have to review all rare, important tasks how to maintain the know-how. So I am trying to figure out, if I were GE I would be really concerned about you taking over from our experts this task and I wouldn’t just send a letter. I would pick up the phone and phone somebody.

Okay. So my question is did such an event happen anywhere else?

MR. SAUNDERS: Yes, it has happened in the past. That's what generated the TIL. It's very rare. It doesn't happen often but it has happened a couple of times. That's what generated the advisory in the first place. So, yes, it was known. It was known to us at some level and it was known to GE as well that this was a risk. Although a

low risk still a risk.

THE PRESIDENT: Just as a question, was it a reasonable expectation the CNSC Staff should have known or not, or this is really now into the microdetails?

MR. HOWDEN: Barclay Howden.

I'd say it's into the small details. The approach we take is the licensee is responsible for safety and we do regulatory oversight, so we deploy our resources in a risk-informed manner. If you look at Bruce Power's safety record regarding conventional health and safety, it's very good, so this wouldn't have been on our radar.

Also, for conventional health and safety, we rely on the Ministry of Labour, and they deploy their resources in a similar manner, although there may be lessons learned for us. Because I think as we go forward and they put the corrective actions in, we'll be looking at ourselves and MOL, because MOL works within the NPPs to look at a lot of conventional health and safety.

I'd like to just make one other comment on these actions that are done on a rare basis.

I think an important thing that Bruce Power said is that having OPEX database is very helpful when you have contractor-led work because then they're providing support. Whereas they're going forward with development of their own procedure, the advantage of a procedure, it's a controlled document, and with that there's a much more formal change structure, which I think

allows these technical information letters to be captured more clearly.

But, no, in our view, because of the good history of conventional health and safety, this is something we wouldn't have picked up in advance.

THE PRESIDENT: Okay.

Mr. Tolgyesi.

MEMBER TOLGYESI: You know you were asking a question about when Bruce took over GE on this task. My question is that when you did that, when you advised GE that "From now on we will do that," did they or they didn't say anything about, you know, risks or what you should be aware of or what you should give attention or what are risks related to this task?

MR. SAUNDERS: Yes, so I should be clear that we only took over a very small portion of this job from GE. It just happened to be this portion, right? So we assign people to do certain support tasks. The main job was still being done by General Electric because they have the expertise. We don't have the expertise to rewind rotors and that sort of thing.

Yeah, GE, I think, was very open about providing us any information we asked for, so I don't want to point a finger and say they were hiding anything because I don't think that's true. However, the last bullet in our contributing causes there I think was the one that was kind of getting at that, which is to say they provided any

information we asked for, but they didn't necessarily come forward and tell us, right?

I don't think that was a deliberate oversight on their part. Quite frankly, I don't think they would have said, "Oh, let them do it anyway." I think that's just inappropriate. They wouldn't have done that. It's just it was an oversight on both parts and it didn't happen.

I don't think we have any complaints about their willingness to work with us or share information with us. I think that's all very...very solid.

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

Are there any other event initial reports that should be brought to the attention of the Commission?

Okay. So we will move on to the next item on the agenda, which is a status update on suspect items used to manufacture valves, as outlined in CMD 16-M.17 and M-17A.

I note that the representatives again from OPG, Bruce Power, and NB Power are in attendance. They can help us understand what's going on here. From NB Power, we have Mr. Essensa and Mr. Cowan.

Can you hear us?

MR. ESSENSA: Dave Essensa, NB Power, for record. Yes, I can hear you fine.

MR. COWAN: Matt Cowan, NB Power, for the record. Yes, I can hear you as well.

THE PRESIDENT: And I'm told also that Mr. Creaser is supposed to be online.

MR. CREASER: Eben Creaser, right here.

THE PRESIDENT: Ah, you're here. Thank you.

There are also in attendance representatives from the Technical Standard & Safety Authority, or better known as TSSA.

So welcome.

MS TURYLO: Thank you.

THE PRESIDENT: The floor is still yours, Mr. Howden.

MR. HOWDEN: Thank you.

CMD 16-M17/16-M17.A

Oral presentation by CNSC staff

MR. HOWDEN: Good morning, Mr. President, and members of the Commission.

My name is Barclay Howden. I'm the Director General of the Directorate of Power Reactor Regulation at the CNSC.

With me today is Dr. Hatem Khouaja, Lead Technical Adviser in the Directorate of Power Reactor Regulations, along with CNSC specialists, licensing staff,

and members from the Ontario Technical Standards & Safety Authority, as you said the TSSA, who have been working on this issue.

Before you today is CMD 16-M.17, which is the CNSC Staff's third update to the Commission on the status of this issue of suspect material used in the manufacturing of nuclear-class valves.

CNSC Staff have closely monitored the developments on this issue since the initial reporting received in March 2015. At that time licensees had been informed by one of their vendors of fraudulent activities in their supply chain that led to the concern we will be discussing today.

You will note that in the CMD and on the presentation today we are using generic company names, Company 1, 2, 3 and 4, as the matter is in litigation. We have now been advised, if desired, licensees are able to identify these companies for information of the Commission.

The company that was at the root of the issue is no longer used by the vendors who supply valves to the nuclear power plants. In addition, you will note in the presentation that the licensees and the vendors have taken actions beyond this specific case to prevent any reoccurrences of such an event for any materials or equipment in their respective supply chains.

This particular event falls under Counterfeit, Fraudulent and Suspect Items, or CFSI. We

will start by defining what CFSI is, we'll follow with a brief chronology and a description of the event and cause. We will review the regulatory requirements and standards applicable to CFSI. We'll look at the actions take by all parties: vendors, licensees, authorized inspection agencies, and CNSC Staff. We will then look at preventive measures and initiatives taken in response to this event. I will conclude the presentation with overall conclusions and the steps forward.

I will now turn the presentation over to Dr. Khouaja.

DR. KHOUAJA: Okay, thanks, Mr. Howden.

Good morning, Mr. President, and members of the Commission.

For the record, my name is Hatem Khouaja. I'm speaking to you today as the project lead for this CMD.

So let me start by defining what CFSI is. Counterfeit items are items intentionally manufactured or altered to imitate a legitimate product, fraudulent items are intentionally misrepresented to be something they are not, and suspect items may be counterfeit or fraudulent.

The primary driver behind counterfeiting is monetary gain. CFSI are produced with less effort and fewer resources, so quality and reliability are reduced. We are concerned about CFSI because of the increased risk of failure during normal operation or during an accident.

We are here today to present a status

update on this event and describe to you the event and actions taken that led to the final conclusions.

In March 2015, all licensees of nuclear power plants received official disclosure letters from the vendor indicating that material properties of certain valves may not meet required specifications. In accordance with REGDOC 3.1.1, licensees submitted preliminary event reports and conducted engineering evaluations to confirm there is no immediate impact on safe operation. In June 2015 CNSC Staff, along with industry members, provided you a second update to confirm that no safety impact was identified, and in December 2015 licensees submitted the detailed event reports.

This is a simplified description of the supply chain of the valves and valve parts supplied to Canadian nuclear power plants.

The supply chain is generally the primary entry point of CFSI. As shown here on the left-hand side of this slide, Company 3, a Tier 3 material subsupplier, purchases the material from the mills. The material was initially certified to British standards, shown in this graph as Certificate A, which identifies the material specification and chemical composition.

Company 3 then submits the material to independent testing facilities to recertify it to the required ASME code, shown as Certificate B in this case, and then Company 3 submits the certified material to

Company 2.

Company 2, a manufacturer of valves and valve parts, arranges for independent third-party testing for valves with greater than 2-inch nominal diameters, as required by the ASME code. Company 2 then checks all certificates, supplies material to Company 1, and releases material into production.

Company 1, shown here on the right-hand side, receives the certified material from Company 2 and supplies valves to Canadian nuclear power plants.

Now, Company 1 and Company 2 are subsidiaries of Company 4, as shown here on this graph. Both Company 1 and Company 2 supplied valves to Canadian nuclear power plants, along with all three certificates.

The concern about the possible CFSI was raised when Company 2 was informed by one of its customers that they suspected certified document forgeries. Immediately Company 4 launched an investigation, which revealed two different forms of falsification of the material certificates and/or Certificate B.

An employee from Company 3 had populated test data onto duplicated certificates even though the material had not been sent for testing, and the same employee modified tests results on the certificate to achieve a pass against specifications. No evidence to suggest any of the original certificates, Certificate A, had been altered in any way.

