Canadian Nuclear Safety Commission

Commission canadienne de sûreté nucléaire

Public meeting

Réunion publique

August 21st, 2013

Le 21 août 2013

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

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

Commission Members present

Dr. Michael Binder
Dr. Moyra McDill
Mr. Dan Tolgyesi
Dr. Sandy McEwan
Ms. Rumina Velshi
Dr. Ronald Barriault
Mr. André Harvey

Commissaires présents

M. Michael Binder
Mme Moyra McDill
M. Dan Tolgyesi
M. Sandy McEwan
Mme Rumina Velshi
M. Ronald Barriault
M. André Harvey

Secretary:

Mr. Marc Leblanc

Secrétaire:

M. Marc Leblanc

Senior General Counsel:

Mr. Jacques Lavoie

Avocat général principal :

M. Jacques Lavoie

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Ottawa, Ontario

--- Upon commencing at 9:00 a.m.

La réunion débute à 9h00

Opening Remarks

M. LEBLANC: Bonjour, mesdames et messieurs. Bienvenue à la réunion publique de la Commission canadienne de sûreté nucléaire. J'aimerais aborder certains aspects touchant le déroulement de la réunion ce matin.

We have simultaneous translation. We would ask you to keep the pace of speech relatively slow so that the translators have a chance to keep up.

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

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

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

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

We would also ask you to please silence your cell phones and other electronic devices.

Monsieur Binder, qui est le président et premier dirigeant de la Commission canadienne de sûreté nucléaire, va présider la réunion publique d’aujourd'hui.

President Binder.

THE CHAIRMAN: I'm just following orders here.

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

Mon nom est Michael Binder. Je suis le président de la Commission canadienne de sûreté nucléaire et je vous souhaite la bienvenue.

Welcome to all of you who are joining us via the webcast.

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

On my right is Dr. Moyra McDill and Mr. Dan Tolgyesi. To my left are Dr. Sandy McEwan, Ms. Rumina Velshi, Dr. Ronald Barriault and Mr. André Harvey.

We have heard from our Secretary, Marc Leblanc and we also have with us here today Mr. Jacques Lavoie, Senior General Counsel to the Commission.

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

Please refer to the updated agenda published on August 15th, 2013 for the complete list of items to be presented today.

Please note that there is a slight change in order for this afternoon. The order of presentation of items 5.3 and 5.4 is now reversed, meaning that we will hear the presentation by OPG on Emergency Plans; that is, CMDs 13-M45.1 and 45.1A, prior to the presentation from a CNSC co-op student on their experience -- the experience of co-op students at Fukushima at a visit at the Fukushima facilities in Japan, which is CMD 13-M46.

In addition to the written documents that have been reviewed by the Commission for today's meeting, CNSC staff will have an opportunity to make presentations and Commission Members will be afforded an opportunity to ask questions on the items before us, as is the case for several of the nuclear power plant facilities today.

Mr. President.

13-M39.A

Adoption of Agenda

THE CHAIRMAN: Okay. With this information, I'd like to call for the adoption of the agenda by the Commission Members as outlined in CMD 13-M39.A.

Do I have concurrence?

For the record, the agenda is adopted.

13-M40

Approval of Minutes of

Commission Meeting held May 15

and 16, 2013

THE CHAIRMAN: I'd like now to call for the approval of the minutes of the Commission meeting held on May 15 and 16, 2013 as outlined in CMD 13-M40.

Any comments, additions, deletions? Marc?

MR. LEBLANC: Yes. If I may, Mr. President, there's a small typo that needs to be addressed. That is in paragraph 82 of the minutes where we referred to model, m-o-d-e-l. It should read modal, m-o-d-a-l, as it related to transportation.

I would also like to note there were two action items that were set out in the minutes for report back today. One is to deal with the NB Power closure plugs matter, and this will be addressed as part -- or is being addressed as part of the status report on power reactors today.

And the second item was an update on the corrective measures being taken by AECL related to dosimetry considerations. This report is not ready for today and has been deferred to the next Commission meeting.

Thank you.

THE CHAIRMAN: With these comments, any other comments?

So do I have an approval?

So for the record, the minutes are approved.

I'd like to proceed now to the Status Report on Power Reactors, which is under CMD 13-M41. I understand, Dr. Rzentkowski, you will make the presentation. The floor is yours.

4. Status Report

4.1 - 13-M41

Status Report on

Power Reactors

DR. RZENTKOWSKI: Thank you very much, Mr.

President, Members of the Commission. Good morning.

I have no further updates today to the Status Report on Power Reactors presented to you in CMD 13-M41. However, I would like to bring to your attention the following two items described in the CMD.

The first item is an event notification in Section 1.2 regarding a leak of an instrument line at Bruce B that took place on June 21st, 2013 during a normal operational test at Unit 5 and resulted in the spill of approximately 400 kilograms of heat transport system water.

Bruce Power staff promptly isolated the leak, monitored contamination, and initiated actions to identify, contain, and clean up the spill.

Bioassay samples were taken from plant staff and were assessed to be far below the regulatory dose limits.

The event had no impact on environment or the safe operation of the facility.

Subsequent to the review of the root cause analysis for this event, CNSC staff will provide an update to the Commission.

The second item I would like to bring to your attention is the follow-up to the Commission's request for an update regarding Point Lepreau fuel channel closure plugs. As per Section 1.6 of the Status Report, nearly 50 percent of the fuel channel closure plugs have been replaced, and progress continues.

This has no impact on normal operation of the reactor.

In addition, I wish also to provide clarification on Pickering Unit 8 trip which is described in Section 1.5. The trip, which is described in the status report, refers to the turbine trip and not the reactor trip.

Thank you. This concludes the status report.

THE CHAIRMAN: Thank you.

I understand that before we're going to Commission, OPG would like to make a presentation on the black deposit issue as outlined in CMD 13-M41.1.

I understand, then, Mr. Jager, you will make the presentation?

MR. JAGER: That's correct.

THE CHAIRMAN: Please proceed.

13-M41.1

Oral presentation by

Ontario Power Generation Inc.

MR. JAGER: Okay. Glenn Jager, for the record, and good morning.

This is an update on the Unit 1 black deposits -- fuel black deposits, and what I'm going to talk about this morning is just a bit of background on what the black deposits are, the history, the causes of the black deposits and the safety analysis that was performed, as well talk about the current status of where we are in terms of the inspections, the actions that we've taken and, finally, some conclusions arising from all the efforts that we've undertaken around this issue.

So on all of our units, we regularly inspect fuel discharge from the reactor core, usually about 20 bundles per unit per year. And we do see, from time to time, small deposits on those bundles.

Those deposits are iron oxide from the heat transport system, the wear of the heat transport system. This is normal. It's expected. It's the normal wear of heat transport system and it deposits around the system.

Back in 2000, we did make an adjustment to the pH of the heat transport system, and that was to preferentially protect the feeders on the system.

So we have seen deposits on the fuel. As I said, it's iron oxide. And when we do examine those deposits, we find that they're very easily removed from the fuel. It's porous. It's a very light coating on the fuel, and it's easily removed when brushed underneath on the fuel sheath.

There's no damage, no discolouration, no deformation and no corrosion, so it's relatively benign. It does not affect the fuel sheath in all the inspections that we've performed to date.

The larger black deposits on the fuel we've seen on Unit 1 following its return to service, and that's what I'm here to talk about today.

Back in 2012, one particular bundle, T -- that was discharged from T-05, had a larger deposit than we had normally seen -- I'll show pictures of that in a second -- right along the full length of the pencil.

So the next slide shows a typical black deposit on the fuel bundle pencil on the fuel that was discharged from Unit 1 prior to any actions being taken, and you can see the deposit is downstream of the bearing pads on the pencil.

I have a bundle here and these bearing pads, just for orientation, are along the length of the pencil and the deposits are a small deposit downstream of that pad.

So that's typically what we saw coming out of Unit 1.

Now, in T-05, the bundle discharged from T-05 had a significantly larger deposit downstream of the bearing pad and you can see that one. It's further along the length of the element.

And interesting enough, it's only on one element. And it's down -- all these deposits are on the lower part of the bundle, the bundle that is on the bottom of the channel.

T-05 is a low flow channel and it's on the periphery of the core, so that's another unique aspect of this particular deposit.

Now, on that particular bundle in the inspection report, the inspector also noted a possible bowing of the element based on looking at the spacers within the bundle.

That, obviously, raised a bit of concern and we performed two follow-up inspections with two different inspectors. Neither reported that there was any deformation or any bowing of the element. The element, as in the previous bundles that we had examined, was unaffected by the black deposit.

And since then we've discharged over 60 additional bundles from the core and then examined them and have not seen a deposit similar to the one that we have taken out of T-05 and those are bundles that are discharged from various channels throughout the core.

So following that inspection, we did re-initiate a TOE, a Technical Operability Evaluation, and that is a formal means of evaluating the safety case or the operability of the condition which was performed in support of operation, and there are two aspects of that.

One is we had experimental data that evaluated the heat transfer capability of the fuel with it completely coated with a deposit. And that experimental data found that there was a three percent impact; this is if the fuel is entirely coated with deposits, three percent full power impact on the onset of dry out.

So at the upper range of the capability of the fuel, there was a three percent penalty and that was done by actual experimental data.

In addition to that, also as part of the TOE, we did analysis to determine the effect of the deposits and there was very good agreement with the experimental data. We found that the penalty is about the same.

So that allowed us to then determine the impact of the deposits that we were seeing and that impact is comparably very, very small because the area that's covered is much, much smaller than if the bundle were entirely covered by deposits. So it's in the order of a negligible impact really on the onset of dry out.

So the actions taken as part of that TOE, we assumed that three percent penalty on the onset of dry out. This is very, very conservative given the experimental data and the analysis data.

Let's say the bundle is entirely covered versus the amount of deposits that we have on the fuel, so we just very conservatively took that data, applied a trip setpoint penalty of one and a half percent to protect against the earlier onset of dry out if we assumed the bundle was entirely covered with deposits.

So this is a very conservative posture, and then implemented actions, of course, to address the cause. And part of those actions, I'll go through them in a moment, but it involved a number of additional inspections, as well as we sent fuel to Chalk River for additional inspection.

CNSC also took action following the discharge and the report of T-05, and again I think that was a conservative action to impose a 97 percent full power penalty on the unit.

So the corrective actions.

First action was to increase the pH of the heat transport system and we are doing that very carefully in small steps. The reason for that is it changes where the deposition of the iron oxides occurs, but we also want to maintain that protection of the feeders to preferentially protect them.

So we're doing it in very small increments and very gradually and we are seeing a benefit of that.

We also enhanced the removal of black deposits or the iron oxides in the system by improving the filtration. That would increase the bleed rate change of filters more often but really, that's a very small removal term compared to the overall production of corrosion products in the system. The main action is the adjustment of pH.

And finally, tighter control on our filter and ion exchange column change outs. What that allows is control of the pH into a very tighter range and a better pH control.

So the results is that we're seeing less number, less incidents of deposits on fuel, the size of the deposits is going down and if you add up the total average area is declining.

So the changes that we made and the actions that were taken have arrested the cause, is improving the condition and we'll keep on with the enhanced bundle inspections to ensure that those changes are effective and continue in a positive manner.

The next slide shows a graph of the average area of deposits and you can see it's declining over time, indicating that our actions are effective. This will take time because it's a combination of fuel discharge and removal of the existing deposits that are on the fuel. So that does take time to reverse.

And the next slide shows a picture. This is now a typical bundle discharge from Unit 1. This shows much smaller deposits that we're seeing on the fuel bundle itself, and this is more typical of what we're seeing right now.

So, as a result of this, we've confirmed that inspection is showing that there is no impact to the fuel and fuel sheath as a result of the deposits on the fuel. All units at Pickering have been operating defect free without any fuel defects, including Unit 1.

That's an industry goal that very few facilities, if any, have achieved. And we're not seeing any detrimental effects to the fuel sheath and by that I mean no discolouration, no deformation, no corrosion. There is no effect of the deposits on the fuel associated with this condition in full power operation.

The safety analysis has determined that the safety margins that we have established remain bounded by the TOE for full power operation, that our trip setpoint reduction is very conservative when you consider the assumptions that have gone into the establishment of that condition. We have arrested the condition and are now reversing the trend. That’s clearly observed.

So our actions are effective and we will continue with the enhanced monitoring, which is increased inspections of fuel discharged from Unit 1 to confirm that it comes back to normal and the same as all the other units.

And finally, we’ll be submitting a request to the CNSC to remove the full power penalty with clear monitoring requirements and control points.

THE CHAIRMAN: Thank you.

Okay. I’d like to open the floor for question on both this presentation on deposit and on the status support. So let me start with Monsieur Harvey.

MEMBER HARVEY: Merci, monsieur le président.

You mentioned that the deposit will decline but it will take time.

Are you confident that the final result could be to come back to what it was in 2008?

MR. JAGER: Glenn Jager, for the record.

Are you asking are we going to get back to normal? Yes. We’re confident we’ll get there, just that it will take some time because those are areas of low flow and it takes time for the corrective actions to take effect on the deposits that are there.

There’s a combination of fuel discharge. We only fuel two channels a day for bundle shifts. So it takes quite a while to discharge the fuel.

I think the real test is the fuel that we’ve put into the core that resides there for a period of time, its normal life cycle, when it’s eventually discharged, having a look at it and confirming that it has not picked up abnormal amounts of black deposits.

Again, that will take time because it takes time for that fuel to move through a cycle.

So we’re confident that we will get back to the same condition as all the other units. We are also confident that there is no impact on full power operation, that there’s adequate margin and there is no impact on the fuel sheath for the condition that we have today and certainly for the condition that we’re trying to establish.

MEMBER HARVEY: Well, you mentioned it will take time. It’s a question of months or years?

MR. JAGER: Years.

MEMBER HARVEY: Years. But you are asking to go to full power right now and that’s the request;

isn't it?

MR. JAGER: Glenn Jager, for the record.

That's correct because there is no impact on normal full power operation. There's adequate margin even when we very conservatively assume that the bundle were -- if it were to be coated entirely with deposits, the trip set points that we've established protect against -- the safety cage provide the design basis for full power operation.

MEMBER HARVEY: Yeah.

MR. JAGER: So we're confident that full power operation is very safe.

MEMBER HARVEY: Thank you.

I will just ask the staff if they are satisfied with that and if they are ready to remove the penalty?

DR. RZENTKOWSKI: Greg Rzentkowski, for the record.

From the CNSC standpoint, we are satisfied with the steps implemented by OPG to better control the situation in the heat transport system.

As demonstrated by Mr. Glenn Jager, there's a reversing trend which is manifesting itself in the heat transport system, and this is a very positive trend because the number and the size of the deposits is definitely decreasing.

And also we know that bowing, which was originally observed or appeared to be present, actually didn't confirm to be the case. Because of that we are quite, quite confident that the integrity of the bundles, and because of that, safe and reliable operation of the reactor can be maintained.

So we are awaiting a written request to return the unit to full power operation. In this written request we expect that there will be a little bit more stringent inspection campaign described which will be implemented going forward. And also we expect some acceptance criteria will be proposed on which we will judge the acceptability of the size of the deposits which we believe will form themselves still in the heat transport system because this is related to aging and I don't think that this problem can be erased 100 percent.

MEMBER HARVEY: Merci, monsieur président.

THE CHAIRMAN: I'd like to piggyback on this. I'm trying to understand. I'm not sure I understood everything here. Is it only for units 1? Is that phenomenon only displayed in unit 1?

MR. JAGER: Glenn Jager, for the record.

Yes, we do see small -- very small black deposits on other units; nowhere near the condition that we see on unit. Unit 1 is the only unit that has experienced this condition to this degree.

THE CHAIRMAN: So do we understand the chemistry? Do we know exactly what causes the deposit? That's what I'm trying to understand.

MR. JAGER: Glenn Jager, for the record.

We believe we do. When we look back into -- it's a good question; why unit 1 and why not the other units, I think you're asking.

When we looked back into the history of unit 1, the chemistry control coming out of return to service was not the same as the other units and its shutdown history may have been different as well because shutdown chemistry control is a factor here as well.

So that unit was a little different in terms of the age of the ion exchange columns and the effectiveness in maintaining property transport chemistry, but that was several years ago and it resulted in the iron oxides and the heat transport system as a result.

THE CHAIRMAN: Okay.

Dr. Barriault?

MEMBER BARRIAULT: Thank you, Mr. Chairman.

For Bruce A, unit 1 and 3 are derated because of zebra mussel, I guess, blockage of your intake cooling water; is that correct?

DR. RZENTKOWSKI: That's correct. I will ask Mr. Bob Lojk who is the Director of Bruce Regulatory Program Division to provide more detail.

MEMBER BARRIAULT: And I guess my next question on that issue is what are you doing to reduce this contamination of zebra mussels? Are you using toxins to poison them or scraping them off or what's going on here?

MR. LOJK: Well, Bob Lojk, for the record.

The licensee is carrying out certain activities on two which at this point, as I understand, I would like -- Bruce Power can confirm are restricted to mechanical removal of the mussels, dredging of the channel.

There was a -- it's a real issue this particular year with the growth and it will take them somewhere till late fall to finish the work. Of course there's an impetus to do this because you can't do the work in the winter, so this is a high-priority initiative to clean those intakes, but as far as we know, it's mostly mechanical work.

MEMBER BARRIAULT: So it's mechanical cleaning ---

MR. LOJK: Mechanical cleaning.

MEMBER BARRIAULT: Mechanical.

MR. LOJK: And also dredging of the channel.

MEMBER BARRIAULT: Okay.

MR. LOJK: We're talking about huge volumes of zebra mussels.

MEMBER BARRIAULT: Well, exactly and the zebra mussels, are they actually just the channel or it's also affecting the intake pipes getting in and actually getting into the system, the cooling system?

MR. LOJK: Well, they're not getting into the system, but the intake -- well, it's not quite set up the same way, but the -- some of the intake structures are being blocked by the zebra mussels and hence the reduction in flow and hence the inability to provide the necessary cooling and reduction in the operating limits.

THE CHAIRMAN: Is Bruce Power -- we have Bruce Power here. Do you want to add anything to that?

MR. SAUNDERS: Yeah, pretty straightforward. It is a straight mechanical. The zebra mussels, in this case, are already dead. What's really happening, we're picking up the shells off the bottom of the intake channel. Of course, you know, we have significantly more flow at Bruce A now than we've had for many years, so that's likely part of the problem.

There's a travelling screen which picks up most of this on the way in, but some that gets into your condenser tubes, you get less cooling water and therefore you have to back off the steam a little bit in order to deal with it and you can open the condenser and clean it online.

Again, it causes a slight derate to do half at a time, so that's why the derates are there is to allow us to keep cleaning. We are looking at ways of dredging the channel to make sure we get all -- most of that out of there so it's less of a problem.

So it's at this point strictly an economical -- an economic issue. It causes us to produce less power.

MEMBER BARRIAULT: It doesn't affect design in terms of volume of water intake?

MR. SAUNDERS: It reduces the amount of water going through the condenser but it doesn't affect the design directly because if your pressure in your condenser raises you have to reduce the inflow to match, right, so that's where you get into the derating.

The derating is not coming from the reactor end; it's coming from the condenser at the end of the turbine. So it forces us to reduce power and therefore we produce less outlet, but it stays within the design parameters of the pressure in the condenser.

MEMBER BARRIAULT: Okay.

CNSC, are you comfortable with this process?

MR. LOJK: Bob Lojk, for the record.

Yes, we're comfortable with the process. As was pointed out, there's a -- it's a well understood mechanical procedure and there's some urgency in order to -- due to weather, but not for safety reasons. Thank you.

MEMBER BARRIAULT: Thank you.

Thank you, Mr. Chairman.

THE CHAIRMAN: Ms. Velshi?

MEMBER VELSHI: Thank you, Mr. President.

The heat transport leak in unit 5 at Bruce, it's been a couple of months since that happened. Can you share some more details on how many employees were potentially exposed to tritium and what the maximum permitted dose may have been?

MR. LOJK: Bob Lojk, for the record.

I apologize, I don't have the specifics on each individual person that was exposed to the tritium due to the flashing of the water to steam and it's affecting the area over there, but that information can be made available to you shortly.

THE CHAIRMAN: Bruce Power, do you have the information?

MR. SAUNDERS: Yes, 46 milligram was the highest dose. In these events, the monitor picks up the tritium very quickly. They sound the unit alert and move people out of the way, so you don't get much unattended uptake. We do, you know, put people in protective gear and send them in to fix the problem is where you get some of the uptake, so very much within the normal working range.

THE CHAIRMAN: What was the number again?

MR. SAUNDERS: Forty-six (46) milligram.

MEMBER VELSHI: And how many workers approximately that may have got, even if it was minimal, a higher unplanned exposure?

MR. SAUNDERS: I don't know the total number, I'm afraid. Forty-six (46) was a max, but I can get you the total number.

THE CHAIRMAN: Can you make this into sieverts please?

MR. SAUNDERS: So in millisieverts it would be 46 millisieverts, I believe, is that right? Multiplied by a 100, divided -- .46, sorry, yes, I went the wrong way.

THE CHAIRMAN: We are in the new system, right?

MR. SAUNDERS: I'm still stuck in the old one.

MEMBER VELSHI: Thank you.

The next question was on Point Lepreau. If I recall correctly, and it’s been a while, I thought that because of these closure plug issues, the unit had been derated; is that correct?

DR. RZENTKOWSKI: Greg Rzentkowski, for the record.

That’s correct. Your understanding is absolutely correct. The unit had been derated because of the problem with fuelling, but because the solution has been proposed -- the closure plugs have been repaired, now the unit is refuelling on a normal timeline and there’s no impact on normal operation.

MEMBER VELSHI: Thank you.

And a couple of questions for OPG on your presentation.

The lowering of the trip set point, so how long would that be in effect for?

MR. JAGER: Glenn Jager, for the record.

Until we -- the black deposits that we observe on fuel discharged from Unit 1 is normal and the same as all the other units.

MEMBER VELSHI: So for a number of years, given what you said how long it would take before you get to normal?

MR. JAGER: Yes, the threshold, and we'll specify that in the communication to CNSC staff.

MEMBER VELSHI: And one of your corrective actions is increasing the coolant pH. What are the potential downsides or risks that that may introduce?

MR. JAGER: Glenn Jager, for the record.

We are planning on no downside, no risk to that. It's a very small and marginal adjustment that we're taking there.

So in the extreme, we may see corrosion. The pH was adjusted initially to protect the feeders, so we may see additional wear on the feeders. But again we have a very comprehensive feeder inspection program that evaluates that, every planned outage, but we don't anticipate any impact to the feeders with the changes that we made.

So this is a very small adjustment to correct the condition that we're not seeing on any other units and re-dissolve -- move the deposits off the fuel and then have that unit perform just like all the others.

MEMBER VELSHI: And my last question is on slide 11 where you show the annual trend. Is the 2013 number annualized or is that kind of year-to-date?

MR. JAGER: Glenn Jager.

That would be year-to-date based on the bundles that we've inspected thus far, which is a considerable number.

MEMBER VELSHI: So that's a little deceiving when you then say we've got a declining trend because if you annualize it, it's actually probably much higher than 2012 in the previous year?

MR. JAGER: Glenn Jager, for the record.

This is an area on a per bundle basis.

MEMBER VELSHI: Got it, okay, so ---

MR. JAGER: So for all the bundles that we've expected, we are seeing a decline. And I'll just go one step further; these are from the same sample sets, so same bundle position, same channel positions. So all other things being equal, this is the data ---

MEMBER VELSHI: Got it, okay.

MR. JAGER: --- we're seeing.

MEMBER VELSHI: Thank you.

Thank you, Mr. President.

THE CHAIRMAN: Thank you. Dr. McEwan.

MEMBER McEWAN: So again on that slide, slide 11, there was that very rapid change, I think, in 2009, where you have two stable years and then you have a very significant increase and then this slow decline again. What caused that?

MR. JAGER: Glenn Jager, for the record.

The unit was returned to service in 2005. And again this is a very slow process where units also went through some substantial outages during that time. So we believe that both the outage chemistry and the online chemistry control was not adequate to protect from this condition on this particular unit.

So that's what caused the build-up. By the time we saw this trend, then you start to take action, but it's already on its way. So it takes time to arrest and reverse that trend.

MEMBER McEWAN: So you're effectively dealing with a cumulative effect ---

MR. JAGER: Yes.

MEMBER McEWAN: --- that suddenly shows itself?

So when -- I mean I was interested that it was just that one bundle that had a significant amount of the build-up on it when you showed the slide. Why there?

MR. JAGER: Glenn Jager, for the record.

We don't have a good explanation of why that particular bundle had a deposit in that manner. We have not seen any bundles like that since. The only thing we can surmise is that pencil is on the bottom most location. When the bundle sits in the channel, we can tell where it is and the orientation of the bundle in the channel. It sat on the bottom most and it is in the low-flow channel. But we don't really have an explanation of why that pencil -- why all the other pencils had no deposits on it for that particular bundle.

MEMBER McEWAN: You can't model it or anything?

MR. JAGER: No.

MEMBER McEWAN: Thank you.

THE CHAIRMAN: And it's not feasible to -- I don't know what I'm saying here, but it's not feasible to take it to see what happens?

MR. JAGER: Glenn Jager, for the record.

Once it's in the channel, we can't alter the position of the bundles.

THE CHAIRMAN: You cannot -- it's not movable?

MR. JAGER: No, it is not; but we can tell -- after it's discharged, we can tell what the orientation of the bundle was based on the wear-pad marks and so forth.

THE CHAIRMAN: Dr. McDill?

MEMBER McDILL: Thank you. Just to follow-up on that, I think the rest of my questions have been asked.

Once the precipitation -- I assume it's a precipitation process that's happening here on the bundle for the black deposit?

MR. JAGER: Glenn Jager, for the record.

I would call it a deposition, but yes, precipitation.

MEMBER McDILL: Okay, but presumably once it initiates it, it's like an initiation point; it just keeps on going there. It doesn't move over to some other pencil? It will preferentially accumulate in the same place once it starts?

MR. JAGER: Glenn Jager, for the record.

That's our experience, yes. Once it's there, it does not move. We are seeing though with the pH adjustment a slow and steady removal of it, but that accumulation, once it's there, it doesn't move after that.

MEMBER McDILL: Thank you. And if you start on the feeder inspection program to see that you've reached the limit of how far you can adjust the pH, then what, if the feeder wear starts to increase?

MR. JAGER: Glenn Jager, for the record.

We'd have to re-evaluate our actions. I don't have an answer for that, but we would certainly re-evaluate the chemistry control.

I would just add that none of the other

units experienced this condition to a degree. So we're pretty -- we're confident that the actions that were taken are sound and won't have a negative effect on the feeders.

MEMBER McDILL: Staff, any comment?

DR. RZENTKOWSKI: Not only on this particular question but also the question stated previously.

Personally, I think the formation of deposits has a lot to do with the flow distribution around the bundle. And some kind of flow visualisation studies would probably help to shed more light into the process of forming of those deposits.

MEMBER McDILL: Thank you.

THE CHAIRMAN: Thank you.

Mr. Tolgyesi?

MEMBER TOLGYESI: Merci, monsieur le président.

Just a quick on the pH. What was the change in the pH; it was raised from, I don't know, seven to eight and a half or it's a big change or a very, very slight?

MR. JAGER: Glenn Jager, for the record.

It's very small. We changed -- we shifted a range, so it was a range of 10.1 to -- or 10 to 10.3 and we changed it from 10 to 10.1 to 10.4, the normal range.

So 0.1 in pH, so very, very small.

MEMBER TOLGYESI: So you consider that the pH is the main reason for black deposits?

MR. JAGER: Glenn Jager, for the record.

Yes, the pH is the main mechanism that creates the iron oxides and where it deposits in the system. So that's our effective means of control of that.

MEMBER TOLGYESI: I have one last for these zebra mussels to Bruce.

You know the zebra mussels are coming from East. I think it's going through all the lakes and eventually reach you guys; you are at the far end.

Now, do you experience -- OPG, do you have experience and problems with zebra mussels because you are on Lake Ontario, which is, you know, much closer to the origin of zebra mussels than Bruce is?

MR. JAGER: Glenn Jager, for the record.

Yes, we do. We have a program which monitors the formation of zebra mussels during their start, during the year as well as when they are not there during the winter. We have chlorination, which ensures all the pipe work remains free of zebra mussels.

And as well, at Pickering, we've started a dredging program. So we've dredged the four bays at Pickering for both -- all the units. And at Darlington as well there's removal of zebra mussels on the intake channel that's regularly performed.

So yes, we have the same issue on Lake Ontario, but we have both the removal method and a -- we use chlorination to control or prevent zebra mussels in the pipe work.

MEMBER TOLGYESI: And I expect that other type, not only nuclear power plants but I will say that cities or all the industry, they have problems with the zebra mussels. Do you have any kind of common program where you try to control how to -- I don't know -- how to eliminate or, not eliminate but how to control lower, or control zebra mussels.

MS. SWAMI: Sorry. Laurie Swami, for the record.

For many years we have worked in industry to look at ways of controlling zebra mussels. This has been an on-going program for OPG as well as Bruce Power for many, many years.

So we do work with industry. We look at the operating experience within industry and within other nuclear plants, and we adopt those practices on a regular basis.

THE CHAIRMAN: Thank you.

Anybody else?

Dr. Barriault?

MEMBER BARRIAULT: Just a supplementary question. What I'm hearing then, is that you're just not using mechanical basis for removing the mussels. You are actually using chemical, which is chlorine, and how much chlorine are you using to poison these mussels?

MS. SWAMI: Laurie Swami, for the record.

I don't have the exact amount of chlorine that we use. What we do is, on a regular basis during certain periods of the year when the Velagers would be present in the water column, we would use chlorination.

We also use de-chlorination so that when the water is returned to the lake, it returns at the quality level that the Ministry of Environment –- through the environment compliance approval -- would allow us to discharge.

MEMBER BARRIAULT: Okay.

Does the chlorine have any effect on your cooling systems at all, that you're using in the system?

MR. JAGER: Glenn Jager, for the record.

I would say that it has a positive effect, in that it inhibits the fouling of heat exchangers and services.

So when we introduced chlorination many years ago, that was an effect that we observed –- a side benefit if you will –- in addition to controlling the formation of zebra mussels.

MEMBER BARRIAULT: Thank you.

Thanks, Mr. Chairman.

THE CHAIRMAN: Anything else?

Justement une petite question pour Gentilly-2. Le déchargement sera complet quand?

M. RZENTKOWSKI: Je vais rediriger cette question à monsieur Benoit Poulet.

M. POULET: Thank you. Benoit Poulet, pour l'enregistrement.

Le déchargement se fait à un rythme d'environ quatre canaux par jour et puis il reste environ une trentaine de canaux à faire. Donc, Hydro-Québec devrait avoir complété le déchargement d'ici la fin août, dans les prochains jours.

LE PRÉSIDENT: Vous êtes d'accord?

M. RINFRET: D'accord avec les chiffres; exactement 30 canaux ce matin au début du déchargement et ça devrait se terminer vendredi prochain sur l'heure du dîner si tout va bien.

LE PRÉSIDENT: Merci.

Any other final questions?

Okay. Thank you.

The next item on the agenda is the event initial report concerning manual shutdown at OPG Pickering Units 1 and 4, as outlined in CMD 13M-42.

We know already the OPG are already represented here, but I will first turn to CNSC staff, if you want to make any introductory comment.

4.2 Event Initial Report

4.2.1 - 13-M42

Ontario Power Generation Inc.:

Manual Shutdown at Pickering

Units 1 and 4

DR. RZENTKOWSKI: Greg Rzentkowski, for the record.

For the benefit of those who are listening to the webcast, I think I will summarize very briefly the status report, and then the CNSC staff will be in a position to answer any questions the Commission may have.

During the environmental qualification walk-downs conducted by OPG staff, a number of environmentally qualification electrical connectors -- environmentally qualified electrical connectors were found misaligned.

This means that affected components could have not performed on demand under extreme environmental conditions such as the main steam line brake.

OPG conducted inspection in accessible areas across Units 1 and -- across all the units at Pickering site. Three connectors were found misaligned on Unit 1, and two on Unit 4.

On June 5th, 2013, OPG conservatively decided to take Unit 1 and 4 offline to inspect connectors in inaccessible areas on power. No connectors were found misaligned.

Unit 5 which was in an outage at the time, was 100 percent inspected, and no connectors were found misaligned.

The safety significance of the discovery is low, but the deficiencies of the program sustainability were taken very seriously by CNSC and OPG staff.

OPG initiated a root cause investigation on the event which is near completion.

CNSC staff believe that OPG has acted very conservatively, and reacted strongly to correct the program sustainability issues.

Staff will follow-up very closely the implementation of the corrective action plan, and will perform a follow-up inspections no later than November of this year.

Thank you, Mr. Chairman.

THE CHAIRMAN: Okay, questions?

Dr. Barriault?

MEMBER BARRIAULT: Reading through this, I guess I wasn't clear –– in my mind anyway –– what the misalignment was. Was it positive to negative, negative to positive or what was going on here with these electrical connectors. What, they weren't connected at all or you know, I guess I'm not clear. Maybe you can explain that a little more.

DR. RZENTKOWSKI: I would ask Miguel Santini, the Director of Pickering Regulatory Program to explain this in more detail.

MR. SANTINI: Miguel Santini, for the record.

I think that OPG will be in a better position to explain that because they have a connector right there.

MR. JAGER: Glenn Jager, for the record.

I thought that question might come up.

MEMBER McDILL: Yeah, show and tell is so much helpful.

MR. JAGER: I brought one connector right here. And what it is, you see there is a red dot on the one side of the connector and red dots on the other. And when the connector is disassembled -- it can only go in one way so its orientation is fool-proof.

But, in order to ensure that it meets its environmental qualification capability, you then have to torque the connector so that the red dots align.

Now, I would say that you cannot secure those connectors with just your hand, at least I can't and I’ll pass it up the Commission, maybe they want to give it a try.

But you cannot do that with your hand. You have to have a strap wrench placed on the outside of this and torque it home so that the red dots align. And the red dots are a means of verifying that the connector is fully in its home position.

We did find, as was described, five connectors out of several hundred that were not in that position. So electrically performs its function, it's connected as it should, however, it's not fully engaged and therefore, not fully compressing the o-ring that's inside of the connector.

MEMBER BARRIAULT: Was there any arcing of the connection at all or is it just…

MR. JAGER: Glenn Jager, for the record.

No, there would be no arcing. The connector is fully –- electrically is fully made, there’s no issue there.

The issue is when those dots are not aligned, what it's doing is compressing an o-ring and ensuring that you have a tight seal to prevent the ingress of any steam or water.

MEMBER BARRIAULT: Thank you, Mr. Chairman.

THE CHAIRMAN: Anybody else?

Dr. McDill?

MEMBER McDILL: So the connection does have air-proofing but it can be not fully activated. It's an interesting –- you create an air-proof system, and you're still making air.

MR. JAGER: Glenn Jager, for the record.

Yeah, it is a passive feature, if you will, of the connector. And we have done the root cause on this event. This is a very serious event for us in terms of the quality of maintenance performed.

The work on these particular connectors was done several years ago, but we did go back and speak with the personnel and do a root cause. And what the findings were was inadequate verification. Because it is a passive feature, we weren't doing independent verification or concurrent verification to assure that those dots were aligned and prevent an error being made by maintainer.

So that change has already been made to the procedures and action taken and the outstanding items is to look at the training that our shutdown system qualify control maintainers get around their awareness and their importance and so forth.

So, we'll do a re-pass, look at the training requirements and see whether we have a shortfall there, and of course make any changes.

MEMBER McDILL: Thank you.

To staff, are these connectors used at other sites?

DR. RZENTKOWSKI: Exactly the same connectors. An environmental qualification program is a generic one which applies to the entire industry.

MEMBER McDILL: But have other facilities looked to see if they have the same issue?

DR. RZENTKOWSKI: We have not noticed similar issues at other facilities. And those inspections are routinely conducted by the CNSC and also the industry staff, so I presume if this was the case it would have been reported by now.

MR. JAGER: Glenn Jager, for the record.

I would just add that Darlington uses the same connectors, and we did look at Darlington and did not find any out of position. And Darlington did have a procedural difference, so there is a procedural quality that they did have concurrent verification to make sure that it was in home. So we had a difference between our procedures.

THE CHAIRMAN: But is it a bad design or is it a human training issue? You think that in a nuclear plant every time you do something you get a positive feedback that you've done it, like a click rather than a red light, or a dot. Am I missing something here?

MR. JAGER: Glenn Jager, for the record.

Unfortunately, because you are -- you have to secure it with a wrench there is no -- I don't think there's any tactile type of feedback. The red dots are it. That's your feedback that it's fully home.

THE CHAIRMAN: Ms. Velshi?

MEMBER VELSHI: So how long would they have been in this condition? How frequently would those walk-downs have been taking place or do take place?

MR. JAGER: Glenn Jager, for the record.

The walk-downs take place during unit outages as part of engineer system health walk-downs in conjunction with maintenance. So they're done on a regular basis.

The maintenance activities only occurs on the periodicity of the PM. So the connectors would only be disturbed when we go to calibrate a transmitter, for example. And all these cases were on transmitters predominately, or position switches. So it's only during the calibration frequency which is in the order at least of an outage every two years or three years.

So that's the frequency which the connectors might get disturbed, but the walk-downs would -- for the inaccessible areas, would obviously be during planned outages; for the accessible areas during system health walk-downs, which are typically quarterly.

MEMBER VELSHI: And were these five inaccessible areas or accessible areas?

MR. JAGER: These five were in the accessible areas.

MEMBER VELSHI: Thank you.

THE CHAIRMAN: Monsieur Harvey?

MEMBER HARVEY: Okay. They were not aligned but they were working properly though. So what could be the effect if they -- long-term effect if it's not fixed and then if it's not working, if it -- I understand there was four over 560. So what would be the effect if it's not working properly?

MR. JAGER: Glenn Jager, for the record.

We did look at all of these and assumed that they would not have worked. That's fairly conservative. There was no past on availability, no safety impact -- direct safety impact of these connectors being in the wrong position. They were all what we would call Level 3 impairments on equipment that's redundant to other pieces of equipment. And so there was no direct safety impact as a result of these connectors.

The issue of them not being fully in the home position is that during the environmental conditions, accident conditions, you don't have assurance that it will perform electrically in water. You can get water or steam ingress, which would affect, for example, the performance of the pressure transmitter and what it's indicating. That's the impact.

MEMBER HARVEY: Okay. Thank you.

MEMBER BARRIAULT: Just a brief question. Obviously the test here is whether you have colour vision to work on this equipment. Are all your employees tested for colour vision?

MR. JAGER: The shutdown system -- we're talking about shutdown system qualified control maintainers so ---

MEMBER BARRIAULT: Yes.

MR. JAGER: --- they are -- they have the highest qualification of all our maintainers in the plant. They are required to be -- well, they're not -- they can't be colour blind because they are terminating cables and wires in a colour sequence, so it is a requirement for that position.

MEMBER BARRIAULT: Thank you.

Thank you, Mr. Chairman.

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

We're going to move on to the next item on the agenda, which is the CNSC staff integrated safety assessment of Canadian nuclear power plant for 2012, as outlined in CMD 13-M30.

Marc?

5. Information Items

5.1 ***CNSC Staff Integrated Safety Assessment of Canadian Nuclear Power Plans for 2012*** (2012 NPP Report)

MR. LEBLANC: So a notice of public participation was published on June 18th inviting the public to comment in writing on this meeting item. A revised notice was published on June 26th to add the hyperlink to the submission filed by CNSC staff, available in both official languages on the CNSC website.

July 16th was the deadline set for filing by intervenors. The Commission received two written submissions from the public.

The President will soon turn the floor to CNSC staff for the presentation. Before opening the floor for questions, the President will invite representatives from the different licensees to provide comments. After a round of questions, the Commission will go through each written submission filed by the public and the Members will have an opportunity to ask questions on these submissions.

I note that security ratings are part of the public document that are filed by CNSC staff. I just wish to remind the Members that sensitive questions pertaining to security, if any, will be dealt with confidentially at the end of the question period in a closed session. Representatives from CNSC staff and effected licensees, as necessary, would be invited to join the Members in the anteroom; again, as necessary.

I should point out that at this time there is no plan to have an in-camera security session.

Mr. President.

THE CHAIRMAN: Okay. So let's start with CNSC staff presentation, and I'll call upon Dr. Rzentkowski to make the presentation.

13-M30

Oral presentation by

CNSC staff

DR. RZENTKOWSKI: Thank you very much.

Today I have the pleasure to present, for information only, the annual report on CNSC staff integrated safety assessment of Canadian nuclear power plants for 2012, hereafter referred to as the NPP Report.

The NPP Report summarizes CNSC staff's assessment of the safety performance of Canada's operation on nuclear power plants. It reflects the effort of over 200 CNSC staff members who are directly involved in the regulatory oversight of nuclear power plants in Canada.

With me today are the directors from the Directorate of Power Reactor Regulation, who will present the NPP Report; and the directors of the Technical Support Branch who are available to answer any questions the Commission may have.

Before I turn the presentation over to the directors, I would like to present the executive summary of the industry safety performance which will provide you with the context for the station-specific highlights, including current challenges the industry is facing.

I would also like to emphasize that the industry safety performance is based upon evaluation of a large quantity of findings originating from inspections, reviews, and assessments conducted by CNSC staff in 2012.

As summarized on this slide, CNSC staff have made the following observations with respect to the safety performance of nuclear power plants during the period covered by this report.

There were no serious process failures of operating systems at any nuclear power plant that could potentially challenge protective barriers.

No member of the Canadian public received a radiation dose above the regulatory limit of 1 millisievert per year.

THE CHAIRMAN: Can you hold on a second? Sorry to interrupt. We're having a problem with the deck with the slides.

(SHORT PAUSE/COURTE PAUSE)

THE CHAIRMAN: Okay. Sorry. Go ahead.

DR. RZENTKOWSKI: So let me start this slide from the beginning.

As summarized on this slide, CNSC staff have made the following observations with respect to the safety performance of nuclear power plants during the period covered by this report.

There were no serious process failures of operating systems at any nuclear power plant that could potentially challenge protective barriers.

No members of the Canadian public received a radiation dose above the regulatory limit of 1 millisievert per year. In fact, doses to the public from Canadian nuclear power plants were almost 1,000 times lower than the regulatory dose limit.

There were no exposures of radiation workers at Canadian nuclear power plants above the regulatory dose limit of 50 millisieverts per year.

There were no radiological releases from nuclear power plants above the regulatory limits. The severity of injuries and accidents involving workers was minimal. In fact, the overall accident severity rate and the accident frequency for Canadian nuclear power plants remained generally lower than that of other Canadian industries, including the energy sector.

All licensees complied with their licence conditions concerning Canada’s international obligation on the peaceful use of nuclear energy and, lastly, all licensees made adequate progress towards updating their public information and disclosure programs, their recently implementing regulatory document RDGD 99.3 entitled, “Public Information and Disclosure.” The updates will be completed by the end of December 2013.

I would like to point out here that these positive outcomes were the result of a multitude of provisions undertaken by each licensee and are, in general, a reflection of good organizational management and control. However, the industry also faced some challenges which will be described during the course of our presentation.

This table summarizes the rating for the safety and control areas and the integrated plant ratings for the licensees and the industry as a whole. As you may recall, we have four rating categories, namely, fully satisfactory, FS; satisfactory, SA; below expectations, BE; and unacceptable, UA. These mean, respectively, that the licensees programs are either highly effective, effective, marginally ineffective, or ineffective in meeting the safety performance objectives and regulatory requirements.

Regarding the overall station safety performance, the integrated plant ratings were fully satisfactory for Darlington and satisfactory for the remaining stations. The station integrated plant ratings are unchanged from the previous year.

Across the industry, the average ratings were fully satisfactory for conventional health and safety and satisfactory for the remaining safety and control areas. This is an improvement from last year where all safety and control areas were satisfactory.

Overall, nine safety and control areas were fully satisfactory and the remainder were satisfactory. This represents an improvement of one additional fully satisfactory rating in comparison to 2011.

No safety and control areas were rated as below expectation or unacceptable, the same results as last year. These results reflect the CNSC's confidence in the licensees' safety performance during the period covered by this report.

The nuclear power industry continues to address CANDU safety issues and make improvements in their operations. These issues should not be viewed as questioning the safety of operating reactors which have obtained a very high operational safety record. Rather, these are areas where uncertainty in knowledge exists and further work, including experimental research, may be required to more accurately confirm that adequate safety margins exist.

By the end of 2012, there were 12 CANDU safety issues pending resolution out of the original 21. It is expected that most of the remaining issues will be resolved by the end of this year.

Regarding neutron overpower protection methodology, Bruce Power and Ontario Power Generation have completed all major activities committed in their work plans. The licensees affirmed that the current trip set points are adequate and are working towards a long-term approach that includes analytical means to predict the impact of aging on trip set points.

An update will be provided to the Commission later this year. In the area of work on large loss of coolant accidents, CNSC staff released an interim regulatory position addressing issues that may have an effect on safety margins. The interim position will remain in effect until the recommendation of the industry working group are accepted by the CNSC and are fully implemented. The industry report describing a composite approach involving design enhancements and analytical and experimental studies will be provided in September 2013.

To date, progress on the CANDU safety issues has resulted in design improvements to nuclear power plants which enhanced safety margins. One example is the modified 37 element fuel bundles which are being implemented at Darlington and Bruce A.

With the aging of the CANDU reactors, industry has initiated the full channel life management project to investigate the use of pressure tubes beyond their analytical design life. Currently, CNSC staff are reviewing documentation submitted by licensees addressing the high priority areas and issues important for the release of the hold point in the Pickering operating licence.

Also, industry is addressing particular challenges stemming from operating experience and lessons learned. For example, as a result of the 2009 alpha contamination event, licensees are implementing long-term radiation protection program improvements through alpha monitoring enhancements.

In addition, the nuclear power industry continues to implement improvements to strengthen safety as a result of the lessons learned from the 2011 Fukushima Daiichi accident.

I will now ask Mr. Peter Corcoran, Director of the Licensing Support Division, to provide background information on the annual NPP Report and present the industry benchmarking of safety performance indicators.

Peter?

MR. CORCORAN: Thank you, Dr. Rzentkowski.

Good morning Mr. President and Members of the Commission.

I will provide background information on this NPP Report and its format, the public comment process conducted earlier this summer, as well as information on Canada's nuclear power plants.

In this annual report, Section 1 provides an overview including background on the nuclear power industry in Canada and the Regulatory Oversight Program conducted by CNSC staff.

Sections 2 and 3 describe the safety performance for the industry as a whole and for each site. It is important to note that the period of assessment for the safety performance was the calendar year 2012.

Section 4 focuses on regulatory developments and issues on a station-by-station basis. This section includes significant licensing and Licence Conditions Handbook activities and updates on major projects. It also includes updates on regulatory issues and a summary of the event initial reports. It spans the broader period from January 2012 to April 2013 in order to allow us to update the Commission and the Canadian public on more recent developments.

Section 4 also provides a summary of the actions taken by the CNSC and licensees in response to the Fukushima Daiichi nuclear accident. Full details will be presented later today in a separate CMD on the CNSC Integrated Action Plan.

This NPP Report provides the results

of systematic assessment of each nuclear power plant's safety performance throughout 2012. It provides ratings for the 14 safety and control areas for each station and for the industry as a whole. It further provides an integrated plant rating indicating overall safety performance at each nuclear power plant.

The integrated plant ratings are determined through combining the ratings for the safety and control areas for each station and again for the industry as a whole. Because the safety and control area framework has been in use since 2010, we are now able to provide in this report a three year trend for the ratings of the licensees.

In this annual report, section 1 -- excuse me -- the 2012 NPP report was posted on the CNSC Web site for public comment from June 18 to July 16th, 2013.

Two interventions were received on the report. The comments received can be categorized as follows. A recommended addition to the report, a comment on the rating methodology, and comments pertaining to the reactor design assessment as given in the Fukushima Action Plan. Reactor design assessment comments will be discussed later in the section on the Fukushima Daiichi accident response.

At the end of this presentation, CNSC staff are prepared to respond to questions that you may have on the comments received through the public consultation process.

As this map displays, the nuclear power plants in Canada are located at five sites: three in Ontario, one in Quebec and one in New Brunswick.

In 2012, the operating license for Point Lepreau was renewed for five years, and the operating license for Darlington was renewed for 22 months. For Pickering A and B, OPG applied for the renewal of the two licenses as a combined single site license for the Pickering nuclear facility, valid for a period of five years.

In August 2013, the Commission reviewed the operating license for the Pickering nuclear facility and it will expire in August 2018.

In December 2012, commercial operation ended at the Gentilly-2 and the station is now in transition to safe storage, which will be followed by decommissioning.

There are currently a total of 22 licensed nuclear power reactors in Canada. This graphic depicts the status of each reactor as of 2013. Of the total, 19 reactors are operating or have been returned to service, as shown by the green and blue bundles respectively. And three reactors are in a safe storage state or in transition to safe storage, as depicted by the red bundles.

This ends the background section of the presentation. I will now continue with a brief summary of industry benchmarking in 2012.

A few years ago, you may recall, CNSC staff began to report on performance comparisons between Canadian licensees and other national and international organizations.

The approach has evolved and today, comparisons involving five such performance indicators will be presented.

As shown in this slide, the first comparison is the number of unplanned reactor trips per 7,000 operating hours. I should explain here that 7,000 represents the number of operating hours in a year for most nuclear power plants around the world.

The data on this slide shows the performance of the Canadian nuclear operators in comparison to that of the World Association of Nuclear Operators, otherwise known as WANO.

It can be seen that in 2012, the number of reactor trips for Canadian reactors is significantly lower than the industry performance target of .5 reactor trips per 7,000 operating hours. And it is the lowest observed trip rate in the past five years. Furthermore, the Canadian nuclear industry achieved a lower average trip rate than the WANO average.

This next figure compares the unplanned capability loss factor for Canada versus the WANO values. This factor indicates the percentage of the year when a station is not producing electricity due to unforeseen circumstances, such as maintenance outage extensions, unplanned shutdowns, and unplanned load reductions.

From 2011 to 2012, the unplanned capability loss factor for Canadian reactors increased from 2.4 to 4.5 percent. The reason for this is the relatively high UCLF values for both Gentilly-2 and the Pickering A sites.

There is no international target for this performance indicator. Rather, each licensee establishes their target specific for that year.

Since 2009, the unplanned capability loss factor for Canadian nuclear power plants has been steadily decreasing until the recent increase in 2012. The UCLF for Canadian nuclear power plants still remains higher than the WANO value in 2012.

The higher UCLF for the Canadian industry in comparison to WANO cannot be attributed to a single cause as this is the result of a number of factors, such as aging of the reactor fleet and unexpected issues during return to service after refurbishment layups and unplanned outages.

In this next slide, accident frequency is a measure of the number of reportable injuries -- excuse me.

In this next slide, accident frequency is a measure of the number of reportable injuries resulting in lost time or medical treatment and the number of fatalities at a station per 200,000 person hours worked.

This slide shows the accident frequency for Canadian nuclear industry in red versus that of other Canadian industries and workplaces. It can be seen that the accident frequency for the Canadian nuclear industry remains very low and lower than other Canadian workplaces.

The accident frequency for the Canadian nuclear industry did increase in 2012, and this could be attributed to injuries occurred -- incurred during refurbishment and outage work.

However, the Canadian nuclear industry continues to remain a safe industry in terms of the frequency of workplace accidents. You will also note that there were no work-related fatalities at nuclear power plants in Canada in 2012.

This slide shows the estimated annual dose to the public, which is attributed to both airborne emissions and liquid releases from Canadian nuclear power plants.

In 2012, this was well below the 1 millisievert dose limit for members of the public for all Canadian nuclear power plants. Please note that because the doses are very low, we have used a logarithmic scale. Each unit on a logarithmic scale represents a tenfold increase in the value of the estimated dose.

The public dose data confirms once again that Canadian licensees programs continue to be effective in protecting the public and the environment from radiological releases.

The effective dose to workers reflects the amount of radiation detriment associated with exposure to radiation. It is obtained by multiplying the equivalent dose of each tissue or organ by an appropriate tissue weighting factor and summing the products.

This slide shows the distribution of doses for 2012, as well as the five-year trend. I would like to highlight the fact that in 2012, merely 80 percent of the workers at Canadian nuclear power plants received a total effective dose of less than 1 millisievert and no worker received a dose exceeding the regulatory dose limit of 50 millisieverts per year in 2012. The highest dose received by any Canadian worker was 29 millisieverts.

I would now like to turn to the director of the regulatory -- I'm sorry, excuse me.

CNSC is in the process of updating the set of safety performance indicators reported by licensees to include those that are currently in use industry-wide. Regulatory Document S-99, entitled "Reporting Requirements for Operating Nuclear Power Plants" is currently progressing toward replacement by Reg Doc 3.1.1. A briefing on that project is scheduled for tomorrow in CMD 13-M44.

Once the new set of indicators has been approved, appropriate indicators can be selected for introduction for future use in NPP reports.

This concludes the section of the CNSC staff presentation on industry benchmarking.

I would like to turn now to the Directors of the Regulatory Program Divisions, who will present summaries for their respective sites.

We will begin with Mr. Robert Lojk, Director of the Bruce Regulatory Program Division, who will summarize the performance for Bruce A and Bruce B.

MR. LOJK: Thank you, Mr. Corcoran.

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

Bruce Power is licensed to operate the Bruce A and Bruce B nuclear power plants which are located on the shores of Lake Huron. Both stations consist of four units each, for a total of eight units.

At Bruce A, by the end of 2012, all four units were operational after Units 1 and 2 were returned to service following refurbishment. At Bruce B, all three units were operational for the entire year.

The Bruce A and B operating licences were renewed effective November 1st, 2009 for a five-year period, and both licences will expire in October 2014.

The table on safety performance in 2012 shows the 2012 performance ratings for the safety and controlled areas for Bruce A and B. As can be seen, the performance in conventional health and safety and security at both Bruce A and B continue to be fully satisfactory, as they had been for the previous two years.

Overall, the integrated plant rating for Bruce A and B were both satisfactory in 2012.

I would now like to discuss Bruce Power's safety performance highlights, starting with good practices.

Bruce Power received a fully satisfactory rating in conventional health and safety. It was observed that the accident severity rate at Bruce A and B decreased during the year to a low rate of 0.1 lost per days 200,000 person hours worked.

In addition, Bruce Power achieved 7 million hours without a lost time accident by the end of 2012.

A full-scale provincial emergency management exercise entitled "Huron Challenge" was conducted at the Bruce Power facility and the surrounding area. The purpose of the Huron Challenge was to demonstrate the ability of Bruce Power to respond to combined emergencies involving local, provincial, federal cooperation, and to demonstrate the effectiveness of the emergency management programs at Bruce.

The security programs at these sites were rated as fully satisfactory. A force on force exercise demonstrated the proficiency of intervention skills and communication skills to the Bruce Power security team.

The security teams were supported by highly effective training team that ensured that qualifications of the personnel were maintained and the skills were reinforced and tested.

In addition to the good practices, Bruce Power is also addressing some challenges to safety performance. The number of hours that can be worked by certified staff in a plant during a period of time is specified by the licensee and monitored by CNSC staff.

Bruce Power surpassed the time limits on several occasions during 2012. Bruce Power was requested to modify their programs to better manage their approach to hours of work.

CNSC staff is closely monitoring this issue and will implement additional compliance action as necessary to ensure the situation is promptly corrected.

In addition, the maintenance programs -- the performance on the maintenance programs at both Bruce A and B remain at a satisfactory level and Bruce Power improved its maintenance backlog of all stations. However, the elective maintenance backlogs remain high at both Bruce A and Bruce B.

Through the reporting period, there were no licence amendments, four revisions to the Bruce A licence conditions handbook and two revisions to the Bruce B licence conditions handbook. These revisions were approved by the Director-General of Director of Power Regulation following the accepted revision process.

The changes were nearly evenly split between technical and administrative. Technical changes generally involved the addition of new regulatory documents or standards, while administrative changes involved updates to documents or revisions to the text in the licence condition handbook.

An example of a revision is the addition of regulatory document RD-336, Accounting and Reporting of Nuclear Material, to the licence. Details of the changes can be seen in Table 10 of the NPP report.

Six event initial reports were presented to the Commission during the reporting period. The events had low safety significance.

There were several noteworthy developments during the reporting period. Bruce Power completed the return to service of both Units 1 and 2 in 2012. However, there were some technical difficulties which had to be overcome in this return to service.

During commission for Unit 1, Bruce Power discovered a flow blockage on a limited number of channels in the annulus gas system. This system is used to provide detection of leaks.

The final point remained in place -- the final hold point remained in place until Bruce Power resolved in the issue in May 2013, at which point it was lifted.

As mentioned earlier, the modified 37 element fuel bundle is a minor modification of the current design. In January 2013, Bruce Power received CNSC's consent to use the 37M fuel bundles in the Bruce A units. Fuelling of Bruce A Units 3 and 4 with this fuel is planned for 2013 and, in fact, is ongoing, followed by similar fuelling of Bruce A Units 1 and 2.

The acceptance of the 37M fuel is based on the safety case approved by the CNSC.

This concludes the summary on Bruce B. On Bruce A, I will now turn over the presentation to Mr. François Rinfret, Director of the Darlington Regulatory Program Division.

Thank you.

MR. RINFRET: Thank you, Mr. Lojk.

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

Ontario Power Generation is licensed to operate the Darlington nuclear power plant, which consists of four units. All four units at Darlington were operational in 2012.

The Commission hearing for the relicensing of Darlington was held in December 2012. The Commission renewed the Darlington operating licence in February 2012, effective for a 22-month period, with an expiry date of December 31st, 2014.

The Darlington operating licence does not authorize refurbishment activities. To address refurbishment, on March 13, 2013, the Commission announced that the environmental assessment for refurbishment was completed.

A hearing is planned for 2014 for licence renewal, including station refurbishment.

In August 2012, the Commission issued to OPG a licence to prepare a site for the Darlington new nuclear project.

This table shows the performance ratings for the safety and control areas for Darlington. Operating performance, fitness for service, radiation protection and conventional health and safety continue to be rated as fully satisfactory, as they have been for the previous two years.

Overall, Darlington received an integrated plant rating of fully satisfactory in 2012. Darlington has received this rating consistently for the past five years.

I would like to discuss Darlington's safety performance highlights, focusing first on the good practices.

Darlington's radiation protection program was rated as fully satisfactory, indicating the licensee has implemented a highly effective program. CNSC staff observed that the dose to the public from the Darlington station and the average dose to workers were the lowest in Canada for a multi-unit station.

Darlington's preventive maintenance completion ratio was 91.2 percent, the highest in the industry. This is an indication of Darlington's performance in maintaining a low number of corrective maintenance recorders through its highly effective maintenance program.

In addition, there were no missed mandatory safety system tests at Darlington, and safety systems had a high level of availability, indicative of a well-run reliability program.

The worker safety program was highly effective at Darlington, resulting in a low accident frequency. Also, compliance with the applicable labour codes throughout the year was fully satisfactory.

In terms of challenges facing the licensee, OPG is planning a refurbishment project for the Darlington site. Quality assurance and oversight of contractors are important elements that CNSC staff is considering in the preparation for refurbishment.

Details of the progress of refurbishment efforts will be provided later in this summary.

During the period of January 2012 to February 2013, the operating licence was amended three times. All amendments were approved by the Commission. The Darlington site did not have a License Condition

Handbook before 2013, February.

In the period of March to April 2013, no amendments were made to the renewed operating licence. The Licence Conditions Handbook was endorsed by the Commission at the December 2012 hearing and it became effective on March 1st, 2013. It has not yet required a revision.

Three event initial reports were presented to Commission during the reporting periods. The events had a low safety significance.

In the area of licensee projects and initiatives, CNSC staff have completed an assessment of the integrated safety review for the Darlington life extension through refurbishment.

Gaps with modern cogent standards have been identified by CNSC staff. Approaches for addressing the gaps will be included in OPG’s Global Assessment Report to be submitted in December 2013.

OPG has initiated days-based maintenance at its three sites. Its change has resulted in the removal of non-essential maintenance personnel and activities from the shift configuration. Sufficient maintenance personnel will remain on shift to address emerging operational issues and emergency response. The project is expected to be completed in 2013.

Similar to the Bruce project, OPG is introducing 37M fuel bundles to its Darlington units. At the end of March 2013, three quarters of the Unit 1 and Unit 2 cores had been fuelled with 37M fuel. Some bundles have also been loaded into Units 3 and 4. No anomalies have been observed to date.

This concludes the summary on Darlington. I will now turn over the presentation to Mr. Miguel Santini, Director of the Pickering Regulatory Program Division.

MR. SANTINI: Thank you, Mr. Rinfret.

Good morning, Members of the Commission.

The Pickering Nuclear Generating Station consists of the Pickering A and Pickering B stations with four units each, operated by Ontario Power Generation.

In 2012, at Pickering A, Units 1 and 4 were operational and Units 2 and 3 were in a safe storage state. All units at Pickering B were operational.

Commission hearings for the renewal of the Pickering A and B operating licences were held in November and May 2013. OPG has requested a combined one-site licence for the Pickering Nuclear facility for a period of five years.

In August 2013, the Commission renewed the operating licence for Pickering from September 1st, 2013 to August 31st, 2018. The renewed licence includes a regulatory hold point that prohibits operating of Pickering B units beyond 210,000 effective full power hours.

Before the hold point can be removed, OPG must demonstrate fitness for service for the pressure tubes and complete the probabilistic safety assessment for the Pickering site.

This table shows the 2012 performance ratings for the safety and control areas at the Pickering station. The performance for both Pickering A and B in all safety and control areas were rated as satisfactory.

Overall, the integrated plan ratings for A and B were satisfactory in 2012 and changed from the previous two years.

Next I will discuss the safety performance highlights stating with good practices. The conventional health and safety program was effective at Pickering resulting in the accident severity rate decreasing to zero day lost and the accident frequency was the lowest in the industry.

The performance of the maintenance programs at Pickering A and B has shown improvement during the year. Maintenance backlogs continued to improve and the action item related to backlogs was closed.

The preventative maintenance completion ratio has remained satisfactory at Pickering A and B over the past five years. In 2012, this ratio remained at 90%, which is considered industry best-practice.

I would like to move on to the safety performance challenges.

Earlier in today's meeting, we discussed the status of the black deposits. We would like to reiterate that the three percent penalty of the full-time operating power will be kept to ensure that the safety margins are maintained and consideration will be given after the submissions by OPG to request the removal.

In previous years at Pickering B, staff identified deficiencies in the initial certification examination program. OPG has performed two root cause assessments and implemented corrective actions. CNSC staff are continuing to monitor OPG's progress and expects OPG to submit an update in 2013.