This slide shows the cross-section of a typical valve. It identifies the main parts that were evaluated for material non-conformance. The affected valve parts included connectors, disks, bonnets, stems, and end stubs. These valve parts are used and assembled into several different valves. These valves are installed in various plants and plant systems.

It is important to note that the structural integrity of each valve was prooftested during manufacturing and prior to operation.

There are a number of requirements and expectations regarding CFSI included in the operating and reactor operating licences. CNSC has specific CFSI reporting requirements in REGDOC 3.1.1. CSA N286 specifies the requirement for a management system, including procurement of components and services. CSA N285 and the referenced ASME codes specify requirements for the pressure-retaining systems.

The pressure boundary quality assurance manual provides the standard against which the non-conformances of valves are dispositioned and the code variance process requires the licensee obtain a determination from the authorized inspection agency prior to submitting a request to the CNSC.

In this slide we describe the code variance process. This is a simplified flowchart showing the overall process used for the evaluation of valves with

suspect material.

The process begins with a vendor sending a disclosure letter to the licensee and non-conformance reports to the authorized inspection agency. These actions trigger a process with two phases. The disclosure letter triggers an interim phase to decide whether continued operation is safe, shown here in the green box in the upper right-hand portion of the slide. The non-conformance report triggers the long-term phase, which determines whether the valve can be used as is.

The licensee must first obtain a technical dispensation from the authorized inspection agency that the valve is acceptable from a code-equivalence point of view. The licensee must then obtain CNSC acceptance that the valve is acceptable from a nuclear safety point of view.

In the next four slides I will describe the roles and the actions taken by each party identified in this graph.

Starting with the vendor, the vendor conducted engineering assessments based on information from the original mill certificates for each affected valve and valve parts, concluding that there is no safety risk for the continued safe operation of the valves and the parts. The vendor's engineering assessment showed that there is sufficient design margin with the valve design stresses using very conservative assumptions.

As we stated earlier, the licensees must first obtain technical dispensation from the authorized inspection agency that the valve is acceptable from a code-equivalence point of view. The authorized inspection agency, which was TSSA in this case, reviewed the non-conformance report submitted by the vendor to assess the impact on the supplied valves and the parts. The authorized inspection agency confirmed that the analysis assumed conservative material properties for the worst-case scenarios.

Licensees have the primary responsibility in preventing and detecting CFSI. For this particular event licensees conducted detailed investigations to identify all suspect valves and components to determine the full extent of condition and completed engineering evaluations to assess the impact on continued safe operation and determined that the installed valves are safe. The licensees also reviewed the vendor engineering assessments and methodologies.

Operating history reviews going as far back as 1997 and '98 showed no failures of these valves related to material properties.

CNSC actions.

CNSC Staff are satisfied that the licensees are following appropriate processes. CNSC Staff had technical meetings with licensees and a representative from the authorized inspection agency to examine the

processes followed, the engineering methodologies used, and information reviewed. CNSC quality assurance specialists verified the measures or initiatives taken by the licensee, in this case OPG or Ontario Power Generation, to prevent similar events.

All code variance requests will be submitted to the CNSC Staff for continued use of the affected valves.

Affected valves in quarantine will remain blocked until CNSC Staff have reviewed and accepted their use on a case-by-case basis.

Now, this table shows the extent of condition for the non-conformance valves and spare parts installed and quarantined received by each licensee. As mentioned earlier, licensees completed an operation history review of all equipment failures. No equipment failures were found to be related to the valve materials.

In the next few slides we summarize the key actions taken in response to this event to prevent reoccurences.

Ontario Power Generation conducted a supplementary audit of valve supplier Company 1 and the results were shared with all Canadian licensees. This audit focused on procurement and testing of material, and validated that Company 1 received material only from Company 2 and did not purchase material directly from Company 3. It confirmed that enhanced measures were taken

by Company 1, for example, the evaluation of subsuppliers' CFSI programs and evaluation of raw materials and components received to confirm chemical properties of materials.

The CANDU Procurement Audit Committee, or CANPAC for short, conducted a supplementary audit of Company 2 and the results were also shared with all Canadian licensees. This audit focused on procurement of materials and validated that corrective actions implemented by Company 2 are effective, for example confirming the removal of Company 3 from the approved vendors list. CNSC Staff inspects licensee supply chain processes, including their use of CANPAC audits.

CNSC Staff is developing a new regulatory document that describes the management system requirements applicable to CFSI and defines CNSC expectations regarding CFSI. A new CSA N299 quality assurance standard is also being developed. This new standard will contain requirements for the prevention and detection of CFSI.

In response to this event, a workshop was organized by CANDU Owners Group, or COG, to provide a venue for the industry to share knowledge, experience, and thoughts on CFSI. The workshop was for the industry and suppliers to review programs and policies aimed at dealing with CFSI. CNSC Staff attended the workshop to clarify regulatory regulations and expectations for the prevention of CFSI.

I will now turn the presentation to Mr. Howden to conclude the presentation and talk about the next steps going forward.

MR. HOWDEN: Thank you, Dr. Khouaja.

Based on the justifications and evidence provided by licensees, CNSC Staff conclude that there are no pressure boundary integrity and/or safety concerns with these valves and parts under the conditions they were designed for and the proposed disposition for all valves and parts supplied is use as is.

All affected valves and valve parts are to be subjected to CNSC review and acceptance of all code-variance requests. Once accepted and approved by the CNSC, the final disposition for the installed valves is use as it.

Affected items in quarantine will remain blocked from use until the variance request has been approved by the CNSC. In the spirit of continuous improvement, licensees continue to implement enhanced measures to prevent CFSI from entering the nuclear supply chains.

As far as next steps, CNSC Staff continue to review submissions to ensure there are no safety or operability risk for continued use of the valves. This is in the form of a code variance request in accordance with the requirements stated in each facility's licence conditions handbook.

Licensees continue their efforts to ensure CFSI do not enter the nuclear supply chain and are taking additional measures throughout the industry.

We are clarifying expectations regarding CFSI and increasing awareness of how the existing regulatory framework applies to CFSI.

Lastly, completion of CSA N299 is planned for the end of this calendar year. CSA N299 is an industry standard, nonetheless CNSC Staff sit on the committee and will have input to this important standard.

Thank you. CNSC Staff, industry members, and representatives from authorized inspection agencies are available to answer your questions.

THE PRESIDENT: Thank you.

Before opening the floor for questions, I'd like to hear from the industry, and maybe I'll start with Bruce Power.

Go ahead.

MR. BURTON: Maury Burton. I'm the Regulatory Affairs Manager for Bruce Power.

I don't really have a whole lot to add to what the CNSC Staff has presented here. We came prepared to answer any questions that you have. We are continuing to work through the process to get all the valves that have suspect material involved in them through the non-conformance process. Right now we have that for one company essentially complete, and approval is with the CNSC

Staff for a final review. For the second company we expect to have submissions to CNSC Staff by June of this year, so that's an update for Bruce Power on the current status.

THE PRESIDENT: Okay. Thank you.

NB Power?

MR. NOUWENS: Jason Nouwens, for the record, Regulatory Affairs manager.

I can't add a whole lot more than what Maury did, but I do think the CNSC presentation highlights the collaboration of the industry and the focus that the industry and CNSC has put in on this issue. It's very important, and I think it demonstrates that the correct actions are being taken.

THE PRESIDENT: Thank you.

OPG?

MR. MANLEY: Robin Manley, for the record, Vice-President, Nuclear Regulatory Affairs and Stakeholder Relations.

Like the others, I believe the CNSC presentation was a very comprehensive one.

A few general comments. You know, upon disclosure of this situation to the industry, we believe that we acted promptly to ensure the situation was in a safe state, to ensure that we had done appropriate evaluations and extent of condition to quarantine the things that were not already in service, to perform the notifications to the regulator, to engage with each other

for operating experience to make sure that we all knew what was going on, and to initiate a very thorough review which has taken time because it's a very robust review. Multiple players involved, as you can see.

And I would add that the engineering assessments that are done through this process are done using a standard process.

You know, this isn't something that needs to be made up. There is a code variance process, well established, international process, and it was done thoroughly. And the results, you know, going through the authorized inspection agency and then to the CNSC for their oversight have demonstrated, along with the actual operating experience of those valves in service, that this is a safe situation, albeit, obviously, one which we don't want to have happen again.