As mentioned in the previous slide, the conventional health and safety program was effective in 2012. However, management of the asbestos hazards at Pickering A continue to be a concern to CNSC staff.

The Ontario Ministry of Labour ordered OPG to correct deficiencies and to enhance workers' training on the hazards of asbestos exposure. CNSC staff, in cooperation with the Ministry of Labour, are monitoring OPG's corrective actions.

In the 2008 NPP report, fish mortality was raised as a major issue. The barrier net deployed by OPG has met the required annual target reduction rates for impingement at 80 percent in 2012. Continuous monitoring is being performed by OPG.

The use of technology to reduce entrainment mortality is not reasonable or practicable for a number of reasons, as discussed during the recent renewal hearing. Therefore, OPG is funding a spawning habitat restoration as an offset for the entrainment mortality.

To address fish mortality due to the effects of thermal plume on round whitefish spawning, OPG has undertaken studies which concluded that the thermal plume from Pickering B has a small impact on round whitefish.

The Pickering A operating licence was amended four times and the Pickering B operating licence was amended seven times during the reporting period. All amendments were approved by the Commission.

The Pickering A Licence Condition Handbook was revised six times for Pickering A, and for Pickering B, the Operating Licence Condition Handbook was revised three times in 2012. The revisions were approved by the

Director General of the Director of Power Reactor Regulations following the accepted revision process.

The changes were evenly split between technical and administrative. Examples of revisions include updates to the text for requalification testing on CSA standard N285.5-08 and on sirens for outdoor alerting.

Details of the changes can be seen in Table 16 on the NPP report. Four event initial reports were sent to the Commission during the reporting period. The events were of low safety significance.

This slide provides an update on three regulatory developments.

OPG is currently managing the end-of-life of both Pickering A and B. In 2010, OPG announced that Pickering B will not be refurbished and both stations will cease operation in 2020.

In 2012, all actions for Pickering B continued operations plan and Pickering A and B sustainable operation plan have been consolidated into an action log. This log will be subject to a monitoring and change control process and executed by OPG through their operating programs.

To date, CNSC staff are satisfied with the safety and control measures in place and are confident that the end-of-life project for Pickering will be conducted safely.

OPG has completed the amalgamation of the site organization under one senior leadership team.

CNSC has observed that there has been no impact on the safety performance of Pickering A and B.

OPG has completed implementation of the days-based maintenance at the Pickering site. During the year, CNSC staff reviewed the analysis and validation reports for minimum shift complement. A revised complement was approved by the Commission for Pickering through the licence amendment in December 2012.

This concludes the summary of the Pickering A and B and I will now turn the presentation over to Monsieur Ben Poulet, directeur de la Division du programme de réglementation de Gentilly et Point Lepreau.

M. POULET: Merci, Monsieur Santini.

Bonjour, monsieur le président, membres de la Commission.

Gentilly-2 est une centrale à tranche unique avec un réacteur de modèle CANDU-600 exploité par Hydro-Québec.

En 2012 et jusqu'au 28 décembre, la centrale de Gentilly-2 était en exploitation commerciale. Le réacteur a été mis à l'arrêt le 28 décembre 2012 et Gentilly-2 a cessé ses activités de production commerciale.

La centrale de Gentilly-2 est maintenant en transition vers l'état de stockage sûr. Le présent permis de la centrale fut renouvelé en juin 2011 et expire le 30 juin 2016.

Ce tableau montre les cotes de rendement accordées à Gentilly-2 en 2012 pour chaque domaine de sûreté et de réglementation. Le rendement de Gentilly-2 pour chacun des domaines de sûreté et de réglementation a été jugé satisfaisant. Le rendement global de la centrale a lui aussi été jugé satisfaisant.

Je tiens à vous présenter les faits saillants sur le rendement en matière de sûreté en commençant par les bonnes pratiques que nous avons observées.

Hydro-Québec a effectué en 2012 une auto-évaluation de la culture de sûreté. Le personnel de la CCSN a accepté les résultats de cette évaluation et continue ses activités de surveillance pendant la présente période de changement organisationnel et de transition vers l'état de stockage sûr.

Hydro-Québec a fourni au personnel de la CCSN les résultats d'une analyse démontrant que l'effectif minimal par quart doit être augmenté lorsque la centrale est dans un état d'arrêt garanti. Hydro-Québec a également soumis les changements aux procédures connexes.

Le personnel de la CCSN a revu cette information et prévoit assister aux exercices de validation qui prendront place le mois prochain.

En ce qui concerne les défis reliés au rendement en matière de sûreté, il a été observé que la fréquence et le taux de gravité des accidents de travail étaient plus élevés que le reste de l'industrie canadienne pour l'année 2012.

Hydro-Québec a mis en vigueur des actions correctives qui ont entraîné une réduction des accidents de travail pour la seconde moitié de 2012. Cinq blessures sur neuf à Gentilly sont le résultat d'efforts pour soulever ou déplacer des objets, causant des blessures au dos et à l'épaule.

Suite à une inspection en 2011 portant sur l'équipe d'intervention en cas d'urgence, la CCSN a émis une directive à Hydro-Québec lui demandant de donner de la formation sur l'utilisation appropriée de l'équipement de communication.

Le personnel de la CCSN a depuis observé qu'Hydro-Québec avait réglé ce problème de conformité de façon satisfaisante.

Hydro-Québec planifie la mise en œuvre d'un projet d'amélioration qui vise la piscine de stockage de combustible usé. Les améliorations prévues couvrent l'intégrité structurale de la piscine, des dispositions additionnelles pour effectuer des appoints d'eau, et l'amélioration des systèmes d'instrumentation et de contrôle.

Le permis d'exploitation de Gentilly-2 a été renouvelé le 29 juin 2011 pour une période de cinq ans. En 2012, il y a eu un amendement fait au permis d'exploitation accordé par la Commission.

Le Manuel des conditions de permis a lui aussi fait l'objet d'une révision en 2012. Il a été approuvé par le directeur général de la Division de la réglementation des centrales nucléaires.

Les changements étaient de nature administrative et consistaient principalement de modifications aux numéros de révision des documents titulaires et de modifications aux numéros de permis d'exploitation dans le Manuel des conditions de permis.

Les détails de ces changements apparaissent au Tableau 19 du rapport. Un rapport initial d'événements a été présenté à la réunion de la Commission tenue le 3 mai 2012.

En ce qui a trait aux projets et initiatives, le 3 octobre 2012, Hydro-Québec a annoncé son intention de ne pas aller de l'avant avec son projet de réfection des installations de la centrale de Gentilly-2.

Conformément aux conditions du permis, l'exploitation de la centrale s'est poursuivie jusqu'au 28 décembre 2012 et celle-ci a alors été placée dans un état d'arrêt garanti.

La campagne de retrait du combustible du réacteur a débuté tôt en 2013 et il est prévu qu'elle sera complétée d'ici la fin août 2013, comme nous l'avons mentionné un peu plus tôt ce matin.

Une fois que le combustible sera retiré du cœur et entreposé dans la piscine de stockage du combustible usé, l'installation sera placée dans un état de stockage sûr pour une période d'environ 50 ans.

Le permis d'exploitation et le Manuel des conditions de permis sont présentement en révision pour être mis à jour en prévision de la transition vers l'état de stockage sûr et du déclassement éventuel de la centrale.

Hydro-Québec doit soumettre une version révisée de son plan de déclassement et de ses garanties financières.

I will now continue with presenting the Point Lepreau nuclear generating station safety assessment portion of the report.

The Point Lepreau Nuclear Power Plant

consists of a single CANDU-600 reactor operated by New Brunswick Power Nuclear.

During 2012, Commission testing was completed at the Point Lepreau nuclear generating station. The reactor was returned to service and commercial operation resumed on November 23rd, 2012. The operating licence was renewed in February 2012 and it will expire in June of 2017.

This table shows the 2012 performance ratings for the safety and control areas at Point Lepreau. The performance for the station in conventional health and safety improved to fully satisfactory while the remaining safety and control areas were rated as satisfactory.

Overall, the integrated plant rating for Point Lepreau was satisfactory.

I will begin by introducing the safety performance highlights starting with the good practices that were noted in 2012.

The conventional health and safety rating for Point Lepreau was fully satisfactory. The accident rate was an industry-leading zero lost days due to injury. Also, there was fully satisfactory compliance with the applicable labour codes throughout the year.

In the area of fitness for service, the implementation of the periodic inspection programs at

Point Lepreau met regulatory requirements. There were no safety significant pressure boundary degradation findings identified in 2012.

Furthermore, New Brunswick Power Nuclear performed the required inspections and repairs for the containment structures and subsequently performed a successful reactor building leak rate test before re-starting the reactor.

New Brunswick Power completed its emergency exercise named Intrepid, which included the off-site activation of the Provincial Emergency Centre and the CNSC Emergency Operation Centre. CNSC staff evaluated the exercise and determined that New Brunswick Power demonstrated its ability to respond to a nuclear emergency.

In terms of safety performance challenges, New Brunswick Power reported that neither the foam water fire suppression system for the external diesel storage tanks, nor the manual foam hose line providing protection for the standby generator and oil tank farm met design specifications.

Compensatory measures were promptly introduced to address the availability of the fire suppression system in that location. CNSC staff continues to monitor New Brunswick Power's compliance in this area.

One licence amendment was made to the Point Lepreau operating licence and this amendment was approved by the Commission. No revisions were made by CNSC staff to the Licence Condition Handbook since the Commission renewed the operating licence.

One initial event report was presented to the Commission. This event had low safety significance.

Concerning projects and initiatives during 2012, New Brunswick Power Nuclear completed refurbishment of Point Lepreau generating station and returned it to full commercial operation. Throughout the process, the regulatory hold points were removed upon confirmation that project commitments had been met.

On November 23rd, 2012 when Point Lepreau commenced commercial operation, CNSC staff returned to routine regulatory oversight of operational activities. In its decision for renewing the Point Lepreau operating licence, the Commission required that New Brunswick Power Nuclear complete a site-specific seismic hazard assessment and share the results through its public information program. The seismic hazard assessment is ongoing; however, New Brunswick Power Nuclear submitted the preliminary results to the CNSC at the end of 2012 and also posted the results on its public website. The preliminary results were reviewed by both CNSC staff and

Natural Resources Canada staff and found to be consistent with the required methodology. The final assessment is expected to be completed by mid-2014.

New Brunswick Power Nuclear continued to maintain and implement an effective environmental risk assessment program. The licensee committed to update its environmental risk assessment by December 31st, 2013.

As mentioned in the 2012 NPP Report, CNSC staff would like to take this opportunity to provide the Commission with an update on fish monitoring at Point Lepreau.

Even though past studies have concluded that fish impingement and entrainment is not a concern at Point Lepreau, New Brunswick Power Nuclear is implementing a monitoring program in accordance with the CSA standard for environmental monitoring programs as referenced in its operating licence. The licensee will provide preliminary findings to CNSC staff by the end of October 2013.

This concludes the Gentilly-2 and Point Lepreau presentations and I will now turn the presentation back to Dr. Rzentkowski.

DR. RZENTKOWSKI: Thank you, Mr. Poulet.

This next section of the presentation will focus on actions taken by licensees during 2012 in response to two CNSC regulatory requests made in previous years; namely, the 2010 directive for alpha monitoring program enhancements, and the 2011 directive for information and action in relation to Fukushima Daiichi nuclear accident.

Following the 2009 alpha contamination event, all licensees improved their alpha monitoring program in response to a CNSC regulatory request.

In 2010, all licensees implemented immediate measures to protect workers from alpha radiation hazards to the satisfaction of CNSC staff and implementation of programmatic and alpha monitoring and control enhancements was initiated.

In March 2011, the regulatory action for the alpha contamination event was closed by the CNSC for all licensees based on the site-specific implementation plans.

In 2012, the implementation of radiation protection program enhancements for alpha monitoring and control for Bruce Power and OPG was completed. CNSC staff are satisfied with the implemented measures and all related actions are now closed.

The alpha enhancements to the radiation protection program at Gentilly-2 were in progress in 2012. Compensatory measures are in place to protect the health and safety of workers. CNSC staff will continue to monitor implementation of the program enhancements at Gentilly-2.

New Brunswick Power informed CNSC staff that implementation of radiation protection enhancements was completed in December 2012. The first CNSC inspection in this area was conducted in March 2013 and no regulatory non-compliances were noted. It is expected that most alpha-related actions will be closed in 2013.

Despite the progress achieved to date, CNSC staff will continue to verify implementation of the long-term radiation protection program enhancements at all nuclear power plants.

Following the Fukushima Daiichi accident in 2011, CNSC requested that licensees review the lessons learned from the event, re-examine their safety cases, and report on implementation plans to address significant gaps. The overall objective was to reassess the safety of operating reactors and identify potential improvements to further enhance accident prevention and mitigation measures.

This approach reflects a shift in regulatory focus from prevention of design-basis accidents to prevention of beyond design-basis accidents and mitigation of severe accident consequences.

CNSC staff confirmed that Canadian nuclear power plants are robust and safe, and have strong designs relying on multiple layers of defence. Further enhancements were identified against extremely unlikely events to reduce the associated risk to as low as reasonably practicable. The measures are already partially implemented. As of June 2013, all 18 short-term Fukushima action items were closed for operating nuclear power plants.

The progress achieved to date indicates that the Canadian nuclear power industry is on track to complete all Fukushima action items by December 2015. A detailed status update on the Fukushima responses will be presented as a separate CMD later today.

Now, I would like to turn to the responses of CNSC staff to an intervention submitted during the public comment period on reactor design assessments as a result of the Fukushima action plan. In the intervention, the concerns expressed were with respect to measures to mitigate and prevent a severe accident caused by a station blackout leading to a sustained loss of heat sinks.

The comments received in this intervention are not new to the CNSC and industry staff. Dr. Sunil Nijhawan raised the issue of the pressure relief capacity repeatedly since 2001. CNSC staff have replied on five occasions with detailed technical responses. In addition, CNSC staff and industry members have met Dr. Nijhawan to address his concerns.

Furthermore, in response to specific Fukushima action items, all NPP licensees provided to the CNSC updated evaluation of their reactor pressure relief capacity. CNSC staff found this evaluation confirmed the relief valve will provide adequate relief for design-basis and beyond design-basis accidents.

The conclusion is supported by analytical studies and testing. Based on this work, the Fukushima action items related to reactor pressure relief capacity were closed.

CNSC staff requested also that all NPP licensees complete the installation of passive autocatalytic recombiners referred to as PARs as quickly as possible. Based on the industry plans and schedule for the installation of PARs, this action item has been closed.

The PARs, in combination with additional cooling capability modifications, made at Canadian NPPs strengthen the overall hydrogen mitigation strategy. The PARs are sized for the design-basis accidents, but due to qualification testing results and extremely conservative assumption recognized they would provide significant safety benefits for beyond design-basis accidents as well.

In general, a CANDU reactor vessel has a large inventory of water available for passive cooling in the event of a beyond design-basis accident. Also, as a result of Fukushima improvements, make-up water can be added to the vessel from external sources in an emergency response to ensure in-vessel retention of molten fuel. This feature will arrest severe accident progression, as has been confirmed by analytical studies and experiments.

Further shield and relief capacity has been installed at Point Lepreau reactor, is committed for Darlington, and may be required at Bruce A and B as a result of two related Fukushima action items.

I would like to end this presentation today with some other concluding remarks on the safety performance of nuclear power plants in Canada, and safety improvements being introduced by licensees.

Based on observations and assessment of safety performance, CNSC staff made a number of general conclusions; namely, nuclear power plants operated safely in Canada during 2012. The integrated plant ratings were determined to be fully satisfactory for Darlington and satisfactory for the remaining stations.

It is important to underline the fact that in 2012, all licensees received either satisfactory or fully satisfactory ratings and no licensee received below expectations or unacceptable ratings.

Furthermore, CNSC staff noted that all licensees made adequate progress towards updating their public information and disclosure programs as per the new regulatory requirements.

Licensees continue to address safety issues and implement improvements to their operations, as shown on this slide.

The regulatory action for Alpha contamination was closed in March 2012 for all nuclear power plants licensees by the CNSC. The licensees continue to improve measures to prevent and mitigate severe accidents by addressing the action items initiated through the CNSC Integrated Action Plan following the Fukushima Daiichi accident.

Licensees are making good improvements on other challenges, such as the resolution of CANDU safety issues. It is expected that most of the remaining issues will be resolved by the end of this year.

Particular attention is being paid to the fitness for service of pressure tubes, which are approaching their end of the analyzed design life.

I would like to conclude today by saying that the CNSC staff safety assessment provides strong assurance that the risk from operation of nuclear power plants in Canada remains very low. This conclusion is supported by the post-Fukushima safety reviews conducted by the CNSC Task Force and nuclear power plant licensees. Safety improvements recommended by the Task Force will further lower the risk to as low as reasonably practical.

Mr. President and Members of the Commission, this concludes the presentation of the CNSC Staff Integrated Safety Assessment of Canadian Nuclear Power Plants in 2012.

Thank you for your attention. CNSC staff is now available to answer any question the Commission may have.

THE CHAIRMAN: Thank you.

We will take a 10-minute much-needed break and we will resume. So it's about 11:20 is that -- okay, close enough, 11:20.

--- Upon recessing at 11:12 a.m./
L'audience est suspendue à 11h12

--- Upon resuming at 11:27 a.m./
L'audience est reprise à 11h27

THE CHAIRMAN: Okay, we are ready to resume. And before we get into the question period by Commission Members, I would like to give an opportunity to all the licensees to present any comment on this report.

So we'll start with Bruce Power and I understand that Mr. Duncan Hawthorne would like to say a few words. Please proceed, sir.

MR. HAWTHORNE: Good morning, Mr. President and Members of the Commission. For the record, I'm Duncan Hawthorne, President and Chief Executive of Bruce Power.

So just by way of general comment, I think I've said this every year, I consider this report to be a good practice. Someone's regulators, I think it's a very transparent way of rating the performance of the plants, and I intend to share this with our Board and with our community. So I do want to commend the staff for the document.

Each year, the document, for me, gets a bit more readable so I think that helps us all in terms of communicating. I know that that's an important part of our outreach strategy. So I really do think it's a great benefit to do this, and I also think the international benchmarking serves us well. You know, we are often asked by our own board how our performance compares with our international counterparts. So to see that in a regulatory document is also very helpful.

I'd also like to say that reading it as an interested party, you know, I think that all of the licensees can be commended for the good work that was done over this last period. It's been a very active period certainly for ourselves as we've returned Units 1 and 2 to service, the Bruce site has been very active.

We consider 2012 to be a kind of historic year for the site. To get back to an eight unit site for the first time in 17 years is a monumental achievement and quite honestly I'm really pleased to see it, believe me, since it was hard work.

But I think we've proven just how strong the industry is working together to take on such complex projects, both at Bruce, at Lepreau, and of course earlier at Pickering.

So I think the industry has done well and for me, the Bruce site, you know, we've returned it to its full capacity and we're providing a lot of good service to the interior marketplace.

There are a couple of things I think I'd like to just briefly mention that were in our report. We've talked often about our challenge in terms of maintaining licences, operational licences on the site. And it was particularly challenging for us having inherited a four-unit site and trying to grow it to an eight-unit site fairly quickly and dealing with all the demographic challenges that were there.

So you know, I can give this Commission a commitment as I have on previous occasions that we are working hard to get more operational licences on the site. We have 37 against a minimum complement of 30. It's a margin but it's not as healthy as we'd like it. We have nine authorized staff going through qualifications now.

So we're hoping to increase that number largely because we think that licensed operators operating in what management and outage planning and other parts of the site just makes for a better operational mixture. And we intend to work with staff to try and find a way to bring some of the best and brightest from university and quickly put them in the authorized programs.

The current pre-qualification makes it a bit longer of a pipeline than we think we need to have. So we're hoping we can get some support from staff in the future to help us out, if I can say that.

But I think just by way of a general comment, that's all I'd say at this point.

Thank you.

THE CHAIRMAN: Thank you.

I'm sure we've got lots of questions, which we'll hold until we hear from everybody.

So I would like to ask the representative from OPG if they have any comment, and I understand it's you, Mr. Jager, who is going to make this comment?

MS. SWAMI: No, actually, I'll make the comment. Laurie Swami, for the record.

THE CHAIRMAN: Okay, it says Mr. Tremblay.

MS. SWAMI: So I guess I'm filling in for Mr. Tremblay.

I have with me today Brian Duncan and Glenn Jager, the Senior Vice-Presidents from the Darlington and Pickering stations.

As you've heard us say many times before, safety is our highest priority. And OPG considers the CNSC's Annual Industry Report an excellent opportunity for the CNSC to demonstrate and document the safety of our facilities.

OPG is, as I said, very proud of our excellent safety performance. We are pleased to be recognized by the CNSC staff in this report. For example, we are very proud that the Pickering station is currently approaching 12 million hours without a lost time accident.

Darlington's performance continues at a very high level. In many areas of safety and reliability, this is recognized in the CNSC staff's assessment of a fully satisfactory integrated plant rating.

I would like to take the opportunity to talk a little bit about some of the significant regulatory activities that we have ahead of us or that have recently been completed.

First, we've finished the Pickering and Darlington public hearings for the renewal of our stations' operating licences and we received approval of the Darlington refurbishment environmental assessment.

We are pleased with the Commission's recent decision to renew the Pickering operating licence for an additional five years. The timeline for completion of some of the requirements documented in the Commission's Decision of Record by the regulatory hold point in mid-May of next year will be extremely challenging.

We've made good progress on the fuel channel life management project that demonstrates safe operation beyond the fuel channel assumed design life and we will complete all of the required work before reaching that hold point.

OPG continues to provide updates on our Pickering continued operations and sustainable operation plans in accordance with the regulatory requirements specified in RD-360.

For Darlington, we continue to work on the Integrated Safety Review and the Integrated Improvement Plan, which will support the refurbishment project and will allow us to submit a license application for renewal of the operating license for ten years, and we're looking forward to that event.

In other areas, we've pioneered the development and implementation of new fuel bundle design that significantly improves safety margins. Full conversion of this fuel design is almost complete on Darlington's Unit 1 and 2. OPG is confident that this innovation, along with the work completed on the neutron overpower methodology demonstrates Darlington's safety margins exceed requirements.

As you will hear later today, OPG will be completing an integrated emergency preparedness exercise in May next year that will demonstrate the effectiveness of ours and other government agency emergency plans.

Finally, we make good progress in continuing the -- addressing the lessons learned from the Fukishima event.

So, in summary, we're committed to the safe operation of our facilities and in meeting regulatory requirements. Excellent safety performance translates into good overall plant ratings.

Thank you.

THE CHAIRMAN: Thank you.

Maintenant, le représentant d'Hydro-Québec, Monsieur Gélinas?

M. GÉLINAS: Monsieur le président, messieurs et mesdames les commissaires, juste quelques mots pour dire que le rapport qui a été préparé cette année est un excellent rapport et nous aide beaucoup à continuer à s’améliorer.

Les comparaisons avec les différentes centrales sont excellentes et la méthode d’évaluation est excellente aussi.

Et aussi, je voudrais remercier le personnel de la Commission, le staff, pour l’aide qu’ils nous aident -- pour l’aide qu’ils nous donnent présentement pour passer à travers le changement d’état de la centrale; c’est-à-dire du fonctionnement en pleine puissance en 2013 à passage à l’état de stockage sûr.

Beaucoup de questions se posent et on a une très bonne collaboration pour passer au travers.

THE CHAIRMAN: Merci, beaucoup.

I'd like to move on to representative from N.B. Power. I understand Mr. Granville will make the presentation.

MR. GRANVILLE: Yes, good morning.

For the record, my name is Sean Granville. I am the Site Vice President and Chief Nuclear Officer of the Point Lepreau Generating Station at N.B. Power.

As N.B. Power has indicated in previous

years, this is a good process to review, document and openly report the status of the safety of power reactors in Canada and it's one of the many strengths of the Canadian regulatory process. I shared this report with my board yesterday.

We are pleased with this report from the regulator, given that 2012 was the year we completed our refurbishment project, achieved the license renewal from the CNSC and successfully returned the station to commercial operation.

We are also pleased with the fully satisfactory rating of our conventional health and safety performance, as this is a reflection of the strong emphasis N.B. Power places on industrial and workplace safety culture throughout the organization. Safety has always been and continues to be our number one priority.

Twenty-twelve (2012) was an exciting and busy year for us. In March, we successfully conducted a full-scale emergency exercise with the New Brunswick Emergency Measures Organization and provincial and federal emergency responders using our new (inaudible) command structure and applying our severe accident management guidelines.

Twenty-twelve (2012) also saw the completion of the refurbishment project, followed by the commissioning and return-to-service activities being carried out safely allowing the unit to be returned to commercial operations on November 23.

Since then, we have experienced some operational challenges since returning to commercial power, including higher than normal boiler sulphate levels, some difficulties around closure plugs and a passing steam valve.

We've met and overcome these challenges using appropriate engineering and operational decision-making methodologies, ensuring conservative decisions are made at every opportunity.

With refurbishment now behind us, our focus is on safe, predictable and productive event-free operations.

In our quest for operational excellence, we've established a solid leadership team; we have re-strengthed our engagement with the Canadian and international nuclear industry; and have undertaken a number of key initiatives to realign our processes with industry best practices. We refer to our plan as “navigating for excellence”.

We are confident in the benefits this plan will bring to improve equipment reliability and human performance leading directly to improved safety and reliability.

Thank you.

THE CHAIRMAN: Okay, thank you.

I'd like to open the floor now for a first round of questions. The way we’ll do it is the way we normally do. Colleagues, if everybody agrees, we will go through the first round of questions, then we will deal with the two written interventions we've got and then we'll have another round of questions.

So let me start and we have to be very precise. We've got many operators here, so we ask -- you have to identify to whom you address the question.

And let me start with Dr. McDill.

MEMBER McDILL: Thank you, Mr. President.

I'd like to start by complimenting staff on the document. I think it has become a document that's far more readable for the public and that's, I think, a huge step forward. I think industry -- this is the second year -- I was asking my colleagues -- the second year when we've had a report card that's been all good. And of course, as an educator, I'm always a little concerned when the class average gets really high but, in this case, maybe we can think about addressing the challenges a little bit more.

I have two questions for this first round.

On Slide 15 -- and it's also in the report, of course -- but on Slide 15, in the “National Benchmarking Accident Frequency”, CNSC is listed, and I think actually that was a request that was made by the Commission.

But what exactly makes the CNSC a more dangerous place to work than the nuclear power industry?

THE CHAIRMAN: I've always told you that government work is very dangerous.

(LAUGHTER/RIRES)

DR. RZENTKOWSKI: Thank you very much for this question.

We were very surprised when we compared the results as well, so one question is: Are the events reported in exactly the same way?

We believe, yes. So the second question is: Why this place is more dangerous than nuclear industry?

I am not trying to answer this question, I only wanted to point out, by this comparison, that the nuclear industry is an extremely safe place to work at.

MEMBER McDILL: But can you say whether this occurs -- I mean, are staff falling down the stairways, or are they -- is it mostly inspections or something like that?

Any clue at all? I was totally perplexed when I saw this.

DR. RZENTKOWSKI: I will ask Mr. Peter Corcoran to provide more details.

MR. CORCORAN: Peter Corcoran, for the record.

Yes, it is an interesting comparison. We thought it was only fair to kind of compare where the CNSC as an organization is in relation to other organizations.

What you don't see on this chart was that, in comparison to Human Resources and Development Canada, the CNSC's rate is, I believe here, .3, and the rate at Human Resources Development Canada, a large department in Canada, is 3. So we're one-tenth at that level for comparison among our similar departments.

But in putting it in context here, you can note that the CNSC is not perhaps -- or sorry, we're at .6, that's what it's at -- we're not quite as low as the nuclear power industry, yet we're doing very well among the departments in the Government of Canada.

But Dr. McDill, to get back to your question, no, I can't put my finger on exactly what it is but except to say that the number of reportable injuries here is low, very low relative to other environments like our own, but not even as low as the industry, underscoring the fact that the industry is an even more safe area to work because of the attention to the safety culture.

MEMBER McDILL: Thank you.

DR. RZENTKOWSKI: In fact, -- sorry -- I would like to clarify one point.

The statistics pertaining to the CNSC apply to all CNSC staff and not only those staff members who work at the power reactor sites.

MEMBER McDILL: Thank you.

La suivante, pour Hydro-Québec, à la suivante vignette 16: La dose annuelle pour 2012 pour Gentilly 2 est petite mais c'est plus que les autres. Pourquoi?

M. GÉLINAS: Claude Gélinas.

La dose annuelle? Premièrement, en 2012, nous avons commencé à établir la dose annuelle avec un nouveau logiciel qui était demandé par le -- par la commission de contrôle. Le logiciel, le nom c'est c'est le « IMPACT ».

Et les doses qui ont provoqué cette augmentation-là sont principalement du -- le tritium et le Carbone 14 qui a été rejeté. Le tritium, entre autres, a augmenté d'environ 10 pourcent dans nos rejets en 2012 et ce 10 pourcent-là est -- vient du fait qu'on a eu un grosse fuite modérateur à la fin de l'été 2012 qui nous a pris quelques temps à ramener ça à un temps normal là, une des pompes modérateur, sa garniture a fui et le bâtiment réacteur avait une ambiance tritium très, très élevée. On en a récupéré une grande partie mais il y a quand même une partie qui s'en allait à l'extérieur.

MEMBER McDILL: Staff?

DR. RZENTKOWSKI: Monsieur Benoit Poulet va répondre à cette question.

M. POULET: Non, je n'ai rien à ajouter aux précisions de M. Gélinas.

C'est effectivement ce que notre compréhension des faits est également.

MEMBER McDILL: That's my two. Thank you.

THE CHAIRMAN: Thank you.

Mr. Togyesi.

MEMBER TOLGYESI: So we have two questions.

(LAUGHTER/RIRES)

MEMBER TOLGYESI: I have a very short one. Ça concerne la recherche et développement où on parle que le programme de recherche de développement de CANDU a été soutenu financièrement par Bruce Power OPG, Hydro-Québec et Énergie Nouveau-Brunswick.

LE PRÉSIDENT: C'est à quelle page, quel document?

MEMBRE TOLGYESI: Page 158, in French.

Est-ce que le fait que Hydro -- Gentilly 2 sera fermé, est-ce que ça veut dire que Hydro-Québec se retire de ces programmes de recherche?

M. GÉLINAS: Claude Gélinas.

Oui, Hydro-Québec s’est retiré de certains programmes de recherche qui ne s’appliquent plus à Gentilly mais restent quand même en contact avec l’industrie de façon à se joindre aux autres recherches qui vont -- exemple, la piscine de combustibles, on en a encore pour plusieurs années, donc, si on a des recherches à faire de ce côté-là, on va travailler encore avec l’industrie.

Donc, on a une entente partielle avec COG, le regroupement des producteurs.

MEMBER TOLGYESI: O.k., merci.

I have a few questions which are -- I’m not sure if it’s just a typing error or it’s something that I don’t understand.

If you go to the Table 4 in the report, we are talking about -- just a second -- it’s in the page, in French it’s 26, in English, supposed to be -- I’m sorry -- which one? Twenty-three (23)? Non -- yes.

You are talking about missed mandatory safety system tests. You are saying that at Point Lepreau there were 24, whereas, when you’re looking the figure, which is down there, there is 16.

Which one is the right one?

And because, if it's "24", the industry total will go up to "31" and the percentage of missed, it will go up to .031 instead of .02.

DR. RZENTKOWSKI: The proper answer is "16".

Mr. Benoit Poulet will explain what happened in this particular case.

MR. POULET: Yes, the -- when the report was circulated to licensees for -- to confirm some of the data, the figures were updated. And I'm looking for the table number here.

But the figure was corrected in one of the tables but not corrected in the other table.

The final version of this report will have the correct figure of "16".

MEMBER TOLGYESI: So it's not "12" and "12" for "24", it's something plus something to be "16?

MR. POULET: Just a minute, please.

MEMBER TOLGYESI: Now, the second one is in ---

MR. POULET: I'm sorry.

MR. CORCORAN: Just to clarify, if I may, Peter Corcoran, for the record.

The Point Lepreau figure will show “16” and the industry total will now show “23”. It will then jive with the table at the bottom of the table at the bottom.

So those corrected numbers along the bottom row in 2012, in Figure 7, would be “16” and “23”.

Just let me check. Sorry, the correct numbers are “24” and “31” in Table 4 for Point Lepreau and the industry and those should have been reflected in Figure 7, as you’ve pointed out, Dr. Tolgyesi, that the bottom line of 2012, Point Lepreau should show “24” and the industry total “31” to concur with the above table.

We apologize for the oversight. And in the final version that is printed and distributed, that will be corrected.

THE CHAIRMAN: So it’s “24”, not “16”?

Okay, anyhow, yeah, let’s get the number right.

DR. RZENTKOWSKI: Yes, I would like to confirm, sorry for my mistake, it’s “24”.

MEMBER TOLGYESI: And there’s another one.

When you are going to Figure 13 and 14, in one, you compare trend details of accidents frequency between -- 32 and 33, page 32 and 33.

You compare the trend details of accident frequencies between the Canadian energy industry and after with Canadian workplaces, the different -- other type of industry.

So I’m just looking that for Canadian nuclear power industry in picture 13 -- in Figure 13, the performance is about .7, .8, whereas in the Figure 14, “Canadian Electric Association”, which is the same, you are talking about 2.

There’s a little bit of a difference between .7, .8 and 2. It’s about -- so I don’t know which one is a good one.

(SHORT PAUSE/COURTE PAUSE)

THE CHAIRMAN: Okay, can somebody who actually know, who put them together, come back to us after lunch maybe with the right answer?

DR. RZENTKOWSKI: Yes, thank you for those questions.

I’m sure we will be able to clarify this but we need some time. Okay, after lunch, we’ll provide clarification.

MEMBER TOLGYESI: I used to bear it, it was the third one.

LE PRÉSIDENT: Monsieur Harvey, s’il vous plaît.

MEMBER HARVEY: Merci, monsieur le président.

When you -- first, I want to congratulate the staff for the report, it's a very exhaustive report. But when you compare Point Lepreau, Gentilly, Pickering and Bruce, it's quite different units.

I mean, you've got eight units in Pickering and so what is the -- I agree for the majority of the area, of the safety and control areas, that it doesn't matter but, for some, it might be -- how do you proceed because it's a kind of average of eight units or four units?

So how can we compare the result for fitness for safe service in physical design some of those areas?

Is it correct to compare one reactor to four or to eight reactors?

DR. RZENTKOWSKI: That's a very interesting question and this is the question we struggled with when we started this assessment process.

It has to be realized that the assessment is based on several hundreds of inspection findings, desktop reviews and additional assessments performed by the CNSC staff.

So we typically spent more time assessing multi-unit station versus a single-unit stations. So if we try to redistribute our findings on a per reactor basis, I think the number would be very, very similar.

So I think looking at this from this perspective, this is a fair process which represents well performance of a single-unit station versus multi-unit stations because, again, the number of findings are very similar on a per unit basis.

MEMBER HARVEY: Okay, thank you.

Other question is -- it's about the impact of commercial plane on reactors.

So you are -- in the text, you think the analysis to Fukushima analysis, so --well, I don't know why. And you mentioned that your analysis is based on the attenuation of the impact, so could you just elaborate on that?

DR. RZENTKOWSKI: There are really two questions, so let me respond to the first one; why this is being addressed under Fukushima action plan.

Originally the work has been initiated post-September 11, of course, in about 2002-2003 timeframe. And certain measures were put in place by the industry which were generally accepted by the CNSC staff. However, at the international level the overall approach to assess the impact of the airplane has evolved and so-called modern forcing functions were produced to represent an anticipated impact of a large commercial aircraft. So under Fukushima action item, we reassessed the safety of operating facilities based on those modern forcing functions to reconfirm again the previous conclusions of our assessment.

There’s many aspects which we took into account, but it’s not only prevention of accidents -- of this kind of the airplane crash. A lot of work has been done in this area post-September 11. We looked more at the mitigation of potential consequences because the overall assumption was that it will lead to a big fire at the reactor site and we assessed what are the recovery options the industry has to mitigate the consequences of an accident of that sort. That’s in general.

MEMBER HARVEY: Okay, thank you.

THE CHAIRMAN: Ms. Velshi?

MEMBER VELSHI: Thank you.

Question for staff: One of the great values from this report, as Bruce Power mentioned earlier, is allowing some comparison with other nuclear power plants. So when we see that for UCLF and for reactor trips per nominal year or so, it’s really good to see how we compare. I wondered why for some other measures, like dose or accident frequency or waste management, we don’t have similar comparators.

DR. RZENTKOWSKI: As we indicated, our approach to the use of performance indicators is evolving, and going forward we will have more international performance indicators stemming from those which are implemented by WANO for all nuclear facilities. So I think going forward, maybe not next year, but probably in two years from now, we will expand significantly this international comparison based on WANO performance indicators.

MEMBER VELSHI: I know that we're going to have a discussion later, the next couple of days, on indicators, so maybe we can have more then.

I was very intrigued to see the safety culture self-assessment done by, I think it was Hydro Quebec and I wanted to know what the CNSC -- so again, question for staff: What are CNSC's expectations around safety culture self-assessments, and is that a performance indicator you're looking at? Especially when performance is so good and when it's so close to zero when one incident can just skew your results and make it look like you're having a bad year that you're looking at some more upstream measures and whether safety culture self-assessment is an expectation for all licensees to do on a regular basis?

DR. RZENTKOWSKI: So I would like to point out that we don't try to enforce a proper safety culture.

What we do, we promote a safety culture. We develop certain guidelines for the self-assessment of the safety culture to make sure that it meets our expectations.

What we have done in the case of G-2 specifically -- I will ask Mr. Andre Bouchard who is the Director of Human Factors and Organization of Performance Division to provide more details.

MR. BOUCHARD: Thank you.

If I can confirm your question, you want to know if there are expectations or requirements pertaining to licensees doing self-assessment first.

MEMBER VELSHI: That’s correct.

MR. BOUCHARD: There are expectations of the CNSC that self-assessment would be done. These expectations were shared sometime in 2004. We staff are in the process of preparing a reg doc that will formalize these expectations into regulatory requirements documentations.

As per today, it is the practice that we receive these self-assessment results and analyze them and review them as part of our regulatory oversight functions.

In the specific case that you described, G-2, we did receive their self-assessments. And if you do remember, that self-assessment was done in the time where the decision closing down the station wasn’t officialised.

MEMBER VELSHI: Right. So my second part of the question was, maybe not today but down the road, do you see the results of the self-assessments conducted by licensees being presented to the Commission, not necessarily for comparison but for training and to see if there are opportunities or issues that are emerging that one needs to be aware of?

MR. BOUCHARD: It’s a very good question. We definitely have an interest in understanding; the understanding how the licensees, by doing self-assessment perceive their own organization and understands them. This is the primary function of a safety culture self-assessment.

Having a comparison of how one understands its organization is not necessarily desirable. What is more important is what the licensee is doing about it exactly. This is the value added into those assessments.

MEMBER VELSHI: Right, I agree with you. So the question was, down the road, do you see us maybe getting a perspective from what the safety culture assessments are actually telling the licensees?

MR. BOUCHARD: Oh, in that light, yes, it -- yes, from a CNSC staff oversight perspective, we are -- in parallel with the reg doc development, we are working on developing an oversight strategy at the CNSC to enable that to come through, yes.

MEMBER VELSHI: Thank you.

DR. RZENTKOWSKI: If I may complement this response, safety culture is really a crosscutting issue. So a self-assessment, it’s only one source of information we do consider. As a matter of fact, we look at safety culture elements, or a reflection of safety culture, in almost all activity conducted by the licensee. We look at this almost under every single safety and control area. So the important element to properly evaluate safety culture is a proper integration of the findings. Once again, the self-assessment performed by the licensee is only one source of information.

MEMBER VELSHI: So what I was getting at here -- clearly I’m not getting -- doing a good job of that -- is Hydro Quebec did a safety culture self-assessment and there is one line that said that it was done. I think it will be interesting to see so what exactly did the safety culture assessment show and what’s the licensee doing about that. And so my question was, are we going to be seeing that down the road?

DR. RZENTKOWSKI: At the current time, this is our regulatory expectation, so I presume the licensees would not shy away from sharing some of the findings of their self-assessment. Once again, we would prefer this to be shared by the licensees at this point in time because this is not a strict regulatory requirement we are trying to impose and it's not our assessment as well.

THE CHAIRMAN: Let me jump in. As Andre said, I think there is a discussion paper that's going around that tried to make the safety culture -- that in some quarter, particularly when you talk to our engineers, is it seems like fluff -- a little more rigorous and regulatory precise so you can actually put some real measures into it which will be in this document and will be consulted in the industry and will put some more rigour about reporting about safety culture indicators. So it's going to be maybe performed by the licensees, but the discussion is now about what are the indicators that show that you actually do have safety culture insight.

It's a topic which is an international topic. The Americans are going for the same thing and it's an interesting kind of new frontier to try to deal with human factors.

Okay, Dr. McEwan?

MEMBER McEWAN: So I have a fairly broad question; as a new member, I hope you can just help me understand a little bit.

When I read the document, which was remarkably well written, coming to it first time I have to congratulate you, but what is not clear to me is the nuance between satisfactory and fully satisfactory.

As I read through the document I'm not saying it's random but it's not clear that there is a robust -- really robust quantitative underpinning to it. Can you help me there?

And the second part of that question is there a target for the licensees that they would expect to have eight indicators fully satisfactory by a given period of time or is this really an operational piece identifying that satisfactory is satisfactory?

DR. RZENTKOWSKI: Greg Rzentkowski, for the record.

I will try my best to help you to understand better what we have done. So we developed this process approximately five years ago. As a result of this process, we assessed several hundreds of inspection findings and desktop reviews, review results.

We categorize them in accordance with the safety and control areas and then we perform calculations which end up providing us an arithmetic average from all our findings. Then we sum it up using weighing factor for the safety and control areas to obtain a single number at the end, and this is a percentage.

Now, if we are in the range of 60 to 80

percent this is a satisfactory rating. If you are -- if we are in the range above 80 percent it would be a fully satisfactory rating. But 60 percent already means meeting all applicable regulatory requirements, 80 percent means meeting most of the guidance imposed by the CNSC, in addition to the regulatory requirements.

So you can look at this almost as an asymptotic safety goal. It's very -- it's relatively easy to get close to it but it's extremely difficult to get very close to this asymptotic safety goal.

This is the answer to the second part of your question; is there a target for eight or nine fully satisfactory ratings. Yes, it would be great but it will be very difficult to get there.

THE CHAIRMAN: Dr. Barriault?

MEMBER BARRIAULT: Thank you, Mr. Chairman.

I'm looking at slide 23 of the CNSC presentation, and it deals with the safety performance of Bruce Power and the maintenance backlog. And I guess what I'm wondering really is where those maintenance backlogs fit in to the overall picture of fitness for service for example. Is it an important part of fitness for service? Because that's where you would measure it I would assume. And if it is, then at what point does a trigger failure for example?

DR. RZENTKOWSKI: I would ask Mr. Bob Lojk to respond to this question.

MR. LOJK: Bob Lojk, for the record.

You're quite right. The bad maintenance -- going back to Madam Velshi's question too, it's one of the other things that also would show how a plant operates.

In this case over here the priority of the work is always safety systems and goes down on it. So there's certain things that can be deferred and other things that cannot be deferred. We don't permit things that are -- the category that cannot be deferred -- can never be deferred, that's a real -- it's a finding contrary to the plant.

In this case over here, they've got items that -- essentially a job jar that needs to be done. It's not top priority but it should get done eventually.

And what we're finding is that at one time there was a bigger maintenance problem and due to changes in program and staffing and application those -- that has improved greatly.

So right now what is remaining is not any critical stuff. It's essentially the job jar is sitting there waiting to be done, and it's coming down but perhaps it should be coming down on a quicker rate. But none of those systems are applied to any safety items in the plant.

MEMBER BARRIAULT: Is there any measurement on numbers, percentage that you apply this?

I'm following up on Dr. McDill's question really is if everybody's passing the exams then we've got two things to look at, either they know the exam that's coming or else that the exam is not adequate, in terms of continuous improvement, to measure what is it you want to measure.

MR. LOJK: When it comes to maintenance, there are guidelines that our plants are using. For instance, the WANO people themselves that look at the plants, that the licensees retain to look at their plants, have the similar findings as we do.

So while not part of a regulatory climate we do have industry data that we look at to see what is reasonable what isn't reasonable, but it's not numeric because it's not one of the most important parts in our safety review of the plant.

Perhaps Bruce Power would care to elaborate on their methodology for keeping track.

MEMBER BARRIAULT: Thank you.

Does Bruce Power care to ---

MR. HAWTHORNE: It's Duncan Hawthorne, for the record.

I think this is a conversation I've had with the Committee several times before.

One of the things that I think is really important for good reliable operations is what I call equipment reliability. The industry has a practice that is actually uniform right across the plant called the equipment reliability index. And what that does is it takes a basket of indicators, maintenance backlog being one of them, and applies a point score.

So with respect to Commissioner Velshi's comment earlier, I think that equipment reliability index might be one benchmark that would actually stand good comparison. Because, for example, when I've talked about backlogs in the past year and our focus, some of the things that matter to us as operators is eliminating operator walk-arounds, and we have zero of those, which is important because that stresses the operator. So if you have things in a backlog which actually require the operators to do walk-arounds that would be of concern.

So I think, for example, we can talk about the Bruce B maintenance backlog and say it's high against a target, but the force lowest rate in Bruce B, you know, stands in the top decile. So it's the combination of those things, and that's why I personally think the equipment reliability index would actually provide a better all-around view, because there's lots of things that take a plant down and focus on a maintenance backlog alone would be a mistake.

MEMBER BARRIAULT: Thank you.

The next question really deals with the Slide 13 and trip per 7,000 hours of operation for the reactor -- or Canadian nuclear reactor plate compared to WANO. And I guess, are the criteria's the same for all of these plants in terms of reactor -- unplanned reactor trip as for WANO for example? It's Slide 13.

DR. RZENTKOWSKI: Yes, the criterion is exactly the same. It applies in the same way to different technologies, including CANDU reactors and pressurized water ---

MEMBER BARRIAULT: Are these automatic trips produced by the reactor or by the operator? I'm just trying to get my head around what the meaning of this is.

DR. RZENTKOWSKI: I think they are all automatic trips, yes. Yes.

MEMBER BARRIAULT: Okay. They're automatic trips. And are the settings the same for all reactors? They're not, so the criteria are different.

DR. RZENTKOWSKI: The setting -- the criteria for the trip will depend on the specifics of the technology. For example, the CANDU reactors have so-called step-back and set-back functions to prevent reactor trips as a matter of fact. So if there is any abnormal condition during operation of the plant, first set-back or step-back will be activated before the trip of the reactor.

MEMBER BARRIAULT: Okay. Do you care to comment on this?

MR. DUNCAN: Brian Duncan, for the record.

You know, quite simply, yeah, depending on the technology, the trip set points may change or the nature of the trip may be different between a boiling water reactor or a pressurized water reactor, for example. But the principle, the consequence of an automatic safety system having to operate, that principle is independent of technology, independent of reactor type or age.

So having a measure that says how many times does your safety systems have to intervene is a very solid measure and a very good comparator across all the different styles of reactors in the world.

MEMBER BARRIAULT: Okay. Thank you.

Thank you, Mr. Chairman.

THE CHAIRMAN: Thank you.

Just for first round, just a couple of questions. Let me start with Bruce Power. During the summer I saw you very actively introduce some new website, and also during the heat period I think you got a lot of press about keeping Ontario lit up. What kind of reaction did you get for this website?

MR. HAWTHORNE: The reality is that -- and Ontario right now does a review -- long-term energy review where the government are making decisions on the supply max in the province. So as part of that view, and they think that Niagara Falls is powering Ontario. And so one of the things we sought to do -- really, two key things. Firstly, to remind people of the role that nuclear plays, you know, 50 -- 60 percent of the power in Ontario is coming from nuclear and probably today is a good example, a very warm day. And you know, if the performance of the OPG fleet and our own, 60 percent of the power in Ontario at least will come from the nuclear fleet and we want people to know that.

The second thing which was in our application is a way of people calculating their electricity bill. It helps them better understand what the cost is of the various technologies. It’s been pretty well received. It’s been -- you know, a lot of people have challenged those numbers because they don’t believe them. Some people think, you know, sun shines, rain falls, wind blows, it’s all free and should be much cheaper than nuclear and so these numbers surprise them.

So we're trying to deal with general public awareness, as well as influencing decision-makers. I think -- you know, it's been fairly effective and the polling we're doing would suggest this.

THE CHAIRMAN: I was just curious about whether there is enough people who actually go to the site, really interested in the science and the math.

MR. HAWTHORNE: Well, we did offer free stuff as well. That tends to draw people. We said, you know, if you download the app, there'll be a chance to win free electricity for a year. So that -- it's amazing how people will do that.

(LAUGHTER/RIRES)

THE CHAIRMAN: My second question is -- it's based on slide -- on Table 2 on page 8 of CNSC staff and that deals with the certified position. And if you look at the total -- the minimum requirement, you know, I guess my question is, nobody is even close to minimum requirement which -- my question is, is our minimum requirement too low?

Let me put it this way; I just want to answer that because let's look at the math. Just give me the answer and the question is, you mentioned that you have difficulty finding people. I was wondering whether you tried to hire some maybe Gentilly-2 employees that may become available.

MR. HAWTHORNE: So that -- I think there was a question in there. So the minimum complement certainly isn't too low if you wanted an answer to that.

But let me start by saying that we don't problem at all getting applicants. These are very well paid jobs. It's not a problem at all recruiting people. What is a challenge is quickly filling the pipeline. This is a -- and rightly so, it's a difficult qualification to obtain and it takes time.

So I could bring the smartest guy from Harvard and put him on my site and right now, he cannot enter the program until he's been a plant operator for two years.

I have some issues with that, just being honest with you, I think that there are things we can do to improve that. You cannot bring in a rocket scientist and ask him to walk around reading gauges for two years and expect to keep him engaged. I think that's a mistake and I do believe that we can improve upon that process.

So -- and to your second point, yes, we have -- we have spoken to Hydro Quebec who have been very cooperative in trying to place people, but of course, they still have their own activities ongoing right now as they defuel the reactors.

We’ve already recruited a few people from Hydro Quebec. We expect we’ll probably have the opportunity to do a few more. But of course, even if you’ve been a licensed operator of Hydro Quebec for, you know, 25 years, you come on our site, you start again. That’s one of the challenges of getting people through.

So, you know, I think there are things we can do together to meet the intent here because young people want to do this job, but it just takes time. You know, if I brought a smart person, it’s five years before he can operate the desk starting today and that’s a long time.

THE CHAIRMAN: Staff, am I misunderstanding Table 2 here?

DR. RZENTKOWSKI: Mr. Chuck McDermott will respond to this question.

MR. McDERMOTT: It’s Chuck McDermott. I’m the Director of Personnel Certification Division for the CNSC.

So the minimum shift complement -- the minimum number there is based is based on the number of crews that a licensee has and how many certified staff are required by licence for -- to be in the control room at any given time.

So for example, if you look at Point Lepreau, they have so many crews so each one of those crews has to have a shift supervisor and each one of those crews has to have a control room operator, the same for Bruce, Darlington, Pickering.

The number is different for a multi-unit station because they have to have more, but that is the number that we're using there. It has nothing to do with should they have more. The licence requires them to have one shift manager for Bruce A, one control room shift supervisor and six authorized nuclear operators or control room operators.

THE CHAIRMAN: But my question is, the last column is total, right? Total actual? What does that represent? Is that not so -- Bruce A, the number 84, is that the actual certified people on site or is that the minimum complement?

MR. McDERMOTT: No, that's the number of certified staff that Bruce has at -- in their organization.

THE CHAIRMAN: Which is way above the minimum requirement that we set; is that not correct?

MR. McDERMOTT: Chuck McDermott for -- yes, that is correct because they have to have extra coverage in case someone calls in sick. There is a ---

THE CHAIRMAN: I know, I know ---

MR. McDERMOTT: So they have more.

THE CHAIRMAN: Yes, my question -- okay, so my question was exactly, should we not have -- 84 is the number rather than, I don't know, 50.

Anyhow, this is something that I will need some -- a little bit more discussion and ---

MR. DUNCAN: I may provide some clarification just to make sure that things are clearly understood.

That table provides the certified staff content of the minimum complement. Minimum complement is also composed of some other work groups like maintainers and emergency response people as well. That must be part of this as well.

So minimum complement is also based on normal function, normal operation and also event response which this rests on the analysis that we ask licensees to make and also their evaluation of their own procedures and the people and their training that they need to respond.

So its minimum complement is that. This table provides the certified staff component of that minimum complement.

THE CHAIRMAN: Okay, thank you.

I'd like to move on to the two intervenors.

So this is a written submission that -- it was a written submission by Dr. Sunil Nijhawan, as outlined in CMD 13-M30.2.

13-M30.2

Written presentation by

Dr. Sunil Nijhawan

THE CHAIRMAN: So are there any questions from colleagues?

Dr. McDill?

MEMBER McDILL: There's a lot of information in this submission and it's hard to know where to begin.

So maybe staff could just sort of summarize. You mentioned in the introduction that much of this had been addressed before, but of course, we don't have the benefit of knowing what has been addressed before.

My principle question relates to ASME codes and whether or not they are or are not being followed as is required under ASME and CSA?

DR. RZENTKOWSKI: I understand and I am quite sure we responded to this particular aspect of the intervention as well.

I will ask Mr. John Jin to respond to this question. Chris Harwood, sorry.

MR. HARWOOD: For the record, Chris Harwood; I'm Lead Safety -- Lead for Safety Analysis in the Directorate of Assessment and Analysis.

THE CHAIRMAN: Can't hear you.

MR. HARWOOD: Sorry. Sorry, can you hear me now?

THE CHAIRMAN: Yes.

MR. HARWOOD: Chris Harwood, Directorate of Assessment and Analysis.

The reactors do meet the ASME code. The requirement that Dr. Nijhawan is talking about is a requirement in ASME that they perform certification testing in a certified test facility to prove that the relief valves have a certain capacity. And that's been done for the CANDU reactors and the valves have been certified for the required flow for design basis accidents and that's what the ASME code requirement is for.

That doesn't cover beyond design basis accidents. ASME does not make requirements for beyond design basis accidents.

That has a higher flow requirement and that has been assessed by analysis, by type testing of similar valves and CNSC staff is satisfied that industry has made the case that the relief capacity will be adequate for beyond design basis accidents. But it’s not based on certified testing.

MEMBER McDILL: And it is not required to be verified?

MR. HARWOOD: That’s correct, it’s not required. ASME requires testing for design basis accidents and that’s been done. The assessment for beyond design basis accidents is by analysis, by extrapolation, and that’s been done. But not an ASME requirement, it’s a CNSC requirement.

MEMBER McDILL: The intervenor appears to suggest that other technologies, other kinds of reactors do test to beyond design basis, if I understand the writing correctly. Is that your understanding?

MR. HARWOOD: He points out that the light water reactors have much higher relief capacities. That’s because their design basis requirement is very much higher than the CANDU design. In a CANDU design, the relief is a two-stage process. The first valves to lift relieve the pressure into a holding tank called the degasser condenser. There is no issue with the size of the relief valves that do that initial relief. They’re the ones that are comparable to the light water reactors.

The issue that Dr. Nijhawan is raising concerns the relief from the degasser condenser, the second stage. And that relief takes place a long time later when the reactor is shut down and the heat load is much lower. Therefore the requirement for relief is much lower. And that explains the difference between the light water reactors and the CANDU design.

MEMBER McDILL: This intervenor is obviously very familiar with the industry. Have there been conversations to attempt to explain this with the intervenor?

MR. HARWOOD: Yes, CNSC staff have met with the intervenor on a number of occasions. Industry has held discussions with him on a number of occasions. We've provided detailed responses to his concerns in 2004, 2007, 2009, 2010, 2011, but we cannot convince him.

MEMBER McDILL: I'm not sure if any of the -- OPG or Bruce or Lepreau or Gentilly-2 would care to comment.

MS. SWAMI: Laurie Swami, for the record.

We have with us today a few individuals who can probably answer some of your questions, Mr. Frank Yee, the Chief Engineer from CANDU Energy is here to speak. As well as Fred Dermarkar, our Vice-President of Engineering Strategies. So I'd ask them to come forward and perhaps answer some of your questions.

THE CHAIRMAN: Go ahead.

MR. YEE: For the record, my name is Frank Yee, I'm the Chief Nuclear Engineer at CANDU Energy, previously AECL. I'm accompanied by Albert Lee, who's the Manager for Safety and Licensing and we can both answer any further questions or the question at hand.

On the question that you asked about interaction with Sunil Nijhawan, indeed we did meet with him. And he brought some concerns to our attention, which we took seriously.

We looked at the assumptions that were made in the capacity of the degasser condenser relief valve. And subsequently, we issued a bulletin to industry saying some of the assumptions that we previously considered may be unconservative so have a second look.

Based on that, we within our company did the assessment and we also simulated the capacity of this existing DCRV and we came to the conclusion that the configuration that we had, that the industry had in the CANDU 6s was still applicable and relevant for the beyond design basis accident that was considered.

Similarly, the utilities that were not CANDU 6s, did their independent assessments came to the same conclusions. So we shared this information with the industry and collectively we did the assessment and we determined that the previous assumptions still held.

THE CHAIRMAN: Let me ask, first of all, is the intervenor here by any chance? Dr. Nijhawan? Okay.

So my -- you know, some of the comments he makes here about CNSC as to the utility to test the valve and they refused to do that, is that a true statement or not? Did utility actually tested the valve?

What I heard you say that AECL did some of the tests, but I don’t know if they were tested by the utilities themselves.

MR. YEE: You have to recognize when these particular valves were designed to procure, it was as a result of an event that happened in Pickering wherein the valves were large, they chattered, they were oversized and led to a small loca.

So based on that lessons learned, AECL determined that proportional smaller relieving capacity leak relief valve with a vibration damping device was appropriate for the design basis accident.

So because it was important also to conclude that the previous accident would never occur again, we did tests at Wyle Labs to simulate the conditions that led to the event at Pickering. So those steps were done and they’re part of the design basis for that particular valve.

THE CHAIRMAN: So, again, let me just quote from his page 7 -- on page 7. This is talking about now beyond design basis.

And the action item should not be closed unless the utility demonstrate that severe accident source term of combustible D2H 2CO can be mitigated without causing a containment failure. I submit that there are no position to make that claim at this time.

Somebody help me with this statement. So you're talking about the design, what will happen in a beyond design event?

MR. LEE: Albert Lee, for the record.

The valves in question, these degasser condenser relief valves for the CANDU 6s or they're called the bleakness relief valve for the Bruce Power and OPG reactors, for many of the stations it's exactly the same physical valve in terms of the physical dimensions of the valve.

And as part of the work that was done by AECL and CANDU Energy subsequently, we went back to the valve manufacturer of the valves and we confirmed with the valve manufacturer that they had data that demonstrated the actual physical steam relief capacity of the valves so that in the accident analyses for the beyond basis accidents, the accident analyses can take credit for the real, physical relief capacity of the valves. And there is data to support that, provided by the manufacturer.

So with respect to the concern that’s been raised in this document, one piece of information that the Commission should be aware of is the physical pressure difference between the inside of the steam generator tube and the outside of the steam generator tube that’s required to be achieved before you will get a physical failure of the steam generator tube is in excess of 27 megapascals.

And in the accident scenarios that are analysed, the pressure, because of the relief through these relief valves and ultimately because of failure, the pressure tubes can never physically reach that high enough pressure to fail the steam generator tubes.

So we are very, very certain that the postulated scenario that is presented in this written submission cannot happen.

THE CHAIRMAN: So just to say -- to try to say what you said in a different language is, if you actually replace them with a larger valve, you’re not buying any increased safety margin?

MR. LEE: Albert Lee, for the record.

If you replace the degasser condenser

relief valve with a valve with a larger relief capacity, then during design basis accidents, it would discharge liquid much faster and empty the inventory of coolant from the heat transport system faster. That is an undesirable direction.

For beyond design basis accidents, if I have already discharged the liquid faster and I reach the steam condition, I will reach the steam condition in the heat transport system earlier.

This will reduce the time that's available for the operator to take action to restore the heat synch and it will shorten the time to when the pressure tube will fail due to thermal stresses causing differential heating of the pressure tube. So it doesn't help.

THE CHAIRMAN: Okay. Staff, are you all in agreement and is anybody from the utilities that can say that they are quite happy and content with the current valve? Because we want to maybe put it on the record about that particular intervention whether we accept the argument or not.

MR. DEMARKAR: For the record, my name is Fred Dermarkar; I'm the Vice-President of Engineering Strategy at OPG.

From a utility perspective, we are satisfied that we have an appropriate design with respect to the bleed condenser relief valves.

As Mr. Frank Yee pointed out and Mr. Albert Lee pointed out, it is important that we have the right size, not the biggest size, not the smallest size; it's an optimization process. The valves that we have in place are -- meet all the design basis requirements, they meet the ASME code requirements.

We have also confirmed that for beyond design basis, we are confident that we will not have a containment bypass. That is what the intervenor is concerned about. He's concerned that if we don't have adequate relief, the first point to relieve will be the boiler tubes which will create a pathway outside of containment. We are satisfied that -- we are confident that that will not happen for a beyond design basis event.

THE CHAIRMAN: Staff?

MR. FRAPPIER: Yes, it's Gerry Frappier; Director General of Assessment and Analysis.

If I could just put staff's overall assessment in perspective here. We've been aware of this concern since way back in 2001. We have had many, many interactions, both with industry, with designers, with valve manufacturers in Germany and with Dr. Nijhawan as well.

We've had multiple, multiple

correspondences back and forth, very technical, very detailed that have looked at all this item in -- very, very thoroughly. And I can conclusively say that our understanding is clear on this, that we have a technically correct perspective and that all of the analysis indicates that his view is in fact not correct in the bigger picture.

For two reasons, two key points here of his analysis that are wrong. One we’ve been talking about, which is the relief valve and its adequacy and, in fact, that we believe that if we went to the direction that he would like it would be an unsafe direction, we would reduce the safety of the facilities.

Secondly, is -- a key point is, as Mr. Dermarkar was just saying, that there will be a big release to the environment due to steam generator tube failure.

That is categorically not what’s going to happen. If it was to -– the accident was to progress to the extent that he’s talking about, which we do not believe could happen, but if we even went that way, then in fact, the pressure tubes would fail before the steam generator tubes and you would have an in core loca, which is an analyzed design based accident that we know how to deal with and would be dealt with by the facilities.

I would also point out that we did request as part of the Fukushima review, as we did with many, many severe accidents, that we have industry relook at them again, do the analysis again, and as Mr. Lee was talking about, that was undertaken.