And so the CFSI programs that we already had in place have been enhanced as a result of the learning of this with an intent to, you know, definitely reduce the possibility of it happening in the future.

So beyond that, if you have any questions, I'd be happy to answer them.

THE PRESIDENT: Thank you.

I'd like to hear also from TSSA about the actual process.

MS TURYLO: Cathy Turylo, TSSA, Manager, Engineering Boilers and Vessel Safety.

The process took some time because it needed it. It warranted it.

The quantity of items that we had in front of us in this issue took time, but I can confirm it was thoroughly reviewed. All the items that were put forward were carefully considered.

All issues that were asked were closed prior to issuing our concluding correspondence.

I would also like to say that, although this is an issue that triggers some questions with respect to fraud and CFSI, but it also reinforced the integrity of our process. So we were very pleased to see that things that we thought were in place are actually in place.

And that, I think, was really the most important learning, I think, we received from all of this.

We have a lot of conservative approaches to various aspects in the process, for good reason, and it was good to see they were all carried out, so that's our position.

THE PRESIDENT: Thank you.

And I'll start the question period by, since I got the TSSA people here, can you do anything about elevators?

We can use your help. A little bit of colleagues in your shop, pass the message.

Okay. Let me start with Dr. McEwan.

MEMBER McEWAN: Thank you, Mr. President.

I -- can I get just a little bit of help in understanding the supply chain? So slide 5 or Figure 1 in the CMD.

So if I understand it correctly, the -- the mill is supplying carbon and stainless steel to the steel supplier. So is Certificate B issued by Company 3 to validate Certificate A, or is it issued after a process by Company 3 to manufacture what they supply to Company 2?

MR. HOWDEN: Barclay Howden speaking.

It's the latter is what you stated in terms of it takes the material, it puts it through a certification process to demonstrate that it meets the ASME requirements, and then it passes on. It's not in any way to validate the material from the mills, but the mills do come with a materials certificate which provides quite a bit of information.

And if you'll note that in some of the engineering assessments, those original mill certificates were used and we've deemed -- and they were deemed by the industry that they were valid. And that really contributed to the engineering assessments.

MEMBER McEWAN: So between the mills in Company 2, there is some manufacturing procedure that changes the nature of the steel and carbon before it's passed on to Company 2.

MR. HOWDEN: Barclay Howden speaking.

I would say no. I think it's just an

additional certification process, but I'd invite the licensees who are intimately familiar with their supply chain to comment on that.

MR. BURTON: Maury Burton, for the record.

In this case, the mill supplies the steel with a mill certificate, and it's generally done to a standard of some sort. In this case, it was a British standard, and they're -- we do have mill certificates where it was done to a number of standards, including European and ASME.

For the keys, Company 2 will place an order with Company 3, which is the steel distributor, for steel to a certain quality or standard. They will take what they have in stock and they will certify it to the -- the material request from Company 2, so that may require additional testing or possibly heat treating.

And in this case, there were some heat treating requirements for Company 2 that -- and that would be the only material change to it from the mill, would be the heat treating aspect.

Other than that, no real material property changes from the original manufacturer of the steel.

MR. MANLEY: If I can -- it's Robin Manley, for the record.

If I could just add one bit to that.

So that process where Company 3 is obtaining the Certificate B tends to include or maybe

always includes sending it off to another company to do a test. And that company supplies that additional test certificate.

And it was at that point that the fraudulent activity occurred because that Company 3, in this case, either did not send it for that test or else falsified the results.

MEMBER McEWAN: So in the CMD, it says in late 2013.

How long had the falsification been going on? Was it a single event or was it multiple events over a number of years?

MR. BURTON: From -- it's Maury Burton, for the record.

From our understanding from our suppliers or vendors is this went on over a period of about eight years from approximately 2003 to 2011 and it was essentially one manager within the steel supply company that was the root of the -- or root cause of this whole incident.

MEMBER McEWAN: So then for Company 2, which I think is the company that became suspicious, what triggered the change from accepting eight years' worth of data to wondering about the data?

MR. BURTON: Maury Burton, for the record.

What happened there, this actually came out of the -- the counterfeit issues that were -- was

occurring in Korea. The Korean nuclear hydro power company had gone back and done a lot of deep dives through their supply chain to kind of -- in extent of condition, and it was their audit going down through this entire supply chain right back to the mill that discovered that there were discrepancies.

What they did was they looked at the actual certificates that the Company 3 had in their files and gone to the test houses and actually got the certificates from the test houses and discovered that there were discrepancies there. And they also discovered that, by going back to another one of the test houses, which I believe was for the heat treating, that the material was never sent to this test house, that the entire certificate was fraudulent.

THE PRESIDENT: So we were really lucky to have detected this. It is not as if some of our own procedure would have detected it. It was running for a long time, and it's just because somebody blew, you know, a whistle, if I use this particular terminology.

MR. BURTON: Maury Burton, for the record.

You could say there probably was an element of luck there.

If you look in the corrective action report that Company 2 had, they've done a number of audits of this company over the years and never detected anything like this because they didn't go back to the mill and look

at the certificates or to the test houses to make sure. They looked at the process, and that's something that we're looking to our suppliers to start doing on a more regular basis.

It's not something that you can do necessarily every time for every piece of equipment, but you need to do some sampling of that to ensure that people are following processes and are not fraudulently representing the material that's being supplied to us.

MR. MANLEY: And if I can add to that just a little bit. Robin Manley, for the record.

So two things. One is that, you know, once that indication of a problem was identified, the process then worked as it should. So you know, acknowledging that it wasn't identified immediately, for sure. But upon notification to that vendor of a problem, they then initiated this thorough investigation which resulted with where we are today, right.

So the vendor's processes took over appropriately to deal with the suspect issue.

The other thing I'd add, and Maury alluded to this already, the enhancement actions that have been initiated here and that are already starting to take effect, right, include drilling down through the sub-supplier supply chain so that the expectation of our primary vendors now is that they're doing their own audits on their sub-suppliers to a higher standard, a tougher

standard than they used to.

And in addition, for our own major suppliers, we are drilling down the supply chain more deeply than we had in the past.

So that will decrease the requirement for someone else to have -- you know, to identify the problem because we're looking more thoroughly ourselves.

MEMBER McEWAN: Yeah, I think that's the encouraging thing, is that there is actually a process by which you can bypass a rogue employee, you know, by expanding the audit trail and doing that drill down.

When I first read this, I was really concerned that you can't get round a single individual who's determined to be fraudulent, but from what you've said, you can by simply bypassing that individual's role in the chain.

THE PRESIDENT: Mr. Tolgyesi.

MEMBER TOLGYESI: My question's a little bit technical.

So following reception from off carbon and steel, the steel supply, which is Company No. 3, was facing test figures and the tests of their products which followed by a falsification of results.

Once manufacturer, which is Company 2, received fraudulent material, he didn't know that. They manufacturer the valves and successfully tested the valves.

In operations, once installed, they were in there performing well.

So my question is, should we expect that test failed material supplied by Company 3 supplier to the manufacturer will automatically or eventually result in failure should be resultant failure of valve test completed by manufacturer or should we see that, eventually, one will be installed and, longer or shorter period, they will fail there?

MR. MANLEY: Robin Manley, for the record.

So I'll briefly have a crack at that, and others may want to expand on it.

So you know, the rigorous evaluation that has been undertaken has demonstrated that these valves are acceptable for use as is, right, for the design application.

One of the things that that is showing us is that there is lots of margin built into the manufacture of these components, and in fact, the components in the valves are not just put into service and, you know, run untested, right. They were tested as described in the CMD before supplied to the licensees, and then when they're put into application, there's testing that's ongoing, you know, depending on what the application is in the plant, post-maintenance testing or, you know, ongoing testing of the system as -- depending on the particular application.

So you know, my understanding is that in some of these cases, the degree to which the component, you know, failed the test would have been pretty minor and that because there's lots of margin in the design, it's -- that's why it still remains safe, right.

And in other cases, where the person falsified the results before even testing it, I mean, it may, in fact, have passed the test, right.

So -- but again, it's the rigorous analysis that's been done since then plus all of the testing that was done before they were put into service and when -- when put into service, that, you know, gives us that confidence that they were still robust equipment.

MR. BURTON: Maury Burton.

I'm just going to add to that.

For -- in reality, we wouldn't expect these valves to fail because they were -- the material was manufactured to an adequate standard.