And I would point out that some of the actions that were taken by industry in response to Fukushima would make this kind of event that he's talking about even more controllable and less likely to cause harm to the environment or to the public.

And finally, I think that as we were just pointing out the end here on the valve, we, as a regulator, would have a very difficult time authorizing industry to put in place what he's suggesting, because again, we would think that that's going in the wrong direction from a safety perspective and we would not typically allow that to happen.

So in general, I think this individual is well-meaning, he has a lot of technical knowledge, there's no question about that. He's been taken very, very seriously over a decade of time now and we are very, very sure that our design, the design that industry is using is –- does not create the kind of problems that he's identified.

THE CHAIRMAN: Okay. I'd like to –- unless somebody has a big question. Ms. Velshi?

MEMBER VELSHI: Again, just on this relief valves, and I don't think we got the answer right on the record, is his statement on page 3 that the CNSC asked the utilities to test the valves and the utilities have refused to do so. Were the utilities asked?

MR. FRAPPIER: Just -- Gerry Frappier, again.

Just to be a little bit clearer, there's perhaps a couple of words that he missed to say. The direction we had was for them to test under further things or do analysis that would allow us to be confident, and that, in fact, has been done.

MEMBER VELSHI: So the analysis was done, the testing was deemed unnecessary, is that the conclusion?

THE CHAIRMAN: Why don't you let him speak directly?

MR. HOWARD: I think we need more chairs. Chris Howard, for the record.

Testing has been done but it was not in –- it was not for -- under the ASME conditions for valve certification. It was for an identical valve, or almost identical valve.

I'm not sure if it was set up for a CANDU, it may have been set up for a light water reactor but its capacity has been tested. And CANDU Energy, AECL at the time, obtained those results and they support the conclusion that the industry and CNSC agree upon, which is that the valves are adequate for the beyond design basis accident.

THE CHAIRMAN: Dr. McDill?

MEMBER McDILL: I have to confess I don't have the ASME section in the top of my head, and I don't think any of us do, but the comment made on page 16 is the installation geometry must be replicated in the test. So if the tests were done for a light water reactor but the geometry was substantially different, would that mean that it hadn't been tested?

MR. YEE: Frank Yee, for the record.

As I indicated, when we bought the valves from the supplier, we also did tests at Wyle Labs. At that time we took great pains to simulate the configuration and set up a pipe from the vessel to the relief valves to simulate and show that there wouldn't be subsequent chatter and damage to the pipelines. So we simulated the actual physical configuration of that line from the vessel to the relief valve.

MEMBER McDILL: So for the sake of argument, if we looked at the 12 points on pages 16 and

17, all of them have been satisfied; is that correct, for design basis accidents?

MR. HOWARD: Yes, for design basis accidents, those are satisfied.

MEMBER McDILL: Thank you, Mr. Chair. Sorry to interrupt.

THE CHAIRMAN: Do we want to move on? Do you have another question?

MEMBER VELSHI: Yes, I have got other questions for this intervenor, just not on relief valves or on this intervention.

THE CHAIRMAN: On intervenor, yes. Go ahead.

MEMBER VELSHI: Yes. Okay.

So the next set of issues he raises is around passive autocatalytic recombiners and their sufficiency for beyond-design basis accidents. And I know staff in their presentation said that with the makeup water and I mean that there would be significant benefit.

But the question I guess I'd like an answer to is, with these additional PARS that had been installed, are they sufficient for beyond-design basis accidents by themselves?

DR. RZENTKOWSKI: I will try to answer this question in two parts.

First the intervenor is correct saying that PARS were qualified only for the design-basis accidents, but I understand that AECL later on extended testing partly to the beyond-design basis accidents and I'm sure that Mr. Frank Yee would be in a position to explain this better.

So the second part of the question is, if we have a large number of PARs installed in the reactor building, and this is the case -- actually the number is significantly larger than what was required by the analysis -- is it going to be more effective?

I cannot give a conclusive answer. The reason is that this will depend on the distribution of the concentration of hydrogen in the reactor building because I believe it's not going to be a homogenous mixture.

For example, if we have molten fuel concrete interaction, there will be a large concentration near the base of the building.   But I understand that industry installed additional PARS in this particular location to eventually mitigate consequences of this potential or postulated accident scenario.

So, from that standpoint, I think we or the industry has done everything of what needs to be done to address the issue of hydrogen production and mitigation.

And we also have to remember that this is only one of the features already installed in the CANDU reactors to deal with the problem of hydrogen generation. It's really a performance-based approach because it involves also makeup water to the steam generators, makeup water to the moderator or, makeup water to calandria. It involves also coolers in the reactor building because coolers, of course, will condensate the steam and in the process probably will mix hydrogen with water.

So there are many other means to mitigate consequences of the generation of the hydrogen in the containment. And of course there is also the last resort which is venting of the containment if it needs to be done.

MEMBER VELSHI: So before CANDU Energy adds anything else, what was the CNSC action in the Fukushima Action Plan? Was it to revisit the number of PARS required for a design basis accident or a beyond design basis accident?

DR. RZENTKOWSKI: In this particular case, we took a very pragmatic approach. We know there will be a benefit to safety and they have to be installed as quickly as possible.

So this was the direction given: accelerate the implementation of PARS in all operating units. And also there is a question about further analysis to make sure that we are not going to miss the points of maximum concentration of hydrogen in the reactor building.

So this analysis is being conducted as well. For the time being, the industry is just installing PARS in a much larger quantity than required and later on we'll reassess effectiveness in comparison to the analytical studies.

THE CHAIRMAN: Go ahead, sir.

MR. DERMARKAR: Thank you.

For the record, my name is Fred Dermarkar with Ontario Power Generation.

A couple of points for clarification: when we talk about installing PARS for design basis accidents, that's absolutely correct, but I want it recognized that the design basis accident for which we designed PARS was an extreme event that today we would characterize as a beyond design basis event.

It was an event involving a large break loss of coolant accident coincident with failure of emergency coolant injection. The accident was selected to maximize the amount of hydrogen that was generated.

On that basis, we designed the passive autocatalytic recombiner locations and in a large containment such as the C6 or the Pickering containment designs, there are approximately 20 in each of those containments recognizing the large volume of hydrogen.

When Fukushima came along and we started looking more closely at beyond design basis events, particularly those associated with a total loss of AC power, and we analyzed those in detail, what we found was that the amount of hydrogen that was generated for a well-advanced severe accident -- by well-advanced I mean if we assume that we weren't able to get water to the steam generators, which we think is a very low likelihood given our new provisions for emergency mitigation equipment, and we assume we can't get water to the moderator, which we think is an even lower likelihood, then the accident progresses to the point where you actually get hydrogen generation.

For that situation, some utilities have already completed the analysis and some are in the process of doing the analysis. And those of us who have completed the analysis have concluded that the PARS that we have are adequate for that beyond design basis event, well-progressed beyond design basis event.

The other thing I would like to note is that the issue of hydrogen is not a new issue. There has been a generic action item and a follow-up CANDU safety issue dealing with the issue of hydrogen and we currently have work ongoing as part of residual activities in support of CANDU safety issue SS5 to close any residual uncertainties around hydrogen mitigation.

So to conclude, our design basis accident was an extreme event that was designed to maximize hydrogen and our PARS were designed for that. Our analysis of severe accidents well-progressed showed that the current PARS design will mitigate that and we are continuing to do some work to close residual uncertainties under the CANDU safety issue for hydrogen.

MEMBER VELSHI: Thank you.

MR. VIKTOROV: Just a complement, my name is Alex Viktorov. I am Director of Reactor Behaviour Division.

So information provided already touched upon various activities we have undertaken to make sure that hydrogen risk is addressed.

The particular concerns that the intervenor raises, that's the action item 1.4, has been closed when he believes it shouldn't have been.

What I need to point out is that the concerns related to hydrogen are also addressed under action 1.3, which is the containment performance including containment performance under severe accidents.

So we are following up on various

challenges to containment input all due to risk under action item 1.3, which is ongoing, and it’s one of the few actions that will be ongoing until 2015.

The action risk is also addressed on the severe accident management activities which is a group of Fukushima action items 3.

So we are very careful in making sure that the industry takes proper care of any risk caused by hydrogen. Thank you.

THE CHAIRMAN: Okay. Unless somebody has a –- do you have another burning question here?

MEMBER VELSHI: Well, I think we should do justice to the intervention. So I do have two more questions and hopefully they won’t be as long.

He raises concerns that there was information requested that was not provided by staff. And again, I think we should just clear the record and just was information in this last round requested that was either held back or just not available?

THE CHAIRMAN: Staff?

DR. RZENTKOWSKI: I would ask Mr. Gerry Frappier to respond to this question.

MR. FRAPPIER: Gerry Frappier, for the record.

So as I mentioned earlier, we’ve had lots of correspondence back and forth with him and I am not aware of any outstanding item that is still to be done or to be given to him. I don't know what it would be.

MEMBER VELSHI: Thank you. Thanks for that.

And my last question is, he is also recommending that for certainly some of the actions before one deems them closed that it may –- there may be merit in getting some independent third-party external review and sign off. And I wondered, based on what's happening around the world, if that is a practice anywhere else. Question for staff.

DR. RZENTKOWSKI: I'm not sure if this is an international practice looking at the regulatory plans and requesting third-party review. But nevertheless, we subjected our action plan to the third-party review. And this was the IRRS mission conducted by international nuclear agency from Vienna. This mission confirmed that our action plan was designed properly and will effectively respond to all lessons learned stemming from the Fukushima accident.

MEMBER VELSHI: Right. So my question wasn't on the action plan but it was on reporting an action as complete.

DR. RZENTKOWSKI: Sorry for lack of clarity on my part. In terms of closure of the actions, no, we don’t request the third-party review. It’s conducted here internally by the CNSC staff and that’s what we consider to be sufficient.

But it has to be recognized that many of the assessment performed by the industry are subjected to the third-party review. And those third-party reviews are being made available to the CNSC staff for review as well.

MEMBER VELSHI: And as far as you know, there are no other regulators that bring in third parties to sign off as something being complete and done?

DR. RZENTKOWSKI: Not to my knowledge, no.

THE CHAIRMAN: Okay. Anything else?

Oh yeah, oh yeah, we have nothing to run to, we have another intervention. Okay, so we’ll move onto the next intervention from the Power Worker Unit, and so this is an intervention by the Power Union –- Workers’ Union as outlined in CMD 13-M30.3.

13-M30.3

Written submission from

Power Worker’s Union

THE CHAIRMAN: And Commissioners, do we have any questions about that particular intervention?

No? I just have one observation. I just want to make sure that what is said here is a very interesting sentence:

> “Unions have negotiated provisions that exceed the regulatory requirements such as the unilateral right of certified GHSC members to shut down unsafe work.”

Is that true?

MS. SWAMI: Laurie Swami, for the record.

Yes, that is true and it’s the Joint Health and Safety Committee is the JHSC.

THE CHAIRMAN: So that’s -– they can actually –- extending to the limit, can they actually shut down a nuclear power plant?

MS. SWAMI: Laurie Swami, for the record.

They can shut down unsafe work with this particular right. We see that as an important part of their right to safe work. And so we don’t encourage it of course, but we would respond should they identify something that is unsafe we would take appropriate management response to that. And should it be that they need to shut down a particular job, they would have the right to do so.

THE CHAIRMAN: Same with Bruce?

MR. HAWTHORNE: So just for clarity, under the *Ontario Health and Safety Act*, any employee has the ability to refuse work on grounds of safety, any employee. It’s not a specific right to joint Health and Safety Committee that like -- to do that; any employee has the ability to refuse any work on grounds of safety.

THE CHAIRMAN: I didn’t relate -- I accept that but I thought that was proactively cause all activity to shut down, not only your own refusal to work. Am I misreading this?

MR. HAWTHORNE: Well, I think what this note says that you’re a number of tripartite agreements in place between an employer and a trade union. So certain agreements said in terms of how you’re going to manage your safety principles, policies and arrangements on site, some of the procedures are tripartite procedures requiring union consent to signing off on those documents.

So I don’t think that there’s a -- you know, any dispute on our part that we do in fact make use and support Joint Health and Safety Committees.

Joint Health and Safety Committees, again, are mandated by the OCEA requirement. You know there have to be a certain number of committees so that every employee has access to representation in that regard. So it’s certainly the case that all of those committees do -–

can exist on our site and we do work with them in a collaborative fashion.

THE CHAIRMAN: Okay. Thank you.

Do we want to start second round?

MR. LEBLANC: It's either that or we take lunch now and come to second round. You have at least another hour to go. You might have a little break now.

THE CHAIRMAN: Okay. We are breaking for lunch and we will back at 10 to two.

DR. RZENTKOWSKI: With your permission, Mr. Chairman, could we clarify on the question posed earlier today on accident frequency? It will take only one minute.

THE CHAIRMAN: Go ahead.

MR. SIMS: David Sims, for the record.

Referring to the accident frequency figures in Figures 13 and 14 on pages 32 and 33 of the NPP report, first, I'd like to inform the Commission, and as you are probably aware, there are many health and safety indicators using different terminology such as lost time injuries, medically treatment injuries, totalities, disabling injuries, minor injuries, just to name a few.

In searching for organizations to compare the Canadian power industry against, we found accident frequency indicators that consisted of three components.

The three components being the lost time injury, medical treatment injury, and fatalities. And also we found others that consisted of just one component, the lost time injury.

So in Figure 13, what we see there is for the Canadian industry sector, it's just the one component, the lost time injuries that's being shown. Whereas for the CN –- or for the Canadian nuclear power industry in that same Figure 13 we show the three components. So the accident frequency in Figure 13 is for the Canadian nuclear power industry consists of the three components: lost time injury, medical treatment injury and fatalities.

So for CEA, what you see in Figure 13, the Canadian Electricity Association, you see values ranging from .6 to .8, and that's based on just the lost time injuries.

If we go to Figure 14, we see all three components being used. So it's the components of the lost time injuries, the medical treatment injuries, and the fatalities. So if we focus on the Canadian Electricity Association, the values range -- they're higher, they're between two and three. And that's because the three components are being used.

So in summary, the figures are accurate. Figure 13 shows just the lost time injury for the Canadian energy industries but it shows the three components, lost time, medical treatment and fatalities for the Canadian nuclear power industry, whereas for Figure 14, it shows the three components for all cases, for the workplaces and for the Canadian Electricity Association, for CNSC and Canadian nuclear power industry.

THE CHAIRMAN: So I assume you'll have to explain this. In the text itself I'm not sure we all caught the explanation here. If…

MR. SIMS: David Sims, for the record.

Yeah, I can refer to that. Yes, we do mention that in the text, perhaps not shown so clearly in the visuals themselves in the figures.

THE CHAIRMAN: Yeah, because you're using -– they both access the same terminology. I think you may want to add that they are different components.

MR. SIMS: But I'd like to point out too that the message is that even if we use the three components for the Canadian nuclear power industry, it's much lower than the one component for the Canadian energy sector.

THE CHAIRMAN: Okay. We are –- we will reconvene at 10 to two.

--- Upon recessing at 1:03 p.m./

L'audience est suspendue à 13h03

--- Upon resuming at 2:01 p.m./

L'audience est reprise à 14h01

THE CHAIRMAN: Okay, we are back and ready to start round two of questions. And I'd like to start with Dr. Barriault.

MEMBER BARRIAULT: Mine is just, I guess, an editorial comment. If you look on page 57 of the presentation by CNSC, and I don't know if the gauges are too small or what the problem is with that picture, but he seems to be having trouble seeing that panel. Maybe someone can explain to me what the problem is. I hope it's not the regular control panels in the ---

MR. CORCORAN: Peter Corcoran, for the record.

MEMBER BARRIAULT: Page 57, 5-7.

MR. CORCORAN: Fifty-seven (57) is the final slide, is that what you're referring to?

MEMBER BARRIAULT: No, not the slides, the page 57 of the presentation, it's 3.23, report operating performance. It's a CNSC employee, by the way.

THE CHAIRMAN: And he's not a mature one, looks like a rather young one.

MEMBER BARRIAULT: He's got visual --

that's right.

THE CHAIRMAN: He doesn't see or he's surprised by what he sees?

MR. CORCORAN: He's reading the gauges.

MEMBER BARRIAULT: But the question is, is the control panel instruments all that size or are there different sizes really that are more user-friendly? That's all.

MR. LOJK: You're talking about the gauges?

MEMBER BARRIAULT: Yes. We look at all these things, you know.

MR. LOJK: Yes. Normally, that sort of panel, that's the type of gauge that you have. It's not a needle, it's a -- there's a real technical term for it, but it just rotates around. So it's quite easy to see, actually. It's designed for you to see exactly what you need to see. So if it's beyond the point where you need, it's you know immediately there's a problem.

MEMBER BARRIAULT: It's got nothing to do with the human instrument interface?

MR. LOJK: No, no, no. It's -- you get only the information you need to see and everything else it's not immediately required.

MEMBER BARRIAULT: Thank you. That's all, Mr. Chairman, thank you.

THE CHAIRMAN: Sorry. Dr. McDill?

MEMBER McDILL: Again, a kind of an editorial comment. I don't want to belabour the fact that if everyone in the class is getting a really good mark, there's something the matter with the professor.

Can -- is there some way of maybe stressing some of the challenges or introducing some of the challenges a little more?

DR. RZENTKOWSKI: To stress more -- Greg Rzentkowski, for the record.

I would like to clarify the question. To stress challenges in the report itself or in the presentation?

MEMBER McDILL: Challenges the industry is experiencing or indeed that staff is experiencing dealing with industry.

DR. RZENTKOWSKI: Yes, this is the NPP performance assessment report so the focus is definitely on the licensees and the reactors; any challenges that affect us, but in an indirect way. And I thought that we did it this time around, but if this has to be highlighted stronger, we'll look into it, by all means. Thank you for this comment.

THE CHAIRMAN: Well, let me give you a topic that you can talk to us about, a little challenge.

We've been hearing a lot of challenge with PSAs, we have had PSA discussion in Darlington, we had PSA discussion in Pickering. And presumably everybody in the industry is learning from each other.

So whenever -- if Darlington comes to us for a license renewal in 2014, Bruce coming to us for a license, I assume that the PSA will be fixed by then.

DR. RZENTKOWSKI: That's the correct assumption, but I would like to rewind back a little bit and state that this report was at the final stages in March or April of this year.

Back then, PSA wasn't a challenge yet. The only challenge we had was to make sure that Pickering A will complete the PSA by December of 2013. This was already a licensing condition and it was captured in the license condition handbook. This was the only thing which we had, which we consider to be a challenge.

THE CHAIRMAN: Dr. McDill, want to pick up on another topic?

MEMBER McDILL: My second question is back to some -- in some respects to the intervenor on ASME codes.

The ASME codes were written before Fukushima. Is it likely that an ASME committee will get together and decide that valves should be tested for beyond design basis accidents?

DR. RZENTKOWSKI: I would like to answer this question in more general way first. There's a significant difference between design requirements and testing requirements supporting the design basis and beyond design basis accidents.

So for the design basis, we have to use conservative safety analysis and also the design codes for the design aspects of the design of the reactor.

For the beyond design basis accidents, we use best estimate and uncertainty analysis and in terms of the design, we use the best technology, which is practical for a given application. But it doesn't mean that this best technology has to meet the design requirements or the standards.

So in order to decide on how the standards would be applied to beyond basis accidents, I think the international community has to first decide what is the approach for the beyond design basis accidents.

We introduced many terms like design extension conditions, complementary design features. To describe everything what goes beyond the scope of design basis accidents. But really, in my opinion, we have to redefine the definition of design accidents so that it will include certain design feature, which are absolutely necessary, for example, to meet safety goals or make implementation of severe accidents management guidelines effective.

If we decide on that, then of course the next step will be to finalize the standards which can support us in finalizing the design of the features, which need to be included to extend the design basis.

I think it's a two-stage approach -- to answer your question.

MR. LOJK: If I may, Dr. McDill, having sat on several committees, I know for instance that the CSA –- and they can confirm -- the CSA personnel are in the audience –- are looking at things.

How we can –- as Dr. Rzentkowski said, how we can increase the breadth and scope of the design and the standards in order to encompass the uncertainties.

But one of the things –- that in previous areas when standards were changed and testing cards were changed, there were, you know, systems –- piping systems get tested to 2.5 times the operating pressure. So you can see from a Fukushima, somebody may say, well perhaps the right amount is three times that and so on.

So rather than change the design basis itself, the safety allowance to cover the uncertainty is increased.

But I don't see that in the short term, but I know that the CSA right now has instructed its groups to start looking at the standards in a broader sense, and the CSA people can correct me if I'm wrong.

MEMBER McDILL: I should offer industry a chance to comment if they wish.

MR. SAUNDERS: Frank Saunders, for the record.

It's a much more difficult area to look at than it appears, and it's mostly because of the lack of certainty around –- beyond design basis. But in the design basis you have –- as Mr. Lojk pointed out –- all your design base calculations, all the information you need to do that.

When you get out into beyond design basis, the uncertainty about what the actual conditions are changes. So the approach of broadening out things like your tolerance bands and that is probably a better one than trying to do a calculations which may or may not actually mean anything in the end of the day.

So yes, industry is looking at it, and yes designers and standards people are looking at it. Not sure where it'll all come down, but there will be something coming out.

THE CHAIRMAN: Go ahead.

MS. CIANCHETTI: Hi. For the record, I’m Mary Cianchetti from CSA Group.

I just wanted to follow-up on Mr. Lojk's comment that CSA is reviewing all of its standards, and we do reference ASME documents in light of Fukushima and lessons learned.

We are going to be presenting a report to the Commission by the end of this year on exactly how we plan to do that. But they are being looked at and our standards are being revised at the moment.

MEMBER McDILL: Thank you. I'll wait with interest.

MR. ELLIOTT: It's Mark Elliott, Chief Nuclear Engineer for Ontario Power Generation.

Just -- maybe a point on how we’re dealing with it right today. We're making modifications in the plant and adding equipment that are solely due to effect and to address beyond design basis events.

So what we have done in OPG is write a guideline that I have signed, that gives the design engineers guidance on how to do that and that guideline has been shared with the industry and we want to get input from others as well.

So we're starting down that path that you mentioned.

MEMBER McDILL: And would that guideline -- since we're talking about this particular intervention, would that guideline apply then to this intervenor's concerns?

MR. ELLIOTT: The way we -- actually the answers you heard this morning or before lunch would be the way that this would be handled.

MR. HOWARD: If I may, I'd like to make a comment on this point.

The approach that's being adopted internationally, as far as we can tell, and is being proposed for Canada is -- as Greg was explaining -- we don't expect the same high degree of conservatism for beyond design basis accidents as we require for design basis accidents.

So we are looking to set up a set of guidelines really for beyond design basis accidents, and a lot more judgement will be used. And I think that's already being done for this particular case.

We have looked in quite a lot of detail at the conditions for beyond design basis accidents for these relief valves and are satisfied that they are adequate.

How it will be codified, that's something for the future but we already have adequate confidence that they work.

THE CHAIRMAN: Thank you.

Ms. Velshi?

MEMBER VELSHI: Thank you.

A question for point Lepreau. Page 8 of the NPP report, again, getting back to the number of certified positions. For your shift supervisors, the minimum required is six and they are actually seven. I just wondered, does that give you enough margin of –- you know if someone –- a couple of people call in sick?

MR. GRANVILLE: Sean Granville, for the record.

Yes, having seven certified shift supervisors to cover six spots does –- you know is not where we'd like to be in terms of having some margin. That position will be filled if someone calls in sick –- and is being filled.

We have three current trainees that are in the program that are in the simulator portion of their training program, and we have high confidence that they'll be successful. They will be in a position to be certified in early spring next year.

But in the meantime, yes, having only seven spots to cover six crews is a concern.

MEMBER VELSHI: Okay, I have a question for Bruce Power. In the report –- and I think it's Slide 23, there's mention made of hours of work limits being surpassed. Maybe the term was frequently, but it wasn't a rare event.

And I just wondered after all these years of operation, like why would this not be better managed? Is this a case of –- I don't know –- sloppiness or –- why would this still be an issue?

MR. SAUNDERS: Frank Saunders, for the record.

So in this case it's related to the Bruce A operation and –- the you know, a bit of –- what we referred to this morning –- as we've increased the number of reactors on site, it's been a bit of a challenge to keep up with the training and get the certified number of people.

So typically we will staff to about 150 percent of the minimum, and that's partially to do coverage on shift and partially because we want the experienced people in the plant doing other duties because that experience is very useful.

At Bruce A we are currently sitting at 37 out of 30 on the ANOs. So, it does leave us at some risk for emergency call-ins right, so it's not about scheduling people to work extra hours, it's about unexpected events; somebody has a death in the family, they get sick or they get ill, short term, and sometimes that means you can't get the coverage as quick as you'd like. So we meet the requirements.

The other thing that's important to point out there is that the six ANOs minimum complement, only four are actually required in the control room. So the other two are there for breaks and coffee, you know sort of to give the other four guys on the panel a chance to rotate out for coffee and lunch.

So if you have one person who's on extended you can't put him rest and that's indeed what our procedure requires you to do. If they're there for extended hours you give them different times of rest depending on how long they've been there. And we don't put them on the primary on the panel if they're on extended hours. So that's been the issue.

We've done an internal assessment. We have an expert group actually coming in to have a look at our whole fitness for duty program, and just make sure we’re doing it as well as we think we are.

So-- and of course we have nine people in the pipeline coming through there so very shortly we'll be out of that issue sometime, sort of early next year.

MEMBER VELSHI: And is this limits of hours of work, is that a federal kind of HR law?

MR. SAUNDERS: There's kind of two sets.

Sorry, I assumed you addressed that question to me.

There's CNSC requirements, which when we're talking the rotating 12-hour shifts, those are CNSC requirements. There are provincial requirements and hours of work as well, but they're not nearly as precise –- I guess I might say –- as the hours work.

So all people who are working 12-hour shifts have fairly stringent time off between shifts and so forth, and so we're talking about either extended shifts it means beyond 12 hours, or perhaps it means you didn't get the three days off between shifts, you got two days or a day and half.

So it's –- there's a number of ways that you're outside the limits, but those are CNSC set limits.

MEMBER VELSHI: And I have a quick question for Hydro-Quebec.

What's your timeline for submission of your decommissioning plan and your revised financial guarantees?

MR. GÉLINAS: Claude Gélinas.

Comme nous l'avons dit à notre -- à l'audience du mois de mai, ça va être au début de 2015 que ces documents-là devraient être complétés pour l'argent là

-- la garantie financière va être accordée pour être sûrs qu’on est à la bonne place.

MEMBER VELSHI: Merci.

LE PRÉSIDENT: Et quand est-ce que vous avez -- vous allez décider la place finale pour les déchets?

This is a question for everybody. I would like to hear from everybody what's the final configuration of waste management, decommissioning waste, things like that.

I guess maybe I should elaborate.

As you know, in the Pickering hearing, we didn't get a lot of clarity about where all the waste is going to reside. Everybody, on the fuel waste, we all assume that eventually there will be a fuel repository.

I'm talking about the non-fuel waste, where is it going to end up?

What's the current plans?

Alors, je vais -- j’aimerais commencer avec Hydro-Québec.

M. GÉLINAS: Claude Gélinas.

Présentement, ce qui est en marche c’est, bien entendu, les installations qu’on a sur le site sont adéquates pour tout ce qu’on va faire dans les prochaines années pour se rendre jusqu’à la fin de l’état de stockage sûr à sec.

Pour ce que est de 2050/2055 quand on va être rendus au déclassement, je ne crois pas qu'il y a beaucoup de travail de fait encore à ce niveau-là à part les travaux qui se font par l'Association là de 'waste management' là qui se fait avec le groupe là.

LE PRÉSIDENT: Alors, pour le moment, c'est les déchets restent au site?

M. GÉLINAS: C'est exact.

THE CHAIRMAN: Anybody else want to talk about OPG?

MS. SWAMI: Laurie Swami, for the record.

OPG has a plan for low and intermediate-level waste.

Currently, all of the waste that's generated through our operations or refurbishment is either stored at our facilities through refurbishment or transferred to our nuclear waste management facility at our Kincardine location. That would be for wastes that are generated by OPG-owned or leased facilities.

For low and intermediate-level waste that could be generated during decommissioning, our current plan would be to transfer that to the low and intermediate-level waste deep geologic repository that's currently going through the regulatory approval process.

That program, currently for regulatory approvals, specifies that it would be from operations and refurbishment waste.

However, we recognize that any low and intermediate-level waste that we generate would be stored in that facility and, when that waste is generated, we go -- we would proceed through a regulatory approvals process that would allow us to use that facility as well.

THE CHAIRMAN: So there is no question of a third DGR? Let me -- just to be really clear.

MS. SWAMI: Laurie Swami, for the record.

There is no plan for a third DGR operated by OPG or, for that matter, any other operator that I'm aware of.

THE CHAIRMAN: Point Lepreau?

MR. THOMPSON: For the record, it's Paul Thompson, Manager of Performance Improvement and Regulatory Affairs.

At present, our low and intermediate wastes are stored at our on-site solid radioactive waste management facility.

The low-level waste goes through a volume reduction process. In the longer term, we have ongoing discussions with our other utility partners and with the Nuclear Waste Management Organization in terms of where we're going to put it in the long-term.

THE CHAIRMAN: Thank you.

Ms. Velshi.

Dr. McEwan?

MEMBER McEWAN: So through the report, there were comments on dose to public and the fact there were no limits being achieved.

How are those values obtained?

What confidence do you have in the calculations that there is truly the low-level that you claim and are you convinced that the data are robust?

For each of the presentations you showed us, one slide on dose to public.

DR. RZENTKOWSKI: I would like Ms. Caroline Purvis, Director of Radiation Protection Division, to respond to this question.

It's Patsy Thompson, Director General.

MS. THOMPSON: Patsy Thompson, for the record.

The question was on doses to members of the public and the confidence we have in those numbers.

Essentially, the doses to members of the public are arrived at by a combination of methods. The first thing that is done is the calculation on the basis of 1-millisievert per year, which is the regulatory dose limit, a value -- an amount of radio-nuclide that would be released to the environment that would result in 1-millisievert dose to a person, led by that person's lifestyle, would ensure that that lifestyle has been most exposed and that members of the public are generally below 1-millisievert.

That's essentially a level that is determined using what we call “pathways analysis”. So we essentially take into consideration the source of the radio-nuclide, how it's released to the environment and, using the knowledge we have on the behaviour of that radio-nuclide in the environment, we know how it will move through the atmosphere, the soil, the vegetation, and eventually expose people.

So all of that information is taken into account and taken into consideration as well the certainty in terms of the knowledge we have on that behaviour.

That essentially sets the basis and allows us to have models we can use to predict doses during operation.

And so the very low doses that are being reported use a combination of that model and environmental monitoring information and so the licensees have to submit to the CNSC a detailed environmental monitoring program based on the CSA standard and, before the CSA standard, based on good science. The CNSC staff review that program and accept it.

We also do verifications, like inspections of the monitoring program, to make sure it's implemented correctly and that the values that are being measured are accurate and representative of the environmental media.

So all of that monitoring information is then used with the pathways model to say if there's an individual living next door to a power plant, for example, we will use the levels measured in water, in foods, in air, to estimate a dose to that person living in that area. And so we have confidence in that information.

And some radio-nuclides are released in such low levels that they're not detectable in the environment and so, in those cases, what is used conservatively are the levels measured at the stack and then we project, using the models, what would be the exposure of the person. That's conservative because, in some cases, it's not detectable in the environment.

THE CHAIRMAN: Thank you.

Monsieur Harvey?

MEMBER HARVEY: Merci, monsieur le président.

Question qui s’adresse surtout à Hydro-Québec sur la surveillance des structures de l’enceinte de confinement en béton.

À la page 28 de la version française, à la fin du dernier paragraphe:

> « Il est prévu qu'Hydro-Québec soumettra en 2013 une mise-à-jour de son programme d'inspection pour tenir compte de l'état de conservation sure de sa centrale et du déclassement à venir. »

Est-ce que ça veut dire qu'il va avoir -- que les exigences vont être moindres pour le confinement et que simplement certains éléments vont être exigés ou?

Pourriez-vous juste -- je demanderais premièrement au personnel d'élaborer un peu sur ça là.

Est-ce que les exigences demeurent les mêmes que le confinement des autres centrales ou que il va avoir un relâchement étant donné que la centrale ne sera pas en exploitation?

M. POULET: Merci. Benoit Poulet, pour l'enregistrement.

Les discussions présentement entre nos spécialistes au sujet des programmes d'entretien pour les enceintes de confinement sont présentement en cours et il est fort probable que la norme qui serait applicable serait une norme autre que celle qui est dans le présent permis.

Et je demanderais à M. Andrei Blahoianu pour compléter la réponse ou demander à M. Gélinas de compléter.

M. GÉLINAS: Claude Gélinas.

Effectivement, comme l'a dit M. Poulet, on est en discussions sur les changements que cela apporte.

Bien entendu, le bâtiment du réacteur n'aura plus à subir de pressurisation n'ayant plus de combustible à l'intérieur. Et d'ici un an ou un an et demi, n'ayant plus non plus de produits radioactifs volatiles -- donc, les quantités d'eau lourde font être sorties du bâtiment -- ça va demeurer un bâtiment, une structure qu'il faut maintenir en état de -- il ne faut pas qu'elle tombe, qu'elle reste correcte, mais ça ne sera pas -- du côté confinement, les normes vont changer et les essais et les exigences vont changer aussi.

C'est ce qu'on est en train de discuter avec -- il y a déjà des pas de faits mais on n'a pas tout complété.

MEMBRE HARVEY: La même question s'applique au programme de gestion du vieillissement et du cycle de vie.

Est-ce que le programme -- la notion du vieillissement va se limiter aux piscines ou ça va être plus large que les simples piscines et, disons, la gestion des déchets?

M. POULET: Benoit Poulet, pour l'enregistrement.

Effectivement, il y a les programmes -- le programme va être -- ou l'envergure du programme va être réduite au système qui demeure en fonction.

Il y aura toujours des systèmes qui seront mis en place et qui devront demeurer en place pour la prochaine période d'état de stockage sûr. Pour ces systèmes, il y aura des programmes de gestion de vieillissement.

Les autres systèmes en centrale qui ne sont plus en fonction, qui n'auront plus de -- qui seront asséchés et puis mis en dormance et non requis, les noms vont être -- le programme de vieillissement ne s'appliquera plus.

Encore une fois, nos spécialistes sont en discussion avec les spécialistes d'Hydro-Québec à ce sujet-là pour -- et les systèmes qui devront demeurer sous le programme de vieillissement, il y a une liste d’élaborée et puis les deux côtés regardent pour s'assurer que la liste est complète.

MEMBRE HARVEY: Mais vous avez déjà eu de l'expérience parce que d'autres centrales ont été mises en état d'arrêt sécuritaire. Donc, vous avez déjà des critères j'imagine.

Vous pouvez déjà mentionner, Hydro-Québec, vos attentes parce que vous avez déjà l'expérience?

M. POULET: Benoit Poulet, pour l'enregistrement.

Effectivement, il y a de l'expérience en industrie dans ce domaine. Il y a toujours des différences au point de vue conception particulière à une centrale qui pourraient changer la liste mais, effectivement, il y a de l'information et de l'expérience dans le domaine, oui.

MEMBRE HARVEY: O.k., merci.

THE CHAIRMAN: Monsieur Tolgyesi.

MEMBRE TOLGYESI: Merci, monsieur le président.

What you're mentioning on the page, I think it's 50, regarding the statistics, that accident frequency was 0.8 at Bruce:

> "… an increase from 0.04 primarily due to including the number of medically treated injuries."

Does it mean that now statistics reflect through all nuclear power plants that medical aids are included or is somewhere or some site which is different?

DR. RZENTKOWSKI: We try to harmonize this requirement across all utilities.

And I think we are successful in doing so but I will ask Mr. Peter Corcoran to confirm.

MR. CORCORAN: Peter Corcoran, for the record.

Yes, that is correct. In a letter, last year, we asked all the industry participants if they would be kind enough to report this particular performance indicator according to the rules used by the Canadian Electrical Association.

Currently, they don't necessarily follow that with one and there's a variety of ways to report. But in doing so, we've been able to keep the number of medically-treated injuries, loss of time injuries and fatalities at the station combined into this accident frequency that's measured and that's for all Canadian nuclear power plants.

MEMBRE TOLGYESI: J'ai deux questions, monsieur le président, pour Hydro-Québec.

Vos fréquences d'accidents et vos sévérités ont augmenté.

Est-ce que, même si la centrale met fin à l'exploitation commerciale, -- ah oui! Ce que vous dites aussi que ces types d'accidents sont surtout dus pour soulever et déplacer les objets.

Ce type d'accident-là ou cette activité-là, malgré la fin commerciale, va demeurer.

Qu'est-ce que vous faites comme programme pour baisser cette fréquence-là parce qu'elle est pas mal plus élevée que les autres centrales?

M. GÉLINAS: Claude Gélinas.

Si on regarde les statistiques de 2012, c'est le premier six mois de 2012 qui a été plus élevé et, à partir du mois d'avril à peu près en 2012, on a commencé à mettre en place un tas de choses pour s'assurer que ça s'améliorait et ça a porté fruit dans la deuxième moitié de 2012.

Pour vous donner des exemples, on a fait des rencontres avec les cadres pour les sensibiliser à leur travail face aux employés, être sûrs que les employés travaillaient de façon sécuritaire. Il y a un énorme plan de communication qui a été mis en place. On a fait venir une personne de l'externe; c'était une conférence sur les conséquences d'un accident grave. C'est une personne qui avait perdu l'usage de ses jambes à cause d'un accident de travail, une inattention lors d'un travail. Il a tombé puis il en a perdu l'usage de ses jambes.

Donc, ça, ça a sensibilisé beaucoup nos gens à faire attention à leur travail qui leur paraît bien ordinaire bien souvent.

Et je peux nommer beaucoup d'autres actions comme ça.

Les plus importants, surtout ceux qui ont eu trait à des déplacements d'objets ou des choses comme ça, chaque fois qu'on en a un, on demande à l'équipe de maintenance, parce que c'est majoritairement les gens de maintenance à qui les incidents arrivent, on leur demande d'arrêter et de réfléchir en groupe à l'événement qui venait d'arriver, trouver les solutions pour être sûr que ça ne se reproduise plus.

Et ça semble porter fruit depuis -- on est rendu à peu près à 112 oui 115 jours sans accident avec perte de temps en 2013 depuis le mois d'avril à peu près.

Ça fait que nos chiffres de 2013 sont beaucoup mieux que les chiffres de 2012.

MEMBER TOLGYESI: And the last question is to staff. It regards also Gentilly 2.

On page 85 of your Fire Emergency Preparedness and Response, you're saying that:

> "Because of the decision to end commercial operations and transition to safe shutdown, CNSC staff did not conduct any inspection of fire emergency preparedness and response."

Does it mean there is no -- anymore, any risk or it's some other reason?

DR. RZENTKOWSKI: Greg Rzentkowski for the record.

The risk still exists. The risk, of course, has been lowered by the fact that the station is not operating anymore and has been already -- is in the process of defueling. But nevertheless, fire protection equipment has to be put in place and a fire protection program has to be fully effective.

With regard to those inspections, I will ask Mr. Ben Poulet to explain why we decided to defer those inspections for the later time.

MR. POULET: Thank you, Dr. Rzentkowski.

That is correct. Because of the ---

M. LEBLANC: Excusez-moi, si je peux?

M. POULET: Oh, pardon. Oui?

M. LEBLANC: Puisque on parle de Gentilly, si on pouvait répondre en français, s'il vous plaît?

M. POULET: Oui, je m'excuse.

Lorsque les -- la décision de mettre la centrale à l'arrêt, d'arrêter l'exploitation commerciale a eu un impact sur les activités de conformité du personnel de la CCSN.

Tel que mentionné par Dr. Rzentkowski, le risque d'incendie n'a pas changé de façon significative mais les types d'exercices qui devraient être faits pour assurer que l'équipe d'intervention est prête et disponible à répondre à des urgences d'incendie, le type peut changer en fait d'envergure, si vous voulez.

Donc, il y a eu des pratiques; Hydro-Québec a continué de faire ces pratiques. Les activités du personnel de vérifier ont peut-être été réduites à ce moment-là pour accommoder d'autres activités de conformité.

M. GÉLINAS: Claude Gélinas.

Je vais peut-être rajouter des renseignements sur ce que M. Poulet vient de dire.

Du côté de l’incendie, bien entendu, il y a toujours un risque d’incendie -- c’est pas à cause que la centrale ne fonctionne plus qu’il y a plus de risque d’un feu dans un panneau électrique -- mais, par contre, les conséquences sont beaucoup diminuées.

Donc, le programme de formation des pompiers a évolué un peu. À l’automne 2012, on a changé l’organisation un peu du groupe qui s’occupait de la prévention incendie et, depuis le printemps, tous nos pompiers sont formés à l’Institut de pompier de Mirabel. Donc, on envoie chaque groupe, pendant une semaine, passer à Mirabel, pratiquer avec les équipements qu’on a.

On a eu la chance d'avoir un prêt d'un de nos confrères de deux camions; un camion pompe incendie qu'on voit dans les villes -- on en a un sur le site maintenant -- et un camion avec des réservoirs avec de la mousse.

Donc, on continue à apporter toute la vigilance possible sur la protection incendie. Bien entendu, ça va évoluer au fur et à mesure que on va aller vers l'état de stockage sûr.

THE CHAIRMAN : Okay, we're going to the third round and it's a free-for-all.

Monsieur Harvey.

MEMBER HARVEY: It's about Point Lepreau.

On page 91 of the report, the top of the page, it's written "NP Power". It should be "NB Power", I suppose:

> "NB Power continue to progress on the transition to compliance with RD-310."

My first question is: What does that mean "continue"?

Because the road seems to be long. Transition includes identifying gaps against, developing principles and guidelines for the safety analysis and the execution of plans. So what does "continue" mean?

And then I would like to hear New Brunswick

Power, where they are in the exercise.

DR. RZENTKOWSKI: Greg Rzentkowski, for the record.

RD-310 is the new regulatory document which is establishing safety assessment requirements which are very consistent with the international practice.

Historically, in Canada, the safety analysis was conducted based on the single and dual failure principle which is very conservative, but it’s different from that which is generally internationally accepted.

So we are trying to align the safety analysis conducted for the CANDU reactors with the international practice and we are starting from the gap analysis to identify what has to be revised.

Unfortunately, the almost entire safety analysis would have to be revised in order to meet RD-310.

So the idea is to identify the gaps and focus first on the priority issues but, at the same time, I would like to ensure the Commission that this is not really -- that the safety of the operation is not a trigger behind this work. It’s mainly to implement modern practices for safety analysis here in Canada.

It was done in anticipation that new power plants would be licensed in Canada. We wanted to have a consistent approach for operating reactors and those which will be relicensed in the future.

So in terms of where exactly New Brunswick Power is with this particular project, yes, we should probably transfer the question over to New Brunswick Power.

MR. THOMPSON: For the record, it's Paul Thompson, Manager of Performance Improvement and Regulatory Affairs.

First, before starting off specifically on RD-310, I'd like to mention that, as part of a plant refurbishment, the deterministic safety analysis was upgraded to CNSC document C6 which was an intermediary safety analysis standard.

And so there was a gap assessment done against C6 and any analyses that weren't already covered off in the original design analysis were performed so that we demonstrated that we could meet requirements in C6.

RD-310 is the next generation of safety analysis standards and beyond that. It's not yet required in the licence. We have done, some time ago, a gap analysis. The CNSC had some questions on that gap analysis and so that gap analysis is being revised.

In addition, we have some discussion ongoing with CNSC staff on portions of that document and we’ve provided some technical assessments stating our position in terms of the applicability of that section of the document that we believe is already adequately covered and we’re in the discussion -- point of discussions with the CNSC staff on that.

MR. VIKTOROV: Alex Viktorov, for the record.

And again, to add to the information already provided, New Brunswick Power, just like the rest of the industry, is moving towards compliance with this new regulatory document.

It actually will be presented in some detail tomorrow as part of the omnibus regulatory document revision.

So we expect a detailed plan from New Brunswick Power as part of a response to Fukushima Action Item before the end of this year but we already know that no major gaps have been identified.

There are still ongoing discussions on some elements of the activities. In fact, we received a submission from New Brunswick Power in May and we are reviewing it and will be providing our response on the ongoing activities before the year ends.

THE CHAIRMAN: Can I piggyback on this?

I guess what surprised me here is a brand new, just refurbished machine, I'd expect it to have maybe not this year, but definitely next year, fully satisfactory everywhere. All the systems are supposed to be new, all the things are supposed to be upgraded, what am I missing here?

I thought that the deterministic and PSA, all of those things would have been done during the four years of refurbishment and all that stuff.

So why are they not fully satisfactory from the get-go?

Staff.

DR. RZENTKOWSKI: Greg Rzentkowski, for record.

So the deterministic safety analysis has been revised during the refurbishment project to account for all new design feature and procedural improvements.

The RD-310 document is the new one, as I explained, which didn't enter into the regulatory space yet. It's covered by the Fukushima Action Item and the industry started evaluating the gaps.

In the case of New Brunswick Power, this document is only referenced in the Licence Condition Handbook as an expectation. So that means that the industry will start transitioning the current safety analysis into the RD-310 framework.

The question was: Why they are not fully satisfactory?

Because meeting regulatory requirements allows only to obtain a “satisfactory” rating. If they had obtained a very significant progress towards transitioning to RD-310, it’s very likely that we will have rated this station as “fully satisfactory” in the safety analysis area.

THE CHAIRMAN: But what I’m trying to understand is it just went through a long time refurbishing everything, all the components, et cetera.

By going into this new standard, do they have to do some new things again?

I’m talking about physical changes, design, components.

DR. RZENTKOWSKI: No, no physical changes are required. This is only the safety analysis.

So, in other words, this is the assessment of existing design feature using new criteria.

But the gaps, we are referring to, are simply the gaps against this other safety analysis framework. Those are not the gaps in the safety assessment of the facility per se.

We are simply changing the approach how the safety analysis is being done. It doesn’t mean that there is any shortcoming in the existing safety analysis.

Actually, in my opinion, the existing conservative safety analysis, which has been applied in Canada since the ‘60s, 1960s, is more stringent, more conservative than the international practice.

THE CHAIRMAN: Thank you.

New Brunswick, do you want to add anything to this?

MR. THOMPSON: For the record, Paul Thompson.

I concur with everything Dr. Rzentkowski has said.

I just wanted to make it clear, when we began setting what was going to be done in refurbishment, safety analysis was obviously one area where we had to identify what we were going to go. We had to peg standards for which we were going to compare to.

At that time, consultative document C6 was still a consultative document. It wasn’t even issued, it was still in a draft form.

And, in fact, we agreed with the CNSC staff, although that’s not a usual practice, was to try to get to do your analysis to a draft standard, they felt and we agreed that it was the right thing to do because it was the best that was available at the time so that is why we locked on to that document C6. And the analysis was done to demonstrate that we could meet those requirements.

Similarly, Standard 294 for PSA was just coming out and we complied with that. And we had a state-of-the-art PSA back in 2008. So as we went in through and we agreed on the definitions of the refurbishment project, we were state-of-the-art.

In the case of 310, that has come out subsequently. It had come out while there was significant interest in the generation of new reactors. It was originally written for new reactors and expanded to cover existing reactors.

And so really it is an example of the continual evolution and the increasing in standards. And so that’s why it’s looking a little strange that yes, we’ve now come out of refurbishment, why aren’t we in compliance with 310. Well, 310 isn’t even in their licence and it was introduced relatively recently.

THE CHAIRMAN: Okay, thank you.

Dr. Barriault?

MEMBER BARRIAULT: Just a brief question. I know -- this is addressed to NB Power. On your environmental risk assessment, you’re going to be looking at fish and you’re going to have a report available, I guess, in December. But this morning we heard that both the problem associated with the mussels -- the freshwater mussels in the Great Lakes that affects, I guess, all nuclear plants pretty well in Central Canada, but do you people have any problem with the saltwater mussels in the Bay of Fundy at all?

MR. THOMPSON: For the record, Paul Thompson.

We carry out a regular cleaning program for our condenser cooling water, the condensers, as well as for the raw service water, RCW heat exchangers. So it's a usual practice, particularly in the summer months, the mechanical cleaning that is done to ensure that the heat transfer is maintained at a high level to allow the plant to operate either at full power or near full capacities.

So this hasn't been something that has changed though over time; it's something that we've always had to deal with. Periodically, as well, we will do an inspection of the intake bay and do cleaning as needed there.

MEMBER BARRIAULT: So it hasn't created a new problem for you folks though?

MR. THOMPSON: You are correct. It has not created a new problem for us.

MEMBER BARRIAULT: Okay. Thank you.

Thank you, Mr. Chairman.

THE CHAIRMAN: Ms. Velshi?

MEMBER VELSHI: I have two questions on Pickering; one for staff and one for OPG.

For staff, given that Pickering now has a single licence, will future reports just have one set of numbers for Pickering, and if so, how do we do trending or compare with historical performance?

DR. RZENTKOWSKI: To answer the first question, yes, we'll have only one rating for the entire site.

How we can maintain trending over the past few years? I think we'll have to reopen our books. As I mentioned, our rating is now a number, so we can average those two numbers and produce for Pickering an average for the site. This way we'll be able to trend over past four to five years.

MEMBER VELSHI: And besides this -- you know, this fully satisfactory/satisfactory even for things like dose and forced lost rate and so on, it'll be the same kind of opening up the books and coming up with an aggregate number?

DR. RZENTKOWSKI: I think we can try to do it. In some instances, it could be only an approximation, but nevertheless for trending purposes, I think it would be sufficient.

MEMBER VELSHI: Thank you.

And the question for OPG, on page 69 of the report there's a statement that both Pickering A and B have had significant reliability issues with the fuelling machine.

Two parts to the question, one is well, how much does that contribute to your UCLF number and just how significant an issue is it and when do you expect performance to get better?

MR. JAGER: Glenn Jager, for the record.

So the answer, it's around 2 percent contribution to our forced loss and that's represented in two ways. In the worst case, it may delay an outage through FEPO because the fuelling machines are actually busier during an outage because the fuel channel inspections and access to the reactor phase for feeder inspections and so forth. So when we have difficulties there, it results in FEPO and outage extensions which contributes to that.

The second piece is when we lose fuelling capability on either the B units or the A units, it results in derating and that contributes to UCLF. So it's around the 2 percent mark.

On the Units 1 and 4, we're already well into a reliability improvement of the fuelling machines and we're seeing a definite improvement there in terms of reduction of forced loss, deratings, and fuelling machine unavailability, so we're quite happy with the investment that we made on those machines; we're seeing returns.

On Units 5 to 8, it's early days yet. We just started into the very same program on the 5 to 8 machines; same type of investment, same look at preventative maintenance.

We expect the same results and our target would certainly be get it down to less than half a percent; certainly no more than that and certainly less than 1 percent was the project target in terms of total loss as a result of fuelling.

And of course, there's a safety benefit there as well to ensure that the machines are performing reliably at all times.

MEMBER VELSHI: Thank you.

MEMBER TOLGYESI: When you going to page 139, we are talking about the research and development, and at Table C-3, these are issues -- research really to some issues. And we are saying in a brief description that licensees are expected to have programs in place.

And in the notes you are saying that however licensee programs for management of aging -- although the system and components have not been fully, systematically implemented.

So according to the description, there are programs in place but are not implemented. Does it mean that the programs are there but not implemented, so it is not a question or issue of research or to be implemented, the programs require further research?

DR. RZENTKOWSKI: The programs are there, but are not fully implemented in accordance with the new regulatory document on aging management which is RD334.

To my knowledge, currently Pickering, Darlington, and Bruce comply with this document, but I'm not sure if New Brunswick Power complies fully as well.

But at any event, this work is progressing extremely well and I think by the end of this year we'll be in a position to say that all nuclear power licensees comply with RD334.

THE CHAIRMAN: Well, I have a more general comment on these. I don't like the title here. These are research topics, they're not safety issues; are they?

I don't know -- because when you describe some of those research topics, it looks like you've got a serious issue here that we don't know what to do or -- I know in your opening remarks on your slide you tried to deal with this. There were 21 such issues, there's 12 left and you're going to dispose of them by the end of this year if I understood correctly. But are they safety issues or not?

DR. RZENTKOWSKI: Those are opportunities for improvements and opportunities where we want to reconfirm that existing safety margins are still adequate.

The reason is that there are new findings. The stations are aging, so very often we have to start a research program to confirm that the safety margins are in fact adequate.

So it's not a safety issue, but it's definitely an effort directed in reconfirming that the safety margins are adequate.

So as a part of the corrective measures, we initiated many research projects because the results of this research project can conclusively demonstrate that there is no change in the overall safety of operating facilities.

THE CHAIRMAN: As you know, I'm a fan of research, doing all this research. I'm just worried about the nomenclature here and labelling it a safety issue which could be misinterpreted in its meaning.

DR. RZENTKOWSKI: I do recognize it, but to be honest, this project is like a follow-up to generic action items we had and generic action items were considered to be safety issues. So it's kind of a legacy problem that we incorporated the same wording here in describing this process, but the process is, in fact, it's only intended to reconfirm the existing safety margins.

THE CHAIRMAN: Okay, I got two quickies here. On page 150, this is at Table E1, Via Rail for gases effluent. For noble gas, what is the unit terabecquerel-MEV? Yeah, I know, but what is it -- what are we measuring, 4.7 million electron volts on noble gas? I guess I don't understand the units, what is the units?

DR. RZENTKOWSKI: I believe this is a measure of energy, but I think it would be good to ask the specialist who is responsible for this particular submission.

THE CHAIRMAN: I've not seen this kind of unit, so I'm trying to figure out what it is. Anybody? Anywhere?

DR. RZENTKOWSKI: Patsy Thompson volunteers.

(LAUGHTER/RIRES)

THE CHAIRMAN: Anyhow, look, you guys, if you cannot figure it out, somebody will send me an email and clarify for me. Is it measure incidents and energy altogether?

MS. JAMIESON: This is Tara Jamieson, Vice President of the Technical Support Branch. The use of

TBq, MeV or curie MeV is a legacy unit and dates back to sixties and seventies where the treatment of doses was a little more conservative; rightly or more modernly, it would be expressed in terms of TBq.

THE CHAIRMAN: Without the MeV?

MS. JAMIESON: That's million electron volts. It's energy ---

THE CHAIRMAN: So it'll be the unit -- so it will be at different number? I'm trying to understand what is it we're measuring here and ---

MS. JAMIESON: It's the ability of the gas cloud for noble gases to deliver a deep dose.

THE CHAIRMAN: Okay.

(LAUGHTER/RIRES)

MR. HAMLAT: Excuse me. It's the ability to ionize the air. It's mega electron voltage. It's the ability to ionize the air; the gas to ionize the air. Then it's measured in mega electron volt.

THE CHAIRMAN: I understand that part. Why is it together with becquerel?

MR. HAMLAT: Becquerel? Because becquerel there is activity in the -- there is activity of the radio-nuclei in the air.

THE CHAIRMAN: Okay, we'll take it offside here.

(LAUGHTER/RIRES)

MR. JAMMAL: Can I try for 30 seconds?

It's with -- with all seriousness now. One becquerel is one disintegration per second. So it's one electron volt. So they're trying to correlate -- I'm not defending it, by the way. So it's a historical aspect, but I'm just trying to clarify that 1 becquerel is one disintegration per second, and then the specific ionization in air is, again, is based on the energy that's being deposited. So it's a combination of all these things.

The point's well taken: If it doesn't make sense, why mention it?

THE CHAIRMAN: No, 4.7, 10 to the 4 megavolt is a big dose. Something -- something doesn't compute in my mind. We'll take it offline.

My last -- my last question. I have a question actually associated with Bruce Power on page 48 of staff report. I'm always -- every time you're talking about the shutdown system, I get concerned. And it's in a section about the reliability of system important to safety and there was -- in Bruce A, there was a problem with this cooling injection system and shutdown system too and the next sentence says, however, it's not a safety significant issue. Please explain why is it not? Regard page 48.

MR. LOJK: Bob Lojk, for the record.

In certain cases -- and I apologize, Dr. Binder, I’m not specifically on this one here, but when you’re dealing with that system over there, when they’re doing tests or when they’re checking systems, the system may appear to be unavailable for a certain period of time, but it’s still within the specifications for the availability.

So consequently, it didn’t affect safety because eventually the system would still have worked. But I don’t have that information directly on me. Perhaps Bruce Power could clarify though you can allow us to provide it later on today.

MR. HAWTHORNE: So Duncan Hawthorne, for the record.

This relates to an event in 2012 in our shutdown system where we discovered the presence of two blanks in a line which, although the systems appeared to be poised, there were blanks in the line that would have had an impact. So it didn’t affect the system being poised, but we had blanks in what would normally have been a full path and they were discovered and removed and that’s why it was characterized in the way it was. The blanks were removed immediately on discovery.

The condition existed on Unit 1 for a number of hours and on Unit 2 for about a hundred days. So it was found during the routine testing of the shutdown system.

THE CHAIRMAN: But any ---

MR. HAWTHORNE: It was reported before on an ENR report.

THE CHAIRMAN: But let me understand. I thought any unavailability of either system should be of concern.

MR. HAWTHORNE: Yeah, I'm not disputing the characterization. I'm just saying that it was a partial -- it was regarded to be a partial impairment. This is how -- this is how we rate these things, how other CNSC staff rate the impairment. This is a legacy from restart. A couple of blanks were left in that was discovered during our first set of tests following restart and the blanks were removed.

THE CHAIRMAN: In the new safety indicators, will we keep track of their availability of the shutdown system at all times? Is that one of the indicators that we're looking for? Is that one of those benchmarks that are available?

DR. RZENTKOWSKI: If I properly recall now, no, it's not, but the numbers are being reported to us in the annual report under a mandatory reporting requirement.

THE CHAIRMAN: Okay, any last question?

Okay, thank you. Thank you very much. I'd like to echo colleagues here in which I see every year an improvement in those reports, and thank you for your patience with us here and we're going to move on.

I guess we are going to move on to the next item and as you all know, we stayed away from dealing with a lot of Fukushima issues in the annual reports because we're waiting for this particular item which is a status update -- I'm talking while you're changing; it doesn't bother me.

It's a Status Update on the CNSC Action Plan: Lessons Learned from the Fukushima Accident. This is outlined in CMD 13-M34 and the way we'll operate; CNSC Staff will make the presentation. Then we'll hear from thee presentations from the industry.

I can get rid of it, for the record.

(LAUGHTER/RIRES)

THE CHAIRMAN: The issue is I have to put it on the record. It's on the record. ...

(LAUGHTER/RIRES)

THE CHAIRMAN: Okay, I guess we're all set, and who's going to lead the charge? Is it going to be Dr. Rzentkowski or Mr. Jammal?

5.2 Status Update on the CNSC
Action Plan Lessons Learned
From the Fukushima Accident

13-M34
Oral Presentation by
CNSC staff

MR. JAMMAL: Ramzi Jammal, for the record.

Dr. Rzentkowski wanted me to be here, so I am here at his service. So I'll start.

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

So before you is CMD 13-M34, which constitutes the CNSC staff third update to the Commission on the Status of Implementation of the CNSC Action Plan and the evolution of the CNSC overall Integrated Action Plan.

The action plan was developed to address lessons learned in the aftermath of the Fukushima nuclear accident for all major nuclear facilities, nuclear power plants, and non-NPP major facilities, based on the

External Advisory Committee recommendation.

The CMD consolidates, once more, all the recommendations and all of the reviews made by the CNSC Fukushima Task Force, The External Advisory Committee, the Commission's directions into one standalone document which now we call the CNSC Integrated Action Plan.

The plan itself was posted on the CNSC website early this August. All of the CNSC branches contributed to this Integrated Action Plan and they are engaged in the oversight of its implementation.

I will start with an overview of the presentation.

The presentation will attempt to show the incorporation of the External Advisory Committee recommendations, with those of the CNSC Fukushima Task Force that's resulted into 82 actions assigned to three distinct groups for the purpose of implementation: First, licensees of nuclear power plants; second group are the licensees of major nuclear facilities other than NPPs; and of course, actions from CNSC staff.

The progress on these actions will be presented by -- separately by each director general, and we'll start with Dr. Rzentkowski.

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

Members of the Commission, as you probably recall, the post Fukushima review has examined events more severe than those that have historically been regarded as credible and their impact on the nuclear facilities in Canada.

I will start my part of the presentation by going through the main elements of this review and general chronology of the steps undertaken by the CNSC staff that led to the development of the Integrated Action Plan.

On March 17, 2011, the CNSC directive was issued requiring all nuclear power plant licensees in Canada to review initial lessons learned from the accident in Japan and to re-examine the safety cases of nuclear facilities. A similar directive was issued a few days later to other major nuclear facilities, non-NPPs.

All Class-1 facilities licensees were requested to review their safety cases and report on implementation plans for short and long-term measures to address any identified gaps.

On October 28, 2011, the CNSC Task Force final report was issued for public consultations. The CNSC Task Force examined the response of nuclear power plants to extreme external events that may cause a prolonged loss of electrical power, resulting in operators not being able to maintain the reactor's cooled. The focus was on the need to anticipate the unexpected, and consequently, the need for an integrated offsite response capability.

As a result, the CNSC Task Force has proposed changes to the design or procedures wherever gaps were found in order to eliminate or minimize their impact. Specifically, the CNSC Task Force made certain recommendations for strengthening reactor defence and depth; enhancing emergency response; improving regulatory framework and licensing; and enhancing international cooperation.

A CNSC management response to the Task Force report was prepared and also released for public consultation, along with the Task Force report on October 28, 2011. This management response accepted the conclusions and recommendations of the Task Force report and established a commitment and timeline for implementation of the recommendations.

In August 2011, the president of the CNSC established an External Advisory Committee to independently assess the CNSC response to the Fukushima nuclear accident. The committee members reviewed the CNSC processes, including CNSC initial response to the Fukushima accident and CNSC interaction with the rest of government and international organization and the Canadian nuclear sector.

The committee also reviewed the CNSC communication with the public and stakeholders, including governments and other nuclear regulators and the public. The committee also assessed the implications on the CNSC regulatory approaches resulting from the international response to Fukushima, such as international stress test conducted in European countries and the IAEA Action Plan.

The External Advisory Committee delivered its final report to the president of the CNSC on April 12, 2012. The committee recommendations centred predominantly on the following elements: Improving communications domestically and internationally among regulators, and the coordination and execution of offsite emergency drills to clarify roles and responsibilities between government departments. Also, the committee recommended that the CNSC examines areas of human and organizational performance and address response to Fukushima events for nuclear facilities other than power plants.