The standard in question here is really what we call a commercial grade standard. The difference here in what Certificate B is, is qualifying to what is a nuclear standard.

So for nuclear class material, what we expect is -- well, because you have a higher consequence of failure, you want to ensure that the material is at a higher quality level, so you do some additional testing on it.

In this case, we could actually have valves that are in a -- on our turbine side that are seeing similar conditions that would be perfectly fine without this additional testing, so like I say, I don't think you -- we wouldn't expect failure based on the standard that the material was manufactured to. It's just we want to make sure that, for nuclear class valve, because of the consequence of failure, that we've qualified the material to a higher level.

MR. NOUWENS: If I could add also -- it's Jason Nouwens, for the record.

Just to your specific point about you suggested that maybe if the material property was inadequate that we would expect the valves to fail at a sooner time period, and as Robin mentioned, the engineer analysis that there is sufficient margin in the design requirements originally, so the -- so the valves would not be suspect or subject to a shorter design life than original.

MEMBER TOLGYESI: TSSA, do you have any comments on that, or...?

MS TURYLO: Okay. To confirm, the analysis was based on, for example, where there was lack of heat treatment, which would enhance strength properties, for example.

The analysis was conducted as if the material had no enhanced properties, so from an actual

strength point of view and longevity, that would not be a factor.

The next question would be asked was whether chemical compatibility, et cetera for a specific application. This is what the licensees would review that, okay, we don't have the precise material. We have not confirmation the precise material with enhanced properties that we were expecting. Do we still have the compatibility for the service application that it's being used? And that has also been reviewed.

So to answer the question, yes, all of those aspects have been looked at.

MEMBER TOLGYESI: So you know, you are talking about margins.

So could we say that safety factors and safety margins, which are built these products, not only in this one, but in general in the industry, are as important, at least as important or more important than the quality of the steel which was -- which we use to manufacture a valve?

MR. NOUWENS: Jason Nouwens, for the record.

I would suggest that both are equally important.

THE PRESIDENT: There is a standard the industry agreed on, and then all the standard is to be abided by. If we understand, there's a nuclear standard and it can be on strength, it can be on safety, it can be

on all those factor. They all have to be met.

I don't think that we would want, in a procurement, to start worrying about which one. It may be non-compliant, partially non-compliant or not be acceptable, would be my read.

But I was going to ask, did it only happen in Canada or this valve was used by others throughout the world?

You know, normally fraudulent activity will result for economic benefit. I'm trying to understand what was the economic benefit of falsifying here, and is it only supply for Canada, or for the world?

MR. BURTON: Maury Burton, for the record.

Now, our understanding is that only Company 2 received this material, and it was countries that have received material from Company 2 that were affected, mostly in Canada, from our understanding, but I believe there was some impact in Korea and other CANDU units around the world. I don't have that information with me.

And as far as your other comment on the economic benefit, that is one of the puzzling things on this because there was no economic benefit to this company for doing this.

Typically, we would expect to see that if the company was in financial trouble or there was going to be an economic benefit, and in this case, there wasn't, so it's one of the puzzling questions in this case.

THE PRESIDENT: Dr. McEwan?

Oh, sorry. I'm skipping here. Ms Velshi.

MEMBER VELSHI: Thank you.

I think we may have asked this before. So the NRU doesn't have these valves. Is that correct?

MR. HOWDEN: That is correct.

MEMBER VELSHI: Given that what we heard -- so, actually, I did want to compliment on an excellent update and all the different players on not only a very comprehensive and the collaborative way in which you've addressed this issue, but also, you know, providing reassurance that what we do have in place is robust, so again, thank you for that.

Question for staff. Given what we've heard from the licensees and from TSSA, would an umbrella approval of the items quarantined be considered?

MR. HOWDEN: So Barclay Howden speaking.

I'll ask Ken Kirkhope, our specialist in this area, to comment.

In general, if we can do that, we're trying to do it in that manner because there's a lot of valves involved. But in some cases, we just want to do some verification of valves that are going into safety systems to ensure that. And we're trying to do it in a risk informed approach.

I'll ask Mr. Kirkhope to describe it.

MR. KIRKHOPE: Ken Kirkhope, Engineering Design Assessment Division.

Yes, as Mr. Howden said, generally we take a case by case look for approval to install a valve. However, we may look at a category of valves and we could approve a group of valves for this specific application and design. This is possible, yes.

THE PRESIDENT: What does such a valve cost? I mean, I'm trying to figure out whether it'll be cheaper to buy a whole new set of valves rather than go through valve by valve assessment.

Some of you...?

MR. MANLEY: Robin Manley, for the record.

I do not know how much a valve costs. But I will say that the lead time to replace components is often very long. And so sometimes it isn't just a question of, you know, the actual cost of the valve but the procurement timeline.

And then of course if you were talking about the ones that are installed, then that's a whole other issue indeed.

THE PRESIDENT: I thought those are mass produced. Nothing's mass produced in the nuclear business.

MR. MANLEY: Afraid not.

THE PRESIDENT: But I thought the volume here at least for all the CANDU, are they specific valves? They cannot be used for anything else?

I'm trying to understand, again, the economics here of going through valve by valve approval rather than reordering. Because you've a couple of hundred.

MR. NOUWENS: If I could add a little bit. Jason Nouwens, for the record.

Typically, these valves are in the tens of thousands per valve, and the lead time is typically one to two years. So it's not easy to simply discard them and order new ones.

THE PRESIDENT: Thank you.

Ms Velshi.

Okay, Dr. McEwan.

MEMBER McEWAN: Thank you.

So just, again, a question on the certificates. We've heard the European certificates and standards and British, ASME. How much harmonization is there internationally between different national standards? And does a variation or an absence of harmonization increase the risk of something like this happening?

MR. BURTON: Maury Burton. I'll take a kick at this one.

The standards that exist, and pretty much every country has their own standards. The ASME is a very popular one in the nuclear area because it's one of the few

that has been developed and it's been around for a long time because the Americans have had a long-standing nuclear program.

But there is work in particularly the European Union to standardize their standards. And British actually are moving all their British standards to harmonize with the Europeans.

Now, there are differences between ASME and the European standards, but India has their own standards, China has their own standards, Russia has their own standards. They're all very similar and based on operating experience around the world, they offer a similar level of safety.

It comes down to the conservatism that the standard has in it. Some are slightly more conservative. But in general, the level of safety is essentially the same across them.

MR. HOWDEN: Dr. McEwan, we have a little bit of a nuance in terms of nuclear, and I'll ask Ken Kirkhope to describe some work that's being done sort of focused in this area.

MR. KIRKHOPE: Ken Kirkhope, Engineering Design Assessment Division.

Yes, over perhaps the past decade there's been an international project called Multinational Design Evaluation Program, MDEP. And that has looked at

harmonizing the different codes, the ASME code, European codes, Japanese codes.

And so there is work going to look at and comparison and harmonization of the codes, but it's a long process. The codes are established in their jurisdictions and all that, so change is hard, but...

And I understand that the British standard, the one we're looking at here, is moving towards harmonizing with ASME codes so that the results will be very similar.

That's all I have for now.

MEMBER TOLGYESI: We were talking about what should be done once, you know. And now, before using these valves which are in stock. So its authorized inspection agencies, authorization, requested when the new valves are purchased or new suppliers are introduced or it was only, in this case, where suspect valves were identified?

MR. BURTON: Maury Burton.

If I understand your question correctly, we have an authorized inspection agency for -- well, the licensees all have one, it depends on the province that you're at. But for our Pressure Boundary Program, and they do inspections on that, the manufacturers will also have an authorized inspection agency that qualifies their manufacturing process and testing of the material.

So the authorized inspection agencies are a part of the codes and standards, so we are required to have an independent inspector come and look at these things in the pressure boundary area. So it's not just for this particular incident. We have inspectors on site all the time, similar to our CNSC inspectors that are looking at our programs. And I can't speak for the manufacturers, how often they have people on site, but they would have a similar process.

Cathy may be able to expand on what the manufacturer process is since she is an AIA for some manufacturers.

MS TURYLO: That's correct, Maury.

At a manufacturing facility you will have an authorized inspector. They have similar qualifications to the inspectors that would be on a site, a nuclear site, albeit that they have different responsibilities which will be specific to the manufacturer. So they have a quality program.

So there are two types of inspections that the inspector would be involved in. One would be in support of oversight of that quality program, as well as inspection-specific to items being manufactured at that moment in time.

MEMBER TOLGYESI: So do you have, like OPG, New Brunswick, do you have the same authorized inspection agencies or you have different?

MR. BURTON: Maury Burton, for the record.

OPG and Bruce Power share the same authorized inspection agency because it happens to be the TSSA for Ontario. New Brunswick Power has a different inspection agency that happens to be the New Brunswick Department of Public Safety in their case. So it depends on the jurisdiction that you're in.

So I imagine we could go for another authorized inspection agency. But the TSSA is in the location that we need and they do have jurisdiction, so we choose to use them as our inspection agency.

MEMBER TOLGYESI: So how do you make sure that the criteria are harmonized? How do you make sure that what you have in Ontario is similar to what's happening in New Brunswick?

MR. BURTON: Maury Burton, for the record.

The criteria are essentially defined by the codes and standards that we're required to use. So in our case, N285 is in our licence, which spells out certain sections of the ASME code. And the code is very specific about the requirements there. So that criteria is highly defined.

And for the authorized inspection agency to be qualified, they need to have a certification from ASME to look at that. The AIAs may have some additional information or CNSC Staff.

MR. HOWDEN: Barclay Howden speaking.

I'm going to ask Ken Kirkhope to provide any additional information to what Mr. Burton said. Because we're responsible for making sure that the AIAs do the work according to the way we require and in a consistent manner.

So I'll ask Ken Kirkhope to comment.

MR. KIRKHOPE: Ken Kirkhope, Engineering Design Assessment Division.

Yes, we require each of the licensees to have an agreement with an authorized inspection agency. And as Mr. Burton pointed out, for the Ontario plants that's TSSA, and in New Brunswick, New Brunswick Department of Public Safety.

All the authorized inspection agencies are accredited by the American Society of Mechanical Engineers to provide these services in accordance with ASME code or, in Canada, CSA-N285.0.

So they have specially qualified inspectors and inspector supervisors and engineering staff that have undergone rigorous training and examinations, as well as supervised experience, and then they're certified according to the National Board of Boiler and Pressure Vessel Inspectors. So that National Board accredits the authorized inspectors and the organization.

So that's sort of the standard that's used

for it, so they're all on the same requirements and same qualifications.

And I don't know if our AIAs want to add anything or...?

MS TURYLO: I think that was good, Ken. Thank you.

THE PRESIDENT: Ms Velshi.

MEMBER VELSHI: Thank you.

Maybe I'll ask Staff to comment first and then industry.

So what do you think is the overall trend for CFSI? Is it getting worse, is it getting better?

MR. HOWDEN: Barclay Howden speaking. I'm going to ask Paul Wong to comment.

I think our information is probably more anecdotal because there hasn't been a lot of statistics within Canada. So I'll ask Paul to comment on that.

Also, at the same time, I think one thing that we want to come across is that this event, even though it came out of sort of knowledge from the Korean event, it's nothing like the Korean event where it was widespread and in many areas. And so that drove this information to come to the surface through all the audits that were done.

In ours, they appear to be more one-offs, but I'll let Mr. Wong provide his comments since he's a quality management specialist who looks at the procurement chain extensively.

MR. WONG: Paul Wong, Management System Specialist, for the record.

Based on the information that we have shared with the other regulators, particularly the Americans and the British and the Finns, I would say it doesn't appear to be getting worse or better. The Korean case is probably the most serious in recent history. And the number of cases in the nuclear industry I'll say has not at least been shown to be that many in North America or Europe.

Based on the information we have on the Americans is that the non-nuclear industry, especially in the electronics, and probably it's getting worse. But we're not seeing so much yet in the nuclear industry. But we are aware of the situation outside the nuclear industry and we're maintaining a close eye on things.

MEMBER VELSHI: Thank you.

Industry have any different insight?

MR. BURTON: Maury Burton, for the record.

Robin and I just kind of had a quick chat, and we agree with CNSC Staff, we're not really seeing much in this area, but that doesn't mean that we aren't going to remain vigilant. All the licensees here are members of the Electric Power Research Institute which contains an OPEX database.

And the bonus of doing that rather than WANO, is it includes the thermal plants and hydraulic

plants in the U.S. and Canada as well for the most part. They're basically the industry standard for OPEX on the CSFI issue.

So it's gaining that information and remaining vigilant, improving our own internal standards. I know for, Mr. Wong mentioned, the electronic equipment. For a lot of our electronic equipment now when we do receipt inspection we actually have a picture of the original equipment manufacturer's capacitor or diode, whatever the part may be to assist in that.

So it goes with the types of improvements that we're making and receive inspection. And we're also, in a lot of cases, going directly to the original equipment manufacturers rather than using distributors.

From experience that we've seen in the industry and other industries is that the risk of CSFI ending up in your supply chain increase with the use of distributors, because you don't know where that distributor happened to get the part from. So it comes back to the traceability.

So using the original equipment manufacturers is one of the things that we do as much as possible so that we know that we have the proper pedigree of material.

THE PRESIDENT: But just on that point, as we're moving more and more into instrumentation and control which are software-driven, et cetera. To detect fraudulent

activity in painted circuit-like or in software-run instruments, going to be a nightmare. And that's what we already detected in other sectors. And if there's a buck to be made, somebody will try to do it.

So I hope you are not only looking at the physical components.

MR. BURTON: Maury Burton, for the record.

No. There's testing that goes along with that too for particularly software. We do have requirements under N286.7, which is in the licence for software qualification. So we don't buy off-the-shelf software and throw it into our systems. It's tested and qualified before it goes in.

THE PRESIDENT: Thank you.

Dr. McEwan.

Mr. Tolgyesi.

Ms Velshi.

So you started by saying that the companies can be identified. And everybody's afraid to ask who they are?

--- Laughter / Rires

THE PRESIDENT: I'll bite. So who's Company 3, and are they still in business --

MR. BURTON: Maury Burton, for the record.

THE PRESIDENT: -- and was their employee fired?

MR. BURTON: I can answer some of those questions.

Company 3 is still in business. It was a company called Hi Tech Steel based in the UK. And from our understanding, the person that was involved in this was terminated from his position. Beyond that, I'm not sure what's going on with that individual. We had heard that there's some legal proceedings against him, but we don't really have any details on that.

We can identify the other two companies if you'd like.

THE PRESIDENT: Well, they're still -- presumably, they were -- did everything correctly --

MR. BURTON: Yes.

THE PRESIDENT: -- right? They're not --

MR. BURTON: They were victims in this as much as we were, so they followed -- like Robin said, they followed the process. And I'll let Robin interject here.

MR. MANLEY: Robin Manley, for the record.

I was just going to say that, you know, Companies 1 and 2 have given us permission to release their names, if necessary. But, you know, they did the right thing, right? Upon identification of the issue, they followed the process, and that's why we're able to know what we know today and have gone through this rigorous process of validating the equipment that we have.

THE PRESIDENT: So we want to know their names, they're good guys.

MR. MANLEY: Yes. So one of them is IMI, that's the parent company for, and Newman Hattersley and Thompson Valves are 1 and 2, I forget which order.

And so I do understand that there's litigation undergoing. And, you know, without me trying to overstate the case, clearly we don't want companies to be performing fraudulent activities, right, and neither do our vendors, right? It's against all of our best interests, it's against safety, even though there wasn't a safety consequence here, we don't want there to be one in the future.

So to the extent that, you know, litigation is successful, I would encourage it to be in this case. We don't want vendors to be doing this kind of thing and we want that message to be sent.

THE PRESIDENT: Absolutely. I think the consequences of doing those fraudulent activities should be publicly, internationally known so there will be some consequences for doing it.

Anybody else?

Okay, well thank you. Thank you very much for this. We will now take a 10-minute break. We'll come back at 11:30.

Thank you all.

--- Upon recessing at 11:19 a.m. /
Suspension à 11 h 19
--- Upon resuming at 11:33 a.m. /
Reprise à 11 h 33

CMD 16-M16/16-M16.A

Oral presentation by CNSC staff

THE PRESIDENT: The next item on the agenda is an information item on the Regulatory Document-3.6, Glossary of CNSC Terminology, as outlined in CMDs 16-M16 and 16-M16.A.

I understand that Ms Karen Owen-Whitred will make the presentation.

Over to you.

MS OWEN-WHITRED: Thank you.