The CNSC management accepted the committee conclusions and recommendations. A CNSC Action Plan was developed accordingly and presented to the Commission before you for acceptance on May 3, 2012 under CMD 12-M23.B. The CNSC Action Plan fully integrated the recommendations of the External Advisory Committee and set out 36 Fukushima-related actions required of nuclear power plant licensees and on the CNSC staff.

The CNSC Action Plan was based on the Task Force review and extensive consultation with stakeholders and the public. It outlines the actions to further enhance the safety of operating nuclear power plants in Canada and reduce the associated risk to as low as reasonably practicable. However, the plan did not elaborate in great detail on actions required of operating major nuclear facilities, other than NPPs and those attributed to CNSC staff regarding communication and public education.

It is important to note here that human and organizational performance aspects were already included, although not explicitly, in the more general Task Force recommendations and that the Task Force recommendations would apply to all major nuclear facilities, other than NPPs, on a graded, risk-informed basis.

On October 25, 2012, CNSC staff presented the second update to the Commission, which included progress made by major nuclear facilities, other than NPPs, and the CNSC on communication and public education initiatives. The details and timeline provided by CNSC staff in CMD 12-M56 were subsequently incorporated into a single standalone document that integrated all Fukushima related actions on all nuclear facilities, licensees, and the CNSC staff.

This document is the Integrated Action Plan. No new recommendation or actions were made as a result of this integration in comparison to what was presented to you in CMD 12-M56. This CNSC Integrated Action Plan was published on the CNSC Web site on August 9th, 2013. A copy of the action plan is included as Appendix A to the CMD.

Going forward, CNSC staff will be preparing to the Commission annually on the status of all actions listed -– will be reporting to the Commission annually on the status of all actions listed in the Integrated Action Plan. The last update is expected August 2016, and will mark closure of the CNSC Integrated Action Plan.

To reiterate, based on the task force review and extensive consultation with stakeholders and the public, the CNSC issued its Integrated Action Plan in August 2013 to further enhance the safety of operating nuclear facilities in Canada and reduce the associated risk to as low as reasonably practicable. More specifically, the plan integrates reviews and recommendation from the CNSC Fukushima Task Force and external advisory committee.

The recommendations were reconfirmed by an independent review, completed by the International Atomic Energy Agency Integrated Regulatory Review Service follow-up mission and comments received from the public and stakeholders during free runs of public consultations.

The CNSC Integrated Action Plan applies to all operating nuclear facilities under CNSC. It consists of the following five categories: Strengthening defence in depth, enhancing emergency response, improving regulatory framework and processes, enhancing international collaboration and enhancing communications and public education.

The tables on the next two slides are provided as references outlining the taskforce and external advisory committee recommendations that form the basis of the plan. I spoke to these two tables while describing the steps and timelines that led to the development of the Integrated Action Plan. I will go through them quickly.

This slide summarizes the 13 recommendations put forward by the CNSC task force in the report published on October 28th, 2011.

This slide summarizes the nine recommendations identified by the external advisory committee in their April 2012 report and put forward to the President of the CNSC.

You will see on the next slide how the recommendations of the advisory committee were incorporated into the Integrated Action Plan and how they were related to each of the three groups responsible for their implementation.

By presenting this table we are trying to illustrate two important points. First, how the task force recommendations and the external advisory committee recommendations were mapped or merged together. And second, who is responsible to address the recommendations. It can be seen that there are 40 recommendations in total pertaining as applicable to NPPs, non-NPPs and the CNSC staff.

The first 13 recommendations are those raised by the task force and recommendation 14 was added to address recommendation 8 of the external advisory committee. The remaining external advisory committee recommendations complemented those of the task force and, in some instances, minor changes were needed to a number of actions, such as additional wording or wording to provide added clarity to the requirements they implied.

For instance, it is important to note that an external advisory committee recommendation 6 on human organizational performance is incorporated into each aspect of the CNSC Integrated Action Plan as a crosscutting issue.

Furthermore, CNSC task force recommendation 1 to 5 for strengthening defence in depth and enhancing onsite emergency response are applicable to NPPs, reflected in the orange section of the chart, were mapped to non-NPPs reflected in the purple section of the chart on graded risk-informed basis.

The CNSC task force recommendations 6 to 13, denoted here by the blue section of the chart, reflect actions on the CNSC staff and will also be discussed in greater detail in the next slide.

At this point, I would like to explain what we mean by saying a Fukushima action is closed. The Fukushima related actions that were raised for nuclear facilities were of a generic nature; that means they are applicable to all nuclear facilities.

The actions were raised with well-defined deliverables and timelines for their completion as stated in the CNSC Action Plan. Closure criteria and expectation for each Fukushima action were developed based on deliverables published in the CNSC Action Plan.

Again, it is important to point out that human and organization performance related aspects were integrated into the development of the CNSC closure criteria and expectations for Fukushima actions, such as related to habitability requirements, training, usability, critical task completion times, severe accidents management guidelines validation, and emergency response roles and responsibilities.

Once the defined closure criteria are met, the Fukushima action is closed. I want to stress that closure of a Fukushima action does not necessarily mean full implementation.

Verification of design upgrades, analysis or procedural changes that is specific to a facility or a site is tracked through a station-specific actions through normal compliance verification processes, such as desktop reviews or inspections after closure of the respective Fukushima action.

To better illustrate this point, let’s consider the example of the hydrogen recombiners or PARs. The related Fukushima action, action 8 1.4.1 in the Integrated Action plan is now closed for all stations based on acceptable analysis, plans and timelines submitted by all NPPs licensees and accepted by the CNSC staff.

However, the installation of these PARs is progressing differently for each of the stations, the number of parts to be installed, and their location in the reactor building are station-specific and differ from one station to another.

For some stations like Point Lepreau, all PARs were installed before restart during the refurbishment outage. In the case of Pickering, the installation is complete for some units and will be completed at remaining units during upcoming outages.

Before we proceed to the status update, I would like to give an overall summary of the number of actions raised in the CNSC Integrated Action Plan.

The plan resulted in a total of 82 Fukushima actions stemming from 40 recommendations which are being applied with specific deliverables and timeline as shown.

Deliverables include 36 actions on nuclear power plants, 11 actions on major nuclear facilities, and 35 actions on CNSC staff.

Timelines set out in the CNSC management response to the task force report include short term actions to be closed by December 2012, medium term actions to be closed by December 2013 and long-term actions to be closed by December 2015.

Please note that for the NRU reactor, closure dates for related actions have been set to coincide with licence expiry in 2016.

Of note as well is the fact that, in some instances, the timeline for completion of implementation of a design upgrade specific to a station will coincide with scheduled outages.

This part of the presentation will focus on those actions of the CNSC Integrated Action Plan that have been closed based on activities completed by licensees of operating nuclear power plants during the reporting period. They apply to safety measures undertaken to strengthen defence in depth and enhance emergency preparedness, specifically on site.

To be more specific at this point, they apply to recommendations 1 through 5 or the corresponding 36 actions assigned to nuclear power plants and listed in Appendix B of the CMD before you today.

I will conclude this part of the presentation with a brief outline of future actions aimed at addressing the remaining medium and long-term actions of the Integrated Action Plan.

We are pleased to confirm today that all short-term actions set for closure by December 2012 have been closed for all sites. We are also encouraged by progress reported by licensees on the medium-term actions in their second quarterly update of July 2013.

This table is to illustrate the distribution of the 36 site-specific action items imposed on all operating nuclear power plants, 18 short-term, 15 medium-term and three long-term.

The status of these 36 Fukushima actions for all five NPP stations, Darlington, Pickering A and B, Bruce A and B, Point Lepreau and Gentilly-2, is listed in Appendix B of the CMD before you.

Licensee actions are currently focused on strengthening the reactor defence in depth and the following major improvements are already completed.

Firstly, licensees undertook actions related to design modification to improve response to containment challenges, such as confirmation of adequate pressure relief capacity for beyond design basis events and installation of passive hydrogen recombiners to reduce hydrogen concentration.

The actions raised for these two items are now closed based on updated evaluation of the capability relief valves, providing additional evidence that the valves can perform its intended safety function and the plan and schedule for installation of PARs.

As I mentioned to you earlier, installation of PARs is continuing according to an accelerated schedule during planned unique outages. It is monitored through station-specific action items.

Second, licensee undertook safety

improvements for additional means to withstand prolonged loss of power and cooling; that is means for more power and water backup in case of severe accidents.

The related actions for the evaluation and provision of back-up power to critical electrical loads during station blackout are now closed. Similarly, the actions related to provision of water makeup to the steam generators and spent fuel pools are closed.

For instance, OPG and Bruce Power have completed the procurement of emergency mitigation equipment. This equipment comprises portable pumps, portable generators, hoses and connections and personal communication equipment stored on site, as well as additional equipment and resources stored off site.

On the analysis and assessment side of actions, the related actions on the evaluation of the existing modelling of severe accidents in multi-unit stations is now closed.

Both OPG and Bruce Power have submitted information to support the closure of related actions. The licensee's submissions have met the closure criteria set forth by the CNSC staff.

This slide illustrates some of the design improvements already implemented by OPG to strengthen defence in depth and complement the drills with the procured emergency mitigating equipment in response to Fukushima accident.

The top left picture shows the floodgates installed at Darlington station to protect emergency equipment. The other three pictures illustrate the drills or field runs performed at Pickering and Darlington to deploy emergency equipment.

This slide denotes safety improvements made by Bruce Power to strengthen defence in depth. The top two pictures show some of the emergency back-up equipment procured by Bruce Power, specifically the emergency power generators on the right that can be placed in service in the event of total loss of power supply.

The bottom two pictures illustrate some of the upgrades for the provisions of means such as piping to add water specifically to spent fuel pools shown here on the right.

OPG, Bruce Power and New Brunswick Power will be discussing in greater details the safety improvements implemented at their site following the CNSC staff presentation.

This slide highlights the actions closed that relate to the measures undertaken by NPP licensees to enhance on-site emergency preparedness, in particular to address task force recommendations 4 and 5.

All Fukushima actions related to on-site emergency preparedness are closed. They relate to the following activities:

Incorporation of beyond design basis accidents and severe accident management guidelines in on-site emergency plans that take into consideration specific provisions for multi-unit events and spent fuel base;

Development of the back-up power into the communications requirements such as provision of portable back-up to emergency response equipment and interim and permanent storage of emergency mitigating equipment;

And lastly, installation of automated real-time station boundary radiation monitoring systems with appropriate back-up power and communication systems, and developing short-term estimation capability including those modelling tools.

As an example, the OPG near-boundary gamma monitoring system for Darlington and Pickering nuclear generating stations were put in service in September 2012. Bruce Power and New Brunswick Power have completed engineering design concept and the installation is being tracked through station-specific actions.

For the next two slides, I will talk about future actions on the remaining medium and long-term Fukushima actions related to nuclear power plants for strengthening defence in depth and enhancing emergency preparedness.

On the design modification side, licensees initiated design work and the execution of design modifications for additional means for water makeup connections to primary heat transport system, to moderator system and shield tank. This is to supplement the connections to the steam generators, as I mentioned to you in one of my previous slides.

Licensees assess also potential design improvements to preserve containment integrity for multi-unit beyond design basis accident sequences, including severe accidents.

On the analysis side and reassessment side, licensees' remaining work will focus on the following elements of the action plan.

Extending severe accident management guidelines, known as SAMGs, to address potential instrumentation survivability and plan habitability concerns during an accident and evaluation of site-specific external initiating events under the scope of the probabilistic safety assessment such as seismic, flooding and high wind external hazard.

The licensees are also assessing the robustness of spent fuel pools. This work includes evaluation of structural integrity of the spent fuel pools at temperature in excess of the design temperature.

Future actions to enhance emergency preparedness are generally focusing on construction of emergency management centres and execution of emergency training exercises. The work on the emergency management centres includes activities to support the final building and commissioning of these centres and the regional emergency response support centre with the objectives of strengthening on and offsite communications. It also includes installation of offsite remote radiation monitoring at site boundaries.

In addition, licensees will continue the execution of training, such as emergency mitigating equipment, operational exercises and drills.

As indicated on this slide, as part of preparation for a large scale 2014 Darlington emergency exercise, OPG has planned two emergency drills; in September at Pickering site and in August 2013 at Darlington site to test the emergency measures implemented post-Fukushima.

I will now turn the presentation over to Mr. Peter Elder, Director General, Directorate of Nuclear Cycle and Facilities Regulations.

Peter.

MR. ELDER: Thank you, Greg.

As mentioned, this part of the presentation will focus on the actions under the CNSC Integrated Action Plan for Major Nuclear Facilities other than NPPs. The actions we are talking about are identical to those presented to the Commission last October.

So similar as has have been done on NPPs, we'll focus on progress since that October update before going on to the future remaining actions.

As has been mentioned by Greg, a graded approach was applied to the Fukushima response for the other facilities, recognizing the difference in activities and hazards at these facilities, which ranged from uranium mines, mills, and processing facilities to very small research reactors then to the large research reactors, the NRU reactor at the Chalk River Laboratories.

And similar to the NPPs, specific Fukushima actions are being tracked that apply to all of these major nuclear facilities. Seven are related to strengthening defence in-depth, and four to enhancing emergency response. Actions are considered closed at this level when the related activities have been verified as complete at all relevant facilities.

While this table shows the four actions in pink as closed, the status for each group of facilities is presented in the tables in Appendix C of the CMD. For example, all actions are closed for a number of facilities, including all uranium mines and mills, all Class I accelerators -- this is TRIUMF and Canadian Light Source, the master research reactor SRBT, Nordion and the Slowpokes at École polytechnique, University of Montreal, and the Saskatchewan Research Council. The next few slides provide examples of recent progress.

The reviews of the safety cases of all facilities confirm that the current analyses were adequate and complete. These reviews did find areas for improvement to defence in-depth for more extreme events and where analysis should be updated to fully incorporate current practices. Most of this additional work is now complete.

For example -- and these changes could be sometimes physical and sometimes they're updating analysis. For example, external power connection has been installed at McMaster to easily allow connection to portable backup generators. Seismic braces were installed at the RMC Slowpoke building as part of ongoing building renovations.

I would just like to point out the design of RMC is different than other Slowpokes in that there's not a concrete cover over a reactor pool since the RMC reactor is used for neutron beam analysis. So this improvement at RMC is not required at other Slowpokes.

For waste management facilities, the safety case review identified the need to update fire hazard assessments at the three AECL prototype reactors currently in safe storage.

The reviews for Douglas Point and the nuclear power demonstration reactor were submitted by AECL and found acceptable by CNSC staff.

The third analysis for Gentilly-1 has been submitted but is still under review by staff.

All facilities also reviewed their site-specific external hazards. These reviews were complete and a few cases have generated further detailed assessments. For example, AECL is updating the NRU seismic assessments and Cameco is revisiting the flood model for the Blind River Refinery.

Turning to emergency preparedness, the reviews completed confirmed that for almost all facilities, there can be no consequential nuclear accident, even after extreme external events, i.e., you cannot get into a situation where there can be a severe accident except for the NRU reactor. That is because these facilities can be quickly shut down and do not require post-shutdown cooling to maintain safety.

Nevertheless, some improvements have been made to emergency response plans, like making sure there are alternative access routes to Cameco's Port Hope conversion facility and additional emergency equipment; for example, additional portable generations and pumps at Chalk River.

Licensees are also making sure that the testing of emergency plans considers extreme weather events that could impact offsite support.

Going forward, licensees will be continuing to implement improvements in both areas, as shown on this slide. Most of their remaining work is at Chalk River, which is because of the NRU reactor that has a specific action plan that is closest to the NPPs.

For example, AECL is developing a severe accident management program for NRU using an approach similar to that for the NPPs, and this will take a few years to fully implement.

So it is expected by the next update for all facilities, except Chalk River, licensees will have completed the work needed to close the remaining actions.

As is currently the case, CNSC staff will independently verify the work before any action is closed.

I will now turn the presentation back to Dr. Rzentkowski.

DR. RZENTKOWSKI: Thank you very much, Peter.

This part of the presentation will focus on those actions of the CNSC Integrated Action Plan that have been raised on CNSC staff and have been closed by CNSC staff in addressing the actions recommended in the CNSC Task Force Report and the External Advisory Committee. This part will end up with a short description of future actions required to be completed by the staff.

You may recall that the development of actions as they relate to CNSC staff, they can be categorized as follows: Enhance offsite emergency response; improve the regulatory framework and processes; enhance international collaboration; and communication and public education.

These actions stem from the Task Force's Recommendations 6 to 13 and are supplemented by Recommendation 14, which is the External Advisory Committee Recommendation 8.

The table shown on this slide reflects the distribution of 35 specific action items to be dispositioned by CNSC staff as shown. Nine short-term items to be completed by December 2012; 24 medium-term items to be completed by December 2014; and two long-term items to be completed by December 2015.

I am pleased to confirm today that all short-term actions scheduled for completion by December 2012 have been closed and that significant progress has been made on the completion of medium-term actions expected for closure in December 2013. Please note that 13 of 24 actions have been confirmed closed thus far. In particular, all medium-term actions related to communication and public education are now closed.

Firstly, I would like to address the action to enhance offsite emergency response. This action deals with the measures undertaken by federal and provincial nuclear emergency planning authorities to review their plans and supporting programs following the events in Japan. It is considered closed.

As you are aware, the responsibility for offsite emergency planning lay predominantly with the provinces, Health Canada, and Public Safety Canada.

CNSC staff is involved as part of federal and provincial committees to either facilitate or to oversight offsite emergency response capabilities. The activities completed today or activities ongoing under this action can be summarized as follows.

On the national level, oversight of emergency protection offsite -- oversight of emergency preparedness off-site processes are being reviewed to ensure good coordination of response efforts at all levels of government, particularly in regards to Health Canada and Public Safety Canada.

All revisions to national nuclear emergency plans, programs and performance are being implemented to consider the integration of federal nuclear emergency plan and federal emergency response plan in order to improve the coordination of stakeholder planning to provide high level guidance for offsite effects such as need for sheltering or evacuation.

On the provincial level, revisions of emergency plans are being expedited with consideration for increasing the frequency of full-scale provincial nuclear exercises. Also, multi-unit accidents are being considered as part of emergency planning basis.

Full-scale multi-level federal and provincial and municipal emergency preparedness exercises are being conducted, such as the ones that were held in 2012 in New Brunswick and the Bruce Power Huron Challenge. A large-scale, multi-level emergency preparedness exercise is planned for 2014 at the Darlington nuclear generating station, with CNSC staff providing assistance and support to Health Canada in all phases of planning for this exercise.

The CNSC task force recommended that the

CNSC amend the power reactor operating licences to include specific licence conditions requiring implementation of accident management provisions, severe accident management, and public information. This action is considered closed.

These two conditions have been incorporated as part of the operating licence renewals for the Darlington and Pickering nuclear generating stations. These licence conditions will subsequently be incorporated into all operating licences.

The CNSC task force recommended also that the CNSC should further enhance the regulatory oversight of nuclear power plants through the implementation of a periodic safety review process referred to as PSR. This is Recommendation 11, to be specific.

This recommendation is also consistent with the findings from the 2009 integrated regulatory review service mission to Canada.

The PSR process would be first implemented for relicensing of Darlington nuclear generating station in December 2014, and consequently, this action is considered closed.

Efforts are underway to develop a strategy for PSR integration into current licensing regime for nuclear power plants. The PSR process is similar to the existing integrated safety review requirements, except that the safety reviews would be conducted periodically, that is, every 10 years, to support each licence renewal.

Licence renewal would therefore be supported by an integrated safety review and the results of this review to be implemented during the licence period will be part of the licensing basis of a licensed facility and referenced in the licence condition handbook.

In the area of enhancing international cooperation, CNSC staff is actively collaborating with the International Atomic Energy Agency and other international regulators and have thus brought closure to actions arising from Recommendation 13 of the task force report for all Class 1 nuclear facilities.

Immediately following the second extraordinary meeting in August 2013, member states began the development of an IAEA Fukushima comprehensive report on the Fukushima Daaichi accident. CNSC staff is well integrated in the production of this international report, whether as lead to key portions of the report or technical contributors.

This comprehensive report would be published by the IAEA in late 2014.

CNSC staff also participated in the development of an IAEA safety report on the safety reassessment of research reactors in the light of the accident at the Fukushima Daaichi nuclear power plant.

This report is intended to provide practical information to member states on their experience from the accident in defining and implementing measures to prevent the reoccurrence of any accident involving a large release of radioactive material at nuclear installations, including at research reactors.

Actions on CNSC staff to participate in the second extraordinary meeting of the convention on nuclear safety and the fourth review meeting of the joint convention on the safety of spent fuel management and on the safety of radioactive waste management in May 2012 are now closed.

Follow-up work arising from these two meetings is well underway, with efforts by a special working group on effectiveness and transparency formed to look at ways to enhance the effectiveness of the CNS. Specifically, Canada is leading the preparation of the discussion papers on greater transparency and openness in making international peer review submissions reports public and on enhancing the CNS or Convention on Nuclear Safety review meeting process and reporting.

To support the implementation of the IAEA action plan on nuclear safety, the CNSC staff has provided a CNSC technical expert beginning of January 2013. The cost-free expert to the IAEA assists the IAEA Director-General's action plan implementation team and acts as a liaison officer with Canada's permanent mission in Vienna on all nuclear safety-related matters.

In addition, benchmarking of the CNSC integrated action plan against IAEA activities confirmed that the scope and depth of the CNSC integrated action plan pertaining to the lessons learned from the Fukushima Daiichi accident compared favourably to those of the IAEA action plan.

Appendix E of the CMD before you today provides a brief overview of the many measures undertaken by Canada to enhance international collaboration and to exchange best practices through its participation at related international forum such as the Nuclear Energy Association Crisis Communication Workshop held in Madrid, Spain, in May 2012, IAEA international experts meeting on enhancing transparency and communication effectiveness in the event of a nuclear or radiological emergency held in Vienna in June 2012.

I will now turn the presentation over to Ms. Timothea Gibb, Director Public Affairs and Media Relations Division.

MS. GIBB: Thank you.

Good afternoon, Mr. President and Members of the Commission.

This part of the presentation will focus on those actions which have been closed by CNSC staff in addressing Recommendation 8 of the external advisory committee report integrated within the CNSC integrated action plan.

As indicated earlier, this recommendation resulted in six additional actions for CNSC staff to improve communications and public education. They include the CNSC Web site and social media platforms, a crisis Web site, educational initiatives, media relations, international participation and an extreme accident scenario video.

During the events of Fukushima, the CNSC Web site was a go-to source of information, but as with all Web sites, there is always room to improve.

The action plan identified a number of actions relating to the CNSC Web site and the use of social media platforms. Apart from the redesign of the Web site in accordance with Government of Canada WEB2013 initiative, all of these actions have been closed and the redesign is expected to be complete later this fall.

To further assist the public in better understanding topics related to nuclear safety, CNSC Web site pages have been revised, ensuring clear and simple language has been used and new pages have been added on topics such as emergency preparedness, transportation, nuclear substances, and radiation protection.

The Fukushima nuclear accident reaffirmed to the CNSC the importance of a crisis website. The CNSC has now developed a pre-populated, non-visible website that can be activated to temporarily replace our external website homepage. When invoked, the crisis website becomes the primary landing page for all visitors to the CNSC website.

The crisis website would only be activated in case of a Canadian or international nuclear emergency incident or accident that may pose a significant risk to Canadians or the environment and where there is significant public concern and media interest. When invoked, it would be used to communicate information specifically about the emergency.

Social media is also part of the CNSC's ongoing efforts to enhance communications with the public. In February 2012, the CNSC launched its English and French Facebook pages and, through this platform, nuclear safety news, photos, videos, and events are now more accessible than ever to Canadians.

And in January 2013, a CNSC -- the CNSC

launched a YouTube channel to showcase CNSC and third-party videos on various topics dealing with the nuclear sector. Two educational videos have been posted to date presenting hard to explain concepts in simple language using graphics and animation and additional videos are currently in development.

The Action Plan also identified areas for continued development with respect to our educational initiatives and our work with media. In fulfilling these actions, the CNSC continues to build on its educational resources pages on its website. These pages are geared towards students and teachers to provide information about nuclear science in plain language.

In addition, the CNSC is a partner in the Canada Science and Technology Museum Energy Exhibit "Let's Talk Energy". This exhibit features a network of partners and presents science and technology information to Canadians through various educational programs, displays, exhibits and kiosks.

The CNSC continues to hold CNSC 101 information sessions in communities across Canada to present information and answer questions from Canadians on how the nuclear industry is regulated. The CNSC has also launched an interactive learning tool called "CNSC Online" to inform Canadians about nuclear safety in Canada.

Following the March 2011 earthquake in Japan, the CNSC worked with the Science Media Centre of Canada, a non-profit charitable organization that helps journalists report on science issues, resulting in media coverage that is more informed and accurate. CNSC staff continues to proactively engage the Centre and recommends subject matter experts.

A credible spokesperson who can respond to a variety of scientific questions during an emergency is important. There are numerous experts available within the CNSC and a number of them have been identified as specialists and subject matter experts to receive media training. This training is underway and additional sessions will be held as needed.

And although not directly part of the action stemming from Fukushima, our work in all of these areas contributes directly to the CNSC's ongoing day-to-day outreach efforts.

Finally, completing the action to develop a graphical representation to illustrate to the public the sequence of potential events during and immediately following an extreme accident at a Canadian nuclear power plant, we developed a video showing the progression of an accident scenario involving a total-station blackout at a nuclear power plant.

This video was designed to help the public better understand the multiple layers of safety systems in place and it highlights that, even during an extremely severe accident, nuclear reactors in this country will safely shut down and contain radioactivity. This video was presented to Commission members in October 2012. We have also posted it to our CNSC YouTube channel where, to date, it has been viewed more than 3,000 times.

And with that, I will turn the presentation back over to Dr. Rzentkowski.

DR. RZENTKOWSKI: Thank you very much.

In the area of improving regulatory framework and processes, the CNSC actions include amendments to Class-1 nuclear facilities regulations to include explicit requirements for submission of offsite emergency plans with license to construct or operate a nuclear power plant; radiation protection regulations to define applicability of operation versus emergency dose limits during the post-emergency phases; and to prescribe radiation protection criteria for workers who receive occupational exposures during emergency; and also key regulatory requirements and guidance documents applicable to operating reactors and New Builds.

The CNSC actions include also future amendments to all power reactor operating licenses to implement and maintain severe accident management program, accident management program, public information program and also to implement the periodic safety review process.

The CNSC staff made good progress in addressing these actions. The Omnibus Project to amend existing regulatory documents will be presented to the Commission tomorrow for your approval as part of the Omnibus Amendment Project update.

The CNSC is leading Canada's participation to the six review meetings of the Convention on Nuclear Safety to be held March 24, 2014 in Vienna. Canada's National Report was developed in collaboration with industry representatives that include members of OPG, Bruce Power, New Brunswick Power, Hydro-Quebec, Atomic Energy Canada Limited and government agencies, including Natural Resources Canada and federal and provincial emergency management organizations.

The report, which outlines the measures taken by federal and provincial regulatory authorities, including actions closed by the licensees during the reporting, has been submitted to the IAEA for peer review by member states. Particularly, the National Report also highlights the important -- the improvements taken to enhance nuclear safety in Canada in response to Fukushima Daiichi nuclear accident and synopsis of measures undertaken to enhance global nuclear safety through benchmarking against the IAEA Action Plan on nuclear safety.

Lastly, although all actions related to communications and public education have been closed, CNSC staff remains committed to continuous improvements in these areas to ensure that public and stakeholders benefit from clear and concise information on nuclear safety.

This concludes the status update on all actions pertaining to the CNSC Integrated Action Plan. As you probably have noticed, in our presentation, we made a frequent reference to beyond design basis accidents or severe accidents. These accidents scenarios were used to develop the Action Plan and implement specific actions.

However, I would like to stress the fact that this update is not about the number of actions -- how many are closed or open -- it's about safety upgrades and procedural improvements already implemented. We made the NPPs in Canada safer and this is the subject of the CMD before you today.

In this CMD, we tried to articulate what we do for safety and why it makes sense. I hope we didn't miss the target.

On this note, I will turn the presentation over to Mr. Jammal for overall summary and conclusions.

MR. JAMMAL: Thank you, Greg.

Ramzi Jammal, for the record.

So, Mr. President, members of the Commission, this latest update marks the culmination of two and a half years of extensive work by staff on a very comprehensive action plan. We've attempted to simplify it. Hopefully, as Greg mentioned, we did not miss the mark.

However, this action plan is to implement the measures and physical improvements to address the lessons learned from the Fukushima Daiichi nuclear accident.

It's important to note in conclusion that the CNSC regulatory principle has been enhanced to change and changed from prevention to mitigation.

And what does this principle mean?

Accepting the fact that events will take place -- even though unlikely -- but when they occur, mitigation measures will be available in order to ensure control, cooling, containment from either onsite or offsite emergency equipment.

So, in conclusion, I would like to re-emphasize the fact that all short-term actions confirming the safety of nuclear facilities are closed.

For all operating nuclear facilities, all safety improvements action are on track to be closed by the established timeline in the CNSC's integrated action plan.

And the CNSC integrated action plan is to enhance safety margins by reducing the likelihood of severe accidents and mitigating consequences through design upgrades and updated processes, procedures and guidelines that take into account the lessons learned of Fukushima to date.

The integrated action plan is to enhance effective communication, public education, continuous safety improvements through implementation of lessons learned as they become more and more known and benchmark the CNSC's safety improvement against the international actions.

So we believe Canada continues to be amongst the international leaders in its response to the lessons learned from Fukushima Daiichi nuclear accident and in the implementation of a comprehensive action plan in order to strengthen the defence in depth, enhance emergency preparedness and improve the regulatory framework and processes.

As I mentioned, as lessons continue to emerge from the nuclear accident, the CNSC will assess the impacts and where applicable build on these initiatives that lead to improve best practices and enhance global nuclear safety.

With this conclusion, I would like to commit to the Commission and staff will commit that we'll continue to provide annual updates on the action plan in August of each year, highlighting the progress by both licensees and the CNSC staff on their implementation of this integrated action plan.

We are now available to answer your questions you may have.

Thank you.

THE CHAIRMAN: Okay. Thank you.

I think we will take a break for another -- I will say -- 10 minutes which will bring us to 4:15.

Okay. Thank you. Four fifteen (4:15) according to this clock.

--- Upon recessing at 4:11 p.m./

L'audience est suspendue à 16h11

--- Upon resuming at 4:26 p.m./

L'audience est reprise à 16h26

THE CHAIRMAN: Okay, we are back. So we are a bit late. So again, before we open the floor for questions, I understand there are some presentations that we would like to hear, and starting with OPG. And I understand Mr. Elliott, you will make the presentation. Please go ahead.

13-M34.1

Oral presentation by

Ontario Power Generation Inc.

MR. ELLIOTT: Good afternoon, President Binder and Members of the Commission. My name is Mark Elliott, Senior Vice-President, Nuclear Engineering and Chief Nuclear Engineer for Ontario Power Generation.

With me today is Fred Dermarkar from OPG, our Vice-President of Engineering Strategy. Also with me is Sean Granville; Site Vice-President and Chief Nuclear Officer at Point Lepreau New Brunswick Power, Paul Thompson; Manager Performance Improvement and Regulatory Affairs for Point Lepreau New Brunswick Power, and Frank Saunders; Vice-President Nuclear Oversight and Regulatory Affairs for Bruce Power.

We’re pleased to have this opportunity to brief the Commission and the public on our response to the events at Fukushima. Our approach this afternoon is to describe the Canadian nuclear utility principles for beyond design basis events which have just been issued.