Bonjour, Monsieur le Président, Membres de la Commission.

My name is Karen Owen-Whitred, Director of the Regulatory Framework Division.

With me today are Ms Jane Hunt, Regulatory Framework Officer with the Regulatory Framework Division, and Ms Marsha Fine, Editor with the Creative Services Division.

We are here today to present the draft of REGDOC-3.6, Glossary of CNSC Terminology.

This presentation is for information only. No decision is requested from the members of the Commission and the document does not impose any regulatory requirements on licensees.

This document was developed at the request of the Commission members and is expected to be published in May 2016.

Before discussing the document in detail, I will briefly review the role of regulatory documents and where REGDOC-3.6 is situated within the CNSC Regulatory Document Framework.

To enhance accessibility of our regulatory expectations, the CNSC structures our regulatory documents according to the framework shown here.

This slide shows where REGDOC-3.6 fits within the CNSC’s broader document framework.

It is situated within section 3.0: Other regulatory areas. This section also includes information about licensees’ reporting requirements, public and Aboriginal engagement, financial guarantees, Commission proceedings, and CNSC processes and practices.

This slide provides an outline of what we will be covering today.

We will start with a brief historical perspective of the glossary entries in regulatory documents.

Next, we will cover the objectives of REGDOC-3.6.

We will explain the development process and feedback received.

Finally, we will move forward to explaining how the document will be implemented.

At this point, I'll turn the presentation over to Ms Hunt.

MS HUNT: Thank you.

Good morning, President Binder, Members of the Commission.

Jane Hunt, for the record, Regulatory Framework Officer with the Regulatory Framework Division.

Most regulatory documents contain a glossary that defines the terms used in that individual regulatory document.

You, the Commission members, requested a CNSC-specific glossary of terms during the Commission meeting of March 27, 2014. This is the draft document that you have before you today.

It is important to note, as Ms Owen-Whitred already mentioned, that REGDOC-3.6 does not impose any requirements on licensees. It is provided as a reference document.

While some of the terms are also used in CNSC licences and Licence Conditions Handbooks, it is also important to note that if there are any differences, the

definitions in this glossary do not supersede licence conditions or other legally binding documents.

REGDOC-3.6, Glossary of CNSC Terminology, provides an easily identifiable source of standard definitions that are applicable to the CNSC's regulatory framework. The document can be updated regularly to reflect changes and improvements in the regulatory framework.

A standardized glossary provides an essential communications tool. It saves time in finding a desired definition and promotes consistency among documents.

The terms and definitions that are included have been comprehensively reviewed to provide definitions that are suitable across all of the CNSC's regulatory activities. Some examples of those activities are the 14 Safety and Control Areas, nuclear power plants, nuclear substances and radiation devices and annual reports.

This document is provided for reference and information and will serve as the standard for future CNSC regulatory documents and other publications.

REGDOC-3.6 was developed by consolidating existing terms and definitions into one document which was then thoroughly reviewed by a cross-functional team of technical specialists. The cross-functional team included a professional editor from the Strategic Communications

Directorate, and therefore we could develop a cohesive format and presentation that aligns with CNSC and industry standards.

The scope for this first version was limited to published CNSC regulatory documents, some other CNSC publications such as annual reports, and the interpretations sections of the *Nuclear Safety and Control Act* and the regulations made under it.

This document does not include terms and definitions from publications that are not yet published, such as draft regulatory documents that are in internal review or public consultation, or from scientific and technical papers or from discussion papers.

Acronyms and abbreviations are included, interleaved alphabetically with the full terms for ease of reference.

Where necessary, the published definitions have been edited for grammar, consistency and accuracy.

If published sources provided multiple definitions for a term, similar definitions were combined and edited so that we ended up with one cohesive definition.

Because the team was looking at all terms and definitions brought together into one consolidated document, inconsistencies in editing or phrasing became obvious and could be addressed in a consistent manner.

And finally, context was added where the meaning applies to a specific regulated activity or a specific type of facility.

The internal review process was robust. It was the same rigorous internal review that all regulatory documents go through.

The comments received from CNSC staff indicated a strong level of interest in having this consolidated tool. All comments were reviewed and addressed.

The definitions were finalized by strong consensus-based discussion involving the entire cross-functional technical team.

The Regulatory Framework Division would like to comment that the cross-functional team developed an excellent working relationship and fully debated all aspects of any conflicts between existing definitions for different contexts of nuclear safety. We would like to thank all of the members of the team, and their directors and directors general, for their participation in, and enthusiasm for, the project.

Like the English document, the French document was developed by first copying the existing published French terms and definitions, followed by a thorough review by Francophone technical specialists.

The French glossaire will be used by the Translation Bureau and by the CNSC’s translation and

editing staff to assist in further standardizing the terminology between regulatory documents.

You may notice that the English version of REGDOC-3.6 includes the French term beside the English one, and likewise, in the French version of the document, the English term is listed next to the French term. This is considered best practice in translation and when publishing bilingual documents and provides a quick and easy reference. This practice is also used in the NSCA and the regulations.

The examples shown here indicate some of the various types of entries:

- First, a simple definition, in this case the English term with the equivalent French term shown in italics; this term is important for nuclear safety and is used in REGDOC-2.5.2, Design of Nuclear Facilities: Nuclear Power Plants.

- Next is an example of an acronym which provides a cross-reference to the full term and definition.

- A third type of entry, as shown on this slide, is quoted from the interpretations section of the *Class I Nuclear Facilities Regulations* and is identified as such at the end of the entry. This is important because terms that appear in the NSCA and the regulations are legally binding interpretations within the context that they are used in the NSCA and the regulations. These legal interpretations must be taken into account when developing

a regulatory document. As shown here, the source of each of those entries has been identified at the end of each entry.

- The last entry on this slide demonstrates one of the issues resolved by having multiple definitions depending on the context. The first definition comes from the *Canadian Nuclear Safety Commission Rules of Procedure* and, as mentioned, is legally binding within that context. However, the term is also used more generically and is used in other contexts. For example, REGDOC-2.10.1, Nuclear Emergency Preparedness and Response, uses the term in an appropriate way for emergency drills.

There were some challenges in developing this glossary even though the scope for the development was based on existing published documents.

There are quite a few different contexts across the CNSC. For example, we have 14 Safety and Control Areas and we license many different types of facilities such as nuclear power plants, uranium mines and mills, medical applications and so on.

For some terms, it was extremely important to ensure technical accuracy and completeness (that is, scientific depth), while balancing the need for plain language in the definition.

Some terms that were published in CNSC documents have not been included in this glossary on the basis that they are standard terms. For example, while a

"Monte Carlo analysis" sounds very intriguing, it is actually a standard statistical term that is fully explained in any statistics-related glossary or textbook.

As indicated on the previous slide, one challenge in developing this glossary is that in the field of nuclear science the context can affect the precise meaning of a term. The team resolved this challenge by providing the context, when necessary, for a number of terms.

For example, I am sure you are all aware of the term "trending" as used in social media. On Facebook, Twitter, YouTube and other social media platforms, "trending" describes a topic that is mentioned more often than others. Trending topics are those that have become popular, often because of an event that prompts people to talk about a specific topic.

However, within the context of nuclear criticality safety, as used in GD-327, Guidance for Nuclear Criticality Safety, "trending" has a very specific meaning of, as shown here, "the extrapolation of data from periodic non-destructive measurements of a control Raschig ring’s physical and chemical properties, and from certain properties of the vessel, to predict changes with time in the properties measured."

As you can see, this definition is quite specific to nuclear criticality safety.

And this glossary does include a

definition of a "Raschig ring" as well, which is a small, hollow, borosilicate-glass cylinder having approximately equal length and diameter.

As mentioned earlier, striking a balance between scientific depth and accuracy and a plain language approach to the definition was a challenge. This challenge could often be resolved by adding notes to the definitions. These notes were also helpful in providing additional detail or clarification wherever it was useful.

Editing of the definitions included the goal of plain language. For this first version of the glossary, plain language was incorporated to the extent possible. In future versions, CNSC staff will continue to add notes and revise the text where necessary to enhance readability while maintaining technical accuracy.

Given the nature of the subject matter -- that is, nuclear science and safety -- the technical team combined a number of variations in definitions to provide full explanations of the meaning from a number of perspectives. For these cases, the terms required more than one note in order to achieve the highest clarity possible within a glossary.

If you check your draft copy of the glossary, you can see that two terms in particular, "effective dose" and "equivalent dose," are balancing the need for scientific depth and accuracy with a plain language" approach. "Effective dose" uses four notes, and

"equivalent dose" has three notes.

No other entries in the glossary are quite as long as those two.

All of these examples are available in the draft copies of the glossary provided to you and will be available to all of our stakeholders when the document is published.

In relation to public consultation, this regulatory document consolidates and reprints terms and definitions that were previously reviewed and approved by the Commission. Public consultation of the terms and definitions occurred during the consultation process for each individual regulatory document.

That being said, this document is considered to be evergreen. That is, it will be updated regularly on an as required basis. Feedback on the current terms and suggestions for additional terms and definitions will always be considered for future revisions.

As mentioned earlier, REGDOC-3.6 does not impose any requirements on licensees.

Existing licensees have already seen these definitions in their past and ongoing interactions with the CNSC.

Because the document consolidates a list of definitions that have already been approved and published, CNSC staff anticipate minimal to no impact on licensees when REGDOC-3.6 is published. It simply provides

a consolidated easy-to-use reference tool.

The updates to the glossary will be ongoing but on an as needed basis.

During internal review, the technical team received quite a few requests for additional terms. However, the scope for this initial version was strictly limited to consolidating terms and definitions from existing published regulatory documents. In preparation for the next update, some of those requested terms may be reviewed and added.

For any new regulatory document, the development process will show if new terms need to be defined for the purposes of that document. All new terms will go through the standard internal review and the stringent public consultation process and then will be added to this glossary.

For any instance where the NSCA or a regulation is revised, the glossary will be reviewed and revised as necessary. We have already done this once. During the period of this glossary project, the *Packaging and Transport of Nuclear Substances Regulations* were updated to become the *Packaging and Transport of Nuclear Substances Regulations, 2015*. This glossary reflects the 2015 regulations.

E-publishing functionality will be added in order to enhance the usability of this document. For example, we plan to add hyperlinks where appropriate, such

as from each acronym to the full term with the definition. This functionality will be posted as an administrative update of both the English and French documents.

I will now pass the presentation back to Karen Owen-Whitred, Director of the Regulatory Framework Division.

MS OWEN-WHITRED: To conclude, REGDOC-3.6 enhances the existing regulatory document framework by providing a single source of information about the terminology encountered in nuclear safety and control. It enhances consistency and clarity across all of the CNSC's safety initiatives.

As mentioned earlier, publication of this document does not impact the licensees. This reference tool simply consolidates existing information. It does not supersede existing licence conditions or other legally binding documents.

As the federal regulator for nuclear safety, the CNSC is an authoritative source on terminology for nuclear science. Our technical specialists use these terms every day and our stakeholders can expect clear, consistent use of our terminology. We anticipate that this tool will be useful to other organizations. For example, the CSA Group (the Canadian Standards Association) is already working with this draft of the document to help inform revisions to their own technical glossary.

Thank you for your time and we remain

available to answer any questions you may have.

THE PRESIDENT: Okay. Thank you.

Let me find my way here.

Monsieur Tolgyesi, please start us off.

MEMBER TOLGYESI: First of all, I should say that these remarks are a little bit like Larousse or Petit Robert. You know, it's something which is a kind of Webster, yes. At first, I didn't expect this. I was expecting much more something like a pocket book, you know, for... But you were saying that you are preparing that for Commissioners. You know, on some occasions we were asking that when a CMD was there, there was no glossary behind. So we were questioning, gee, what's that, what's that acronym?

However, I think it's a big job. I admire your artwork because it is really something like that. I think it's a useful tool. It removes in lots of cases questioning and discussions and disagreements and all those.

Now, there is one major typo error. In English you call it 3.6; in French you call it 3.5.5. It's just .5 the difference but I think it could become important.

Besides that, I have some comments but it's -- you know, I'm questioning this is supposed to cover all fields that CNSC is covering. Now, if you remember, we had some discussions when we were talking about uranium

mines up in the North. There were drill holes where the water was leaking and we were talking about plugging. So I don't see that here, drilling or drill holes and that kind of stuff. So I don't know to what extent it should be in or it should not be.

What you are saying is tailings contain chemical residues but there is no residue, what's a residue.

There is event or accident, a definition there, but what about reportable event or reportable accident? We discuss that lots of times. So to what extent or when it should be or at least what's the definition and the limits when it should happen will be probably determined somewhere else.

On the French side -- and I will end with this and I will not have any more comments. On the French side, when you go to "résidus," which is at page 111, les résidus -- it means tailings -- and could contain les résidus chimiques. So it's a little bit maybe confusing because les résidus contiennent les résidus chimiques. Maybe there's some, you know, more details that could be said.

So I was talking about drilling emergency simulations and near miss and that kind of stuff. I don't know how far it should be in, you know, because we could go in very detailed, but I don't know to what extent it will be useful.

That's it. Thank you.

MS OWEN-WHITRED: So the scope of this first version of the glossary was very explicitly limited to only terms and their definitions that have been published previously by the CNSC, as Ms Hunt mentioned in the presentation, and some of the terms that you mentioned just now that you don't see in the glossary, that's why, they were outside of the scope of this first version.

That being said, we do anticipate revising the glossary of course going forward. We've taken note of those particular terms that you've mentioned that may be of interest to the Commission, and certainly if there are any others, we'll take note of those as well.

With respect to the translation issue that you noted or the potential for confusion within the French term that you pointed out, that's something else that we'll take note of. As we've said, we are still finalizing the glossary and we'll make sure that that is addressed before the final publication.

THE PRESIDENT: Thank you.

Ms Velshi.

MEMBER VELSHI: Thank you, Mr. President.

I too also have fairly minor little nitpicky things that I wanted to share with you. So when you talk about one-stop shopping, I think it's extremely helpful for that but it's not a standalone document.

So if I look at the two specific examples

you gave of "equivalent dose" and "effective dose," it makes reference to the *Radiation Protection Regulations*, column 1 or column whatever, and not very helpful as a definition if I don't know what's in there. So I'm just wondering if there were some definitions where it would make more sense to make them more complete, but those were two specific ones where the definition means nothing if you don't know what's in those columns.

THE PRESIDENT: But that's where hotlinking it is crucial.

MEMBER VELSHI: Right. And I think --

THE PRESIDENT: We are migrating to an online Google-driven society, so all of this, I'm assuming -- I didn't get some clarification. When are the hotlinks going to be implemented? Because I mean you start with A.1, A.2. This is really -- I wouldn't have started with this because -- and you give me an explanation totally not useful unless I can click in and see what are we talking about here.

So when is the hotlink going to be operational at least to some, maybe not all of them?

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

Yes, thank you, that's exactly the answer I would offer to your question, that the intent is to have hyperlink functionality throughout the document that will address exactly those context or source questions or

confusion that people may have.

I would also just like to reiterate that in some cases, as was mentioned in the presentation, when a definition is taken from one of the regulations or from the Act itself, that definition we have re-created word for word because it is a legal definition and we're not able to change that.

With respect to timing, I don't have an actual date for you right now but I can say that we are actively pursuing that and that would be within the next version of the glossary that we're pursuing, is to have hyperlink functionality.

THE PRESIDENT: You mean you're going to go first version without the hotlink; is that what you're saying?

MS OWEN-WHITRED: We are anticipating publication of the final REG DOC 3.6 in May of 2016 and that is correct, that first version would not have hyperlink functionality.

THE PRESIDENT: Why not? At least on some of them.

MS OWEN-WHITRED: Yeah.

THE PRESIDENT: On some of them really it's not useful without it. I'm not talking about all of them, but how difficult it is to get uplink? Uplink is relatively easy to do nowadays.

MS OWEN-WHITRED: So Karen Owen-Whitred

for the record.

I'm certainly not an expert in that area, but yes, we can pursue that for the first version in some specific cases where we can see that it would be helpful, certainly.

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

I think it just delays the amount of time it takes to get it published online, but we can certainly incorporate some of that hyperlinking, it might delay this putting it online, but as you said, it would make it more useful.

THE PRESIDENT: Particularly when you're ready, the documents themselves are online. When you make a reference to a REG DOC, you know, it should be almost instantaneous. I don't think there's a problem here. In fact, if we were to design it correctly it should automatically pick a hotlink if you quote it -- anyhow, we're getting into technology issue, we don't have our techies here. Check with them. Some of them should be really easy to do.