They consist of an objective and nine principles which I'll explain, and we'll also describe the supporting actions taken by each of the utilities to implement those principles.

The three utilities are committed to a consistent approach using the best ideas from across the industry. All of our reactors are CANDU reactors, but they have design differences and they're all unique. And to maintain that consistency, we decided to develop and work to a set of principles and a common objective which we've done and we've called them the "Canadian Nuclear Utility Principles for Beyond Design Basis Events".

They were developed and agreed to by the three utilities and signed by the three chief nuclear officers. They provide guidance for utility decision making, to maintain consistency, and they will position Canadian utilities at the forefront of the post-Fukushima response across the world.

These principles have not yet been communicated to CNSC staff as they were just signed last week, but I'll commit to getting the industry together and briefing the staff very soon.

The objective: The objective is to practically eliminate the potential for societal disruption due to a nuclear incident by maintaining multiple and flexible barriers to severe event progression.

This statement recognizes the public's expectation and our commitment as operators to have minimal impact on our host communities. That's our social licence.

We know that severe environmental conditions like earthquakes and floods can occur, although rare, and will challenge our host communities. This statement is our commitment to manage those conditions within our plants so that we don't add to the challenges that our host communities would be facing.

The objective sets a high bar for nuclear safety as it should and we've written nine principles which taken in total will enable us to meet that objective.

I will explain each principle, what it means, what OPG is doing to satisfy the principle and then turn it over to my colleagues in the other utilities.

Principle 1: Actions and defences will focus on stopping accident progression prior to a severe accident. Maintaining adequate fuel cooling prevents fuel failures and that's paramount. That's the starting point.

The severity of consequences escalates with event progression. As the event gets worse, so do the consequences, so stopping that progression is key and so prevention and mitigation should receive the majority of the actions and focus from the utilities.

So how does OPG satisfy this? The first thing OPG has done is confirm the robustness of our stations for beyond design basis seismic events. What that means is we've assessed our plants for earthquakes worse than our design basis and we've confirmed that our plants can handle a worse earthquake or a worse seismic event.

We've confirmed at Pickering 5 to 8 and Darlington that through wind analysis that a worse wind event, worse than our design basis, can be handled by our plants as well, and that actually resulted in revisions to procedures at Pickering 5 to 8 to pre-stage emergency mitigating equipment when we get warning of a severe weather event. And we're continuing that analysis with Pickering 1 to 4, and we'll have that done this year.

We've also looked at flooding, beyond design basis flooding analysis, and that's been completed for both plants. It's resulted in us installing flood barriers around essential systems at both sites. And again, that means that OPG can handle a flood worse than our design basis.

Principle 2: Multiple Barriers: Multiple barriers to event progression and multiple means to supply water or electricity will be used to ensure adequate defence. You can ask how we were able to say “practically eliminate societal disruption”, it’s this multiple barrier approach that allows us to say that.

You’ve seen this slide before. It shows that on an initiating event, there are a number of barriers, a number of layers of defence, starting with normal power and water, then two types of design basis power and water systems; stand-by power and emergency. And then for beyond design basis events, another two layers; emergency mitigating equipment and then severe accident management guidelines. And all of that is leading up to be able to do a good job of emergency response.

For OPG, we’ve implemented this principle through diesel-driven pumps and generators. You saw the video that I showed a year ago. We’ve got a sufficient number of these, plus one, N plus 1, N being the number of reactors at each site, so that we can handle all units going into an accident at the same time.

There’s multiple different connection points and we’re actually designing connection points that are easier to make, so easier on those responders to simplify the connections.

Principle 3, early fuel cooling. Methods and actions to initiate heat transport system cool down and maintain fuel cooling will be a primary and early priority. The way we do that at all of our sites, at all Canadian sites, is by rapidly cooling down the heat transport system by opening steam release valves. What that does is lower the margin to fuel failures. It lowers the starting point, it lowers the temperature at the beginning of the event and so you've got more margin to a problem. And depressurizing the steam generators allows the emergency mitigating equipment to be able to inject into those steam generators because they're injecting into a depressurized steam generator.

Now to do that, actions again on across Canada to open the SRVs need to be simple and reliable. At OPG, there's two ways to get power to those steam release valves, through the Class 2 battery banks, the normal system. What we've done is assess that normal system again to a beyond design-basis seismic event, and that Class 2 battery bank can supply power in that situation.

We've also added portable uninterruptable power supplies as a second layer, again to supply power to those valves because opening those valves early in the event is key. We've done the procedure work and the training to make sure this can happen.

Principle 4; there’s a few slides on Principle 4 because it’s very important, it relates to containment integrity. Actions to maintain containment integrity will be utilized to minimize radioactive release. There’s three elements of that. You’ve got to control pressure. There’s a lot of energy in the core and energy inside the containment. By cooling the containment, we remove that energy.

Also to control pressure, we talk about containment venting. You’ve got to be able to vent containment -- and I’ll describe in detail how we do that, venting containment to keep the containment pressure within safe limits so the containment system is not damaged, is intact and can provide its function.

We’ve also got to control hydrogen. You saw the explosions at Fukushima, which damaged containment. To preserve containment, we’ve got to control hydrogen. That’s minimizing the generation of hydrogen and removing the hydrogen -- any hydrogen that’s created.

And the other thing we have to do to preserve containment is control the water inventory. What you’ve seen at Fukushima, and you see it today, is water being added to the core to cool the fuel. You’re still seeing that. And if you keep adding water to containment, eventually, you cause a problem with containment and could breach containment. So what we've agreed to is that we will have, obviously, water injection; we have to have water injection to cool the fuel. We'll also get into recovery so that -- and we'll do that by a recovery and recirculation of that water so we're not left with a large amount of water to deal with. You've seen the tank farms at Fukushima that they're building, water tank farms. We believe that recovery and recirculation is a better answer.

So for OPG to do those actions, to protect containment, you've seen some of them already, but here's some new ones. We bought some larger generators. You can see the truck in the slide at the bottom. Because what we're going to do is repower the existing emergency power system. Power may have been lost through a flood or an earthquake or high winds. We're going to repower that with this truck-mounted generator. And that will allow us to have bolt and boiler room air cooling units to condense the steam, remove energy from containment. It also powers up post-accident containment filtered venting systems that are in place at Old Pickering and Darlington -- I'll talk some more about that -- provides power to existing emergency water systems, to cool safety critical loads, and it helps us with that recovery and recirculation of the water.

On the top right, you can see the vault coolers at -- in the vaults at our plants.

Also to protect containment, we’ve got to stop the event progression, stop it from going farther, stop it as it’s progressing. To do that, we’ve got multiple ways of cooling the fuel. You heard us talk about steam generators, but we’re also adding water makeup to the moderator and the shield tank.

So again, this comes back to why we could say that we’re going to minimize, that we’re going to practically eliminate societal disruption, because we’ve got three ways of cooling the fuel beyond design basis, three ways to add water; steam generators we’ve spoken about, but also moderator and shield tank. We’ve assessed the shield tank integrity so that it can handle severe accidents, and we actually have to make a modification. At Darlington, we have to modify the shield tank over-pressure relief system. And we’re doing that as part of refurbishment. At Pickering, it’s adequate already.

And we’re considering additional filtered venting system that’s beyond our existing system that’s designed and installed right now. We’ve already committed this additional containment filter venting system, we’ve already committed to that as part of Darlington refurbishment. And we're evaluating that system or that need for Pickering right now.

I've spoken about hydrogen, we've got six of 10 units complete on our passive autocatalytic recombiners. And by the end of this year, we'll have eight units done and next year we'll finish the last two and have all the units done.

Also related to containment integrity is we have got procedures, training, and drills that have been developed and implemented for severe accident management guidelines to implement these. You've heard Dr. Rzentkowski talk about the drills that are coming up at Pickering A and B. Next week is the one at Darlington. All leading up, of course, to the large drill next May at Darlington.

Principle 5, containment venting; two parts of this. Containment venting will be controlled and it will be done through a filtered system. With functional containment, decisions can be made when to vent and how long. By controlling filtered venting, you minimize radioactive releases and their potential on the environment. And the ability to delay when containment is vented allows the short-lived material to decay and be reduced.

So how is OPG doing that? Both Pickering and Darlington already have post-accident containment filtered venting systems. And we’re going to repower those after an accident with the portable generator that I showed you. Additional filtered venting is being installed as part of Darlington refurbishment. I’ve said the Pickering decision on additional filtered venting is under review. We’ll have that decision made this year, and that’s consistent with the Fukushima Action Plan from the CNSC. And the post-accident procedures are available and have been trained.

Related to filtered venting is that we have, at OPG, installed near-boundary automated gamma monitoring at Pickering and Darlington. And you can see the locations. I’ve got to correct this picture at the bottom because it looks like there’s a gap in the top right; that’s just the slide. There is actually gamma monitoring out there and you can see a picture of it at the right-hand side. So what that would do is provide us any early indication of the impact of venting outside of our plant.

Principle 6, necessary system structures and components will be confirmed to survive rare, yet credible, conditions for external hazards.

Now, you’ve seen in my previous slides that we’re relying on some equipment that’s already part of our design. And you might say, “Yes, but that’s for design, this is beyond design-basis that we’re talking about. How can you rely on that?” Well, we’ve decided a method to assess that equipment so that we can be sure that we can rely on it for this beyond design-basis situation and we’ll only credit it at any of the Canadian sites; we’ll only credit that or rely on that equipment if we’ve assessed it to be adequate not just for design, but for the beyond design-basis.

So we’ve come up with this value called review level condition, which takes the design basis event, makes it much worse, and that assesses that in-plant equipment. And only if it passes will we rely on it as part of our response.

For OPG, we’ve completed a seismic margin assessment on the water that we’re talking about sending to the steam generators.

The original water for that comes from the de-aerator, a big tank of water already in our plant. We've assessed that for the beyond design seismic event and it can handle that event and supply water. And I've talked about the Class II batteries already.

Our quick connects that I've talked about, better connections are being designed now to meet these more severe requirements. In a question this afternoon to Dr. McDill we talked about, you know, how do you design those connections when they're beyond design basis? So we are designing those connections for that more severe event.

We've looked at the impact of seismically induced fires and floods at Pickering and Darlington. So can you get a fire from an earthquake? Can you get a flood from an earthquake? And we've determined that there's no significant impact on risk.

We're looking at instrumentation equipment survivability as part of a joint project with the other utilities, a COG project, and we've got diversity and independence of means of these emergency mitigating equipment connection points, so multiple places to put in these connections.

Principle 7, irradiated fuel bay water levels will be maintained sufficiently above the top of the fuel to mitigate high radiation fields, hydrogen production, and fuel damage.

Now, the time required on our loss of cooling to an irradiated fuel bay is typically quite long. The volume of water should be maximized. When we're in normal situation, we should keep the water level kind of at the top end of normal. That gives us more room.

And any emergency equipment that we supply for the spent fuel pools have got to account for leakage and steaming and still keep water above the level of the fuel. And that's at all of our Canadian plants.

For OPG, the time to boil is greater than 72 hours and the time to deploy the emergency equipment is less than four. So there's a lot of margin there for the spent fuel pools. We've confirmed that we have enough water, by our analysis, and we're actually designing some portable measurements for level and temperature that we can use.

Principle 8: This equipment should be readily deployed. Emergency mitigating equipment will be robust, readily available, easily deployable within required timeframes and have adequate redundancy. The equipment is being stored at higher elevations at all the Canadian plants, away from the station but close enough for timely deployment and, in some cases, we'll do pre-staging.

It's deployable by diverse work groups supported by procedures, training, practice and validated by drills. And when I say "diverse groups", more than one trade group could deploy this equipment. We're not only relying on a certain small number of people. It's simple type of equipment that many people can be able to deploy.

We're looking at more than one method, truck, tractors, security vehicles. We want to make sure the equipment is reliable. So it's proven technology that we're purchasing all across Canada and we've got to have enough fuel onboard. So the fuel has to be available for 72 hours with provisions to refuel in place. We don't want to stop the cooling on the reactor to fuel.

Just one slide on how OPG is meeting that readily deployable; just a bunch of pictures but some new ones that you haven't seen.

You've seen some of these before but if you look at the bottom left and right-hand corner, you can see our storage facility. We talked about the light kind of canvass-type building in previous discussions and on the bottom right, you can see the generators inside the building. Kind of in the middle row towards the right-hand side, you can see some of these connections that we're installing.

The last principle is the common philosophy. Canadian utilities will use a common philosophy and this presentation describes it for prevention of beyond design basis accidents.

If we interact with each other, we'll get a larger perspective, a larger experience base. It encourages each of us to challenge each other and learn from each other, improves the capability to respond and provide mutual assistance. It's more credible and it facilitates regulatory concurrence. I'm sure you'd like to see us come as a Canadian industry and it allows us to do that.

There's a number of things in place already to allow us to work together. There's the CANDU industry integration team facilitated by COG. My colleague Fred Dermarkar is the Chair of that team. There's meetings you can see there, updates the chief nuclear officers and international meetings. And we've got together as a group with COG to examine and explore technical issues together, and you can see the list of them there.

OPG specifically, we've participated in emergency preparedness workshop in June. That was one that had a large amount of diverse participation. You can see the names there. We've developed the corrective action plans cooperatively, these WANO SOER corrective action plans. We actually got a strength at Pickering in a recent WANO peer review on Fukushima response.

We've got a mutual aid agreement in place. So if any of us need help, there's no trouble with administration, with legal, anything like that. We can just go and help.

And it was said earlier that we're

developing a regional emergency response support centre. There's a conceptual design report that we're reviewing now and the potential is for that centre to be used by all of the Canadian utilities.

Our commitment; we're committed to these principles to protect against beyond design basis events such as the one at Fukushima. We're confident that these are the right principles and when we implement these, we'll practically eliminate the potential for societal disruption.

I'd now like to turn the presentation over to Sean Granville from New Brunswick Power.

MR. GRANVILLE: Thanks, Mark. Sean Granville, for the record.

Earlier I talked about Lepreau engaging more with the rest of the industry, and I think that this is an excellent example of where we are -- we're working with our Canadian partners in developing and co-signature of the principles.

So I'm going to ask Paul Thompson, Regulatory Affairs Manager, who is going to walk through how we at Lepreau are meeting these principles.

MR. THOMPSON: Thank you very much, Mr. Granville.

So I'll just briefly state the principle, because they've been discussed in length by Mr. Elliott, and just demonstrate what we've done or doing at Point Lepreau to align with the principles.

So Principle Number 1 relates to event progression defences, and that actions and defences will focus on stopping accident progression prior to the onset of a severe accident.

In this case the primary focus is to provide water to the boilers to maintain fuel cooling through thermal siphoning. We've got a very robust boiler make-up water system that can provide more than four days of cooling inventory.

We've demonstrated both by robustness assessments and by seismic upgrades that this system will survive much more significant seismic events than was originally designed for.

One of the things that we did was installed a main control room filter and what that allows us to do is extend the capability and habitability of the main control room where the information available to the operator is much more than where it would be in the secondary control room. And this provides more options to prevent a severe accident.

We have improved our emergency response capability. We've made changes to our incident command.

We've introduced the severe accident management guidelines, and we've drilled and exercised it. So both at the control room staff, our emergency response organization, and emergency response teams.

And connections for portable mitigating equipment are going to be installed in the spring 2014 outage.

This picture just shows on the top left-hand side, those are the filters that were installed for the main control room. So this id prior to installation and, as I mentioned, they're now installed.

The bottom left picture just illustrates some of the training and drills that goes on. In this case, this is in the simulator with control room staff and of course the picture on the right-hand side is of the emergency response team training.

Principle Number 2 relates to having multiple barriers to event progression and multiple means to supply water or electricity to ensure adequate defences.

At Lepreau, we have multiple barriers for a wide variety of events. There's large volumes of water available for heat sink to boilers, heat transport system and our calandria vault.

Connections, that I mentioned a minute ago to provide additional water to the boilers, the heat transport system and the moderator will be installed this coming spring. These are going to be based on the same concept of connectability as we had for calandria vault makeup line, which is a very simple connection to fire hose to allow for water injection. We also have looked at multiple injection points in case one injection location is not accessible.

In addition to the water connections, electrical connections to provide additional backup power to supply to critical plant loads will also be installed in the spring.

Principle No. 3 relates to the importance of providing early fuel cooling and it states that methods and actions to initiate heat transport system cool down and maintaining fuel cooling will be a primary and early priority.

At Lepreau, we have a Class 3-driven auxiliary boiler feed water pump. But if that is unavailable, such as in a total loss of station power, we have a steam-driven auxiliary boiler feed pump and that provides for adequate cooling to the boilers.

In the event that that's not available, rapid cool down can be achieved by opening the main steam safety valves pictured on the right-hand side of the slide. Access to open these MSS fees are simple and reliable and procedures exist to open these valves without power or air supply and these are embedded in our Severe Accident Management Guidelines and are practiced.

Principle 4 relates to containment and integrity and there are a number of slides here as there was in the OPG presentation. Actions to maintain containment integrity will be utilized to minimize radioactive releases. So the first subset of that is controlling pressure.

Safety analyses demonstrate that existing system, such as our dowsing system and local air coolers, are effective for the design basis events.

And we've installed additional capability for beyond design basis events as I've explained in the December 2011 license hearings for Lepreau. We have a calandria vault makeup system as well as an end shield over pressure relief to ensure that event progression is stopped within the calandria vessel, sometimes referred to as "in-vessel retention".

In parallel, we have the emergency filtered containment ventilation system that was installed to ensure that containment pressure stays below acceptable levels and that any release through that system is filtered to a very high degree.

We also, as I've mentioned, incorporated this Severe Accident Management Guideline strategies and proceduralized them and the interesting thing that we've done at Lepreau is that the group that follows these and then gives the advice to the control room are made up of licensed operators as well as senior technical staff at the station.

So what that means is that the operators themselves are familiar with the Severe Accident Management Guidelines and the people giving the advice to them so that they're not second-guessing the advice that they're being given.

Just some pictures here of the calandria vault makeup system. On the –- it is the ability to add water directly into the calandria vault from outside through fire hose connections.

So what is the calandria vault, sometimes discussed as a –- or mentioned as a shield tank in other CANDU designs?

On the picture on the left, the yellow cylinder is the calandria vessel. It is the vessel that contains the fuel channels and then inside the fuel channels is the fuel. Surrounding that yellow cylinder is the calandria vault and it is filled with water.

So in the event of a highly unlikely

accident in which you've not only lost your cooling to your primary system and your secondary system but you've also lost your ability to cool or refill the moderator, then the events still can be terminated by ensuring that there's adequate inventory in the calandria vault.

And that's what this system does, is provide that necessary water so that the event progression stops within the vessel. And that has a significant benefit as I'll discuss in a minute.

With regards to hydrogen control, we've installed 19 passive autocatalytic recombiners. These are self-start, require no power and no operator actions. The concept uses a number of catalytic plates to which the incoming hydrogen flows over and begins the reaction. These plates are individually removable and testable during normal operations.

The plate is the -– shows the picture in the middle as an individual plate and the toaster-looking device on the right-hand side is the tester. You can probably guess what its nickname is.

These were designed, as we've mentioned in the discussion this morning, for design basis events which was the local loss of coolant accident with the loss of emergency core cooling.

But as Mr. Rzentkowski stated this morning, the methodology that we have used in assessing that accident was extremely conservative.

We have a mystical, magical flow rate going down every single channel indefinitely in order to maximize the amount of hydrogen production. That is not realistic. As a result, we have a large number of –- very large number of these recombiners installed.

So long as the calandria vault makeup system, it maintains the water in the calandria vault, in-vessel retention ensures that the accident does not progress beyond the calandria vessel and thus there is no core concrete interaction which has the potential to release more hydrogren.

In addition, we have a severe accident monitoring and sampling system and all of this has been incorporated in our Severe Accident Management Guidelines.

Speaking of the severe accident monitoring and sampling system, this is a picture of some of the components on it. It is a system that allows for online monitoring of both hydrogen and gross gamma. It has the ability to be used with no other power other than a simple generator hook-up and it allows for taking grab samples which can then be analysed later to determine the exact makeup of the fission product inventories for long-term management.

As I have discussed many times in the December, 2011 hearing about how we manage water level, water addition –- for design basis event, the reactor has been designed for the amount of water that would be released from the loss of coolant accident and that which is required from the emergency required cooling system and the dowsing system. If you go beyond design basis, the water that is added through the calandria vault makeup line is, in essence, removed through the emergency filtered vent by steaming.

To provide additional confidence, we’re installing water level measurements both in the calandria vault and the reactor building and that’s going to be implemented in the spring of 2014. Both have been designed to withstand severe accident conditions.

Containment venting will be controlled through a filtered system. Point Lepreau has an emergency filtered vent system that is in place. These pictures were taken during construction because it’s a little easier to see the equipment. Right now, all you’d see is a brick wall.

So on the right-hand side, you can see that the wall is partially built but you can still see the large tank that is part of the filtering system.

Running from the tank, up, is the large

high-stack release point which is the picture in the middle. This system requires no power. It is a manually operated system and the pictures on the left-hand side are showing the control cables which are activated just outside of our secondary control area.

Principle 6 relates to equipment integrity. Necessary system structures and components will be confirmed to survive rare yet credible conditions for external events.

Similar to what OPG did, we established review level conditions for these events and we've included them in our design guides. We performed a PSA-based seismic margin assessment as part of our probabilistic safety assessment submitted in 2008. In that assessment, we also considered seismically-induced internal fires and seismically-induced internal flooding.

External hazards, both from natural and man-made sources, were also evaluated and submitted in 2008.

As a result of the Fukushima assessment -- accident and the action plan, we are relooking at credible external hazard magnitudes such as that associated with seismic, tsunami and wind.

Instrument survivability is going to be further assessed now that we have produced the industry approved methodology, and that work is going to begin shortly.

And lastly, the diversity and independence of our emergency mitigating equipment connection points is advantageous to address extreme external hazards.

Principle 7 relates to spent fuel cooling or irradiated fuel bays, as it's sometimes referred to, and that is water levels will be maintained significantly above the top of the fuel.

As Mr. Elliott indicated, there's a very long time to boil in the CANDU units. Point Lepreau has emergency make-up capability and the CANDU 6 design caters easily for the use of other emergency mitigating equipment for inventory make-up.

We modified our emergency procedures to ensure that the irradiated fuel bay condition is monitored under events in which it could be compromised and severe action management guidelines for irradiated fuel bays are being developed. The thermal stress analysis will be completed shortly.

Principle 8 relates to readily deployed emergency mitigating equipment to ensure that it's robust, readily available, and easily deployable.

A deployment plan has been developed, and it includes emergency mitigating equipment, its staging, debris removal, and the training associated with it.

We've completed a design guide for beyond design basis events to guide us in design of this equipment, and it reflects consistent industry approach for robustness, availability, and redundancy.

And in the interim, until this equipment is provided, we note that it has been developed such that its small generators which are easily obtainable from local suppliers. As well, we have fire trucks available on short notice from the Musquash Fire Department until we get our fire trucks.

Principle 9 was related to ensuring that we utilize a common philosophy throughout the Canadian utilities for prevention of design basis accidents.

Experiences are shared through the CANDU industry integrated team, which includes both domestic and international participation. It ensures consistency across all the utilities, as Mr. Elliott has mentioned, and that any differences in the design of approach are understood and rationalized, recognizing that there are differences.

Active participation in the CANDU owners group joint projects and task team facilitate common approaches for difficult topics.

We've participated with the other nuclear utilities in the COG emergency preparedness and multi-jurisdictional workshops, and they've been very beneficial in exchanging good practices. And there's been a collaborative effort in developing responses to the WANO significant operating experience report relating to Fukushima.

Mark mentioned that there was a mutual aid agreement in effect and also that we are looking at the considerations of emergency response centre -- regional response centre.

In summary, we are committed to aligning with industry in applying the CANDU nuclear utility principles for beyond design basis events.

Thank you very much, and I'll turn this over to Mr. Frank Saunders.

MR. SAUNDERS: Good afternoon. Frank Saunders, for the record.

I'm going to diverge a little bit from my two colleagues in what I present, and we're -- I'm going to talk specifically about Phase 1 activities at Bruce Power. And I'm doing this for a reason because I felt it was important that we show you what these changes actually look like on the ground. And I think you'd be impressed by the simplicity and other aspects which are an intentional part of the design.

As you know, nuclear philosophy has always been to prevent accidents. I would say that in the past we've had what I would call a very large fixed defence program with multiple layers, redundancy and diverse systems, but all located in one spot, not movable.

And we've seen in the accident at Fukushima that one very severe event managed to cripple all that fixed defence in three units, at least. So it seemed obvious that what we needed to do was also add a layer that provides a flexible defence, and that's what the industry generally has gone to.

And that defence ought to be something that lets you respond to the circumstances appropriate, should be broad, flexible in that regard, scalable from small to large, something that you can put quickly in place when you need it, adds more redundancy and margin.

And our philosophy at Bruce when we developed this was to put it in place, test it, work on it, improve it until we got it to where we wanted it to be.

So I'll take you through a series of pictures here which just shows you the actual field installations.

So in this first one we’re at Bruce B, this is a Bruce B boiler cooling. We've talked about it already. This is the primary way of keeping the fuel cool.

The picture on the left, you see is the -- where the hose will come in through the door. That door that you see just at the edge of the picture is an external door. On the outside, it's painted red. There's a big fluorescent sign above the door that says "Emergency cooling connection", and so the people can see there's one for each unit, so this is unit by unit.

That red point that the arrow is pointing to runs 60 feet up that stairwell to the emergency water system.

On the right-hand side, you see the connection to the emergency water system where that water flow is then connected through a very short hose to connect those two things together.

Those two pipe branches are part of what you need to do the installation. They're now in an actual red cabinet fastened to the wall rather than -- a part of the improvement effort was to (a) make sure they stay there and not on the floor where people can trip over them.

So this gives you an idea of the simplicity to hook up that hose. That's a fire connection, so our firemen are very well trained, they just come through that door, they connect the hose. There's a holdback on the door that pops it open so that it doesn't interfere with the hose, and away you go.

Similarly, at Bruce A it has a slightly different setup, so on Bruce A, this is the emergency boiler cooling system, again one per unit.

You simply come in and you hook up. The picture on the right is just a magnification of the picture on the left.

Because the system's a little bit different than it is over at Bruce B, you don't need to run up the stairwell; you actually go down a level and attach this, so very straightforward again.

And you can see there the standard fire connections at the end of that fitting.

So we talked about the need to open the large relief valves on top of the steam generators in order to be able to cool the fuel. At Bruce, these relief valves are opened by instrument air.

You'll see pictures on the left of Bruce B, on the right of Bruce A. These are the normal parts of the instrument air line, which is an environmentally qualified and seismic qualified line, normally supplied from the instrument air system.

What I don't show on the picture here, just for room, is there's now a rack of air bottles that are mounted close to these. Very quickly, you can run from the air bottles to one of the quick connects you see on this picture and manually open up the RV should the instrument air system not be available. And then the procedure has you block the RV open once it's open so it won't reclose.

So looking first here at the primary fuel bay, you can see, again, the green pipe that the arrow is pointing to, the connection point just at the bottom.

Again, that's about 30 feet in from the exterior door of the plant. You simply hook it up.

On the right, you see that that pipe goes up to the top of the fuel bay and extends over the fuel bay and basically just looks like your faucet in the kitchen. The water comes out of the end of that and runs down into the fuel bay, so fairly straightforward application.

Next one is a secondary fuel bay. Secondary fuel bay, you see the pipe starts on the outside of the plant on the left-hand side, runs up the wall. There are now two big yellow cement bullards that sit there so that somebody can't actually drive into this with a vehicle and damage it. This picture was taken just prior to that.

Runs up through the wall and into the secondary fuel bay, again, much like the faucet on your sink would do.

So electrical connections are next. Bruce A on the left. Slightly different here between Bruce A and Bruce B. There's a single connection at Bruce A because of the way the qualified power system was set up. This is a connection in the plant. It's all labelled, as you can see, and this is specifically for the emergency power hook-up. It's at the Unit 03 boundary.

On the right-hand side of Bruce B, you'll see the connection. This sits outside of each secondary control area, so it's a unit by unit basis and, again, it's down one level, actually, just inside the door as well, so relatively easy to get to.

A couple pictures here of the emergency equipment as set up.

A couple of things to note here, we installed the dry hydrants down into the outtake to the channel that's going out to the lake, so basically at lake level, makes it very quick and easy to hook-up the fire trucks, they take suction from there.

We also have a second site down at the dock. We have a dock at both Bruce A and B at the edge of the lake. You can also put the trucks down there and hook up for some reason if this one should not be available.

In this case, they're just bringing the water back to the outlet channel because the operators didn't really want us to put it in the plant at this point. But we did charge the hoses, ran them to all the places they need to go.

And one of the things we did discover -- this takes us about an hour to set up, we did discover a different way during our practices and there's an interunit feedwater tie which actually runs to all the units now. We're currently modifying that and that'll be done next month. When that's finished, we'll change that time to about 15 minutes.

And that really just gives you another alternative, again, a different place you can put water in and get to where you want to go.

Here's just a quick picture of some of the generators. These are 200-watt –- megawatt -- sorry, kilowatt generators and, in front, the hose trailer moving into deployment. The hose trailer, as you can see, this looks like a very simple apparatus. It took us about four tries to get this simpler apparatus working right. We tried everything from reels to other things, but 2,000-feet of hose takes a lot of handling.

This works real slick. You simply get at one end, you drop the hoses out and pin them down, and the guy drives away with the tractor and they drop out. It's a lot more work to put them back ---

(LAUGHTER/RIRES)

MR. SAUNDERS: --- but from an emergency point of view, putting them back is less important. So getting them out is important and you'll see the techniques that the firefighters use to move them.

A lot of human forms analysis in all of this to make sure it was all doable and effective.

This is just a picture of our storage building. You'll see the edge of one of the fire trucks and you'll see 700-kilowatt generators parked in there.

A little bit more equipment. Here is a couple of front-end loaders clearing ground. So we rely on them should the roadways become blocked or otherwise impassable. So they're the method to clear the roadway.

We did also exercise in Huron Challenge this mobile operation centre. One of the assumptions we made in Huron Challenge was that the control room and the EOC and Bruce B were no longer habitable. We parked this thing outside the emergency pump house and the shift manager used this as his main control centre to control the activities in the plant, again, testing for those possibilities where you can't necessarily ensure habitability. So it worked very effectively.

Command and control, a new AMC. You've seen these pictures before. It just shows how we do that. A pumper actually can be used to control the flow of water if you want it to. So the pumper has that kind of capability to control both pressure and flow should you need it.

Radio system is the backbone. We've got many other ways of communication but the one that will work most of the time and most to any circumstance and can run off of batteries or trucks or vehicles is the good old two-way radio. That's our last line of defence.

We have VSAT and communications via satellite through web and all kinds of things but for the guy on the ground and when you're trying to deploy a large force of people, radio actually is the best way of doing it. Lots of experience with that and that's the one we use as our backup.

A couple of pictures showing our Emergency manager -- Management Centre training. Huron Challenge, again, a very large exercise over 70 agencies participating all tolled.

It went very well. Had huge support, both in the communities and the province and from a number of the federal agencies. We deployed our resources, so did the regions and the province.

We had Health Canada, for example, doing the helicopter flyovers for radiation and they sent me the pictures they took afterwards and asked me to verify if they were correct so we are in the process of doing that for them; because, of course, you can detect some radiation above the Bruce site.

And we really tested the integration, which I thought was marvelous.

Just to give you a picture of a few of the things you didn't see in some of our previous discussions, this is the Provincial