MEMBER VELSHI: The next one, again, very minor. Page 32 and page 59 where you've got definition of "DO and job", the French one it just says "French" and not the word itself, if you can find those and I'm not sure why that's the case.

MS OWEN-WHITRED: Karen Owen-Whitred for

the record.

Yes, thank you for pointing it out. There are a few items that still remain to be edited in this draft version and, yes, we will make sure that that's accurate and correct for the final version.

MEMBER VELSHI: And my last one, as you were looking at the different REG DOCs and got your cross-functional team, were there any major inconsistencies that would necessitate any of the REG DOCs to get re-issued?

MS OWEN-WHITRED: Karen Owen-Whitred.

The short answer is no, we did not discover any inconsistencies that would require us to go back and edit or change existing REG DOCs.

There were a few cases, as was outlined in the presentation, where wording might have been slightly different for the same -- definitions for the same term across REG DOCs, but it was more in the order of editorial and those discrepancies were discussed, resolved and a final consistent definition was developed and that's the definition that you would see in the glossary.

THE PRESIDENT: Dr. McEwan...?

MEMBER McEWAN: Thank you. So congratulations. I think this is -- it's a huge amount of work. The risk of a glossary this size is the size and I think that some of the hyperlinks and things like that are important.

So I would like to say that I read every page in detail, but I can't. However, there is one for a nuclear regulatory agency an egregious omission. You have neither the shortened version nor the definition for megabecquerel and gigabecquerel and so those are used in almost every single report from the Nuclear Substances Division. I think that must be included.

THE PRESIDENT: There's becquerels.

MEMBER McEWAN: There's not mega, there's not giga.

THE PRESIDENT: Oh, the --

MEMBER McEWAN: And I think you need to be able to go straight to that because a becquerel is --

THE PRESIDENT: Terrabecquerel, I found that. You have to get all the Greek --

MEMBER McEWAN: Yeah.

THE PRESIDENT: Absolutely. Millisievert, microsievert --

MEMBER McEWAN: Millisievert's in there. Megaelectronvolt is in there. So I think, you know, MBq, GBq are so commonly used.

THE PRESIDENT: Yeah.

MS OWEN-WHITRED: Karen Owen-Whitred.

Yes, thank you, that's a good point. We'll look at the full suite of Greek --

MEMBER McEWAN: Yeah.

MS OWEN-WHITRED: -- conditions for any

term where that's appropriate.

MEMBER McEWAN: I think the second comment is a plea for a significant end user of this document. It would be very, very helpful to have a subsection of this document which was just a list of acronyms because it's frequently the acronym that will trip us up reading CMDs rather than some of the definitional components, recognizing you've got multiple audiences for this document. Certainly selfishly, that would be very helpful.

THE PRESIDENT: But I thought this replaces the acronym list that we -- we already have a long list of acronyms posted. Are not all of them in here?

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

Yes, that list of acronyms was considered when putting together the document and, as was mentioned in the presentation, the acronyms right now are interleaved with the definitions.

But I just wanted to clarify, if what you're suggesting would be more helpful to the users is a separate -- within this glossary, a separate list of just acronyms?

MEMBER McEWAN: I would leave the acronyms in the major glossary, but a separate list as section 1 or section 2 of this document from my narrow, selfish perspective would be very helpful, so that I have it all in one and I don't have to leaf through if I'm looking at it

on paper.

THE PRESIDENT: Okay. Let me challenge you a little bit. What do you mean have it, are you going to carry it in your pocket?

MEMBER McEWAN: No, but I am going to have it on my desktop to look at as I'm reviewing documents.

THE PRESIDENT: All right. So I'm coming back to without this being searchable, I don't think you're going to go and look at it like a dictionary. You're probably going to type in "meg" and it will come out.

MEMBER McEWAN: But at the moment, I --

THE PRESIDENT: So I don't know how, because I'm just looking at the use, so how it's going to be used and the last time I used a dictionary was a long, long time ago. So I'm not sure how -- you know, whether it will give you a list of acronyms that you're actually going to keep the paper format on acronyms.

MEMBER McEWAN: The acronym I might, yeah.

THE PRESIDENT: Okay.

MEMBER McEWAN: I might. Just a thought. I don't know how much additional work it is.

THE PRESIDENT: Well, if you put it online, they can always print it locally; right, or they can print it in there, et cetera?

MS OWEN-WHITRED: Karen --

THE PRESIDENT: So if you were really -- if we had a really smart, and again we need the techies

here, you can extract the acronym right out of this by doing a search function of acronym and it will give it to you right away. So, again, we need our friends to advise us on this.

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

First of all, yes, the intent is for the document to be searchable electronically, that function will exist, but if it would be helpful to have a separate list or whatever approach is the most helpful to make it an easy, kind of quick reference for acronyms, we can -- of course, we can look at that for the final version, the first version.

THE PRESIDENT: So, again, let me congratulate you. I think it's a great work. And yesterday, I don't know if you were here, I asked the question whether the LCH of CNL was consistent with this. It will be interesting to see.

And I think all the REG DOCs that we're developing in place will bring in new vocabulary and you'll always have to maintain -- the maintenance of this is going to be tough unless you make it digitally and being able to do this.

I also hope that now and then do what, I think it's Webster or the Oxford, every year they come up, we added this new terminology, some of it is bizarre, but I think we will have the same kind of a thing in the nuclear

or in related, think we're going to have a whole new vocabulary, you know, we're never going to replace CEAA-2012, there's going to be maybe a whole new vocabulary will to with this and may have something in here.

So this is going to be an ongoing kind of work, but so far great stuff, let's put it on.

MR. LEBLANC: Can I ask a question?

THE PRESIDENT: Go ahead.

--- Laughter / Rires

MR. LEBLANC: This is not a hearing, so it's not a problem.

How will you collect all those new terms; will you have kind of a suggestion box where staff can go and say, we'd love to have -- I know now it was constrained to documents and to the *Act* and REGs, but when you go to version 2 or version 3 where it's broader and -- I'll tell you why I'm mentioning this.

My first test when I read this is, the first test I have with new Commission Members when the term comes up and they're always surprised when they see that it was a good thing that the reactor was poisoned, that meant that whatever the reaction was was stopped and there's no definition of the word 'poisoned' in the nuclear field. So it's always my reference because I know it's always one that I need to have somebody explain.

So if there's terms like this that are missing, that will be helpful in future because those are

really specific to the nuclear field. How will you collect those?

THE PRESIDENT: Well, I don't want to answer on their behalf, but the way I visualize this is this as being a live document. There will be a place where you solicit on an ongoing basis suggestions, changes, some people will find some mistakes, a typo, new terms and they will take it and continuously update it. At least I hope this is not going to be one of those, every three years we'll come up with version 2, I think it should be evergreen, and evergreen means to me updated as you go along.

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

Yes, you've hit it exactly. As Ms Hunt mentioned in the presentation, the intent is for it to be updated on an ongoing basis as needed.

So I would just outline in the formal version of that, just to reiterate, what we see is that as any new REG DOC is developed, we will be, as per usual, making a list of terms that require definitions within that REG DOC.

Any terms and their associated definitions that are new, so that are not currently captured in the glossary, upon -- assuming approval and publication of that new individual REG DOC, those new terms would be added to the glossary. So that's kind of the formal process for

adding new terms.

In addition to that, as with any of the CNSC's REG DOCs, we are open to receiving feedback from stakeholders, from the public at any time and it's clearly indicated on the CNSC's website how they would contact us in order to provide suggestions.

So that would be the case for the glossary, if there was a term that somebody thought would be a valuable addition to the glossary.

And then, finally, if you ever have any terms -- within the CNSC, if there's ever any suggestions for adding new terms, you can always send us an e-mail.

THE PRESIDENT: So just again, so to use Marc's example on 'poisoned', maybe it's not defined anywhere, but if it's a suggestion, which I agree with, it should be explained somewhere, drive somebody, some technical specialist to come up with -- so you drive the requirement to get a definition and post it and let people react to it.

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

Yes, that's exactly how it would happen, it would be managed centrally through the Regulatory Policy Directorate.

THE PRESIDENT: Anything? Anything else?

Well, thank you.

Looking forward to its publication.

This concludes the public meeting for the Commission. Thank you for your participation.

--- Whereupon the meeting concluded at 12:15 p.m. /
La réunion s'est terminée à 12 h 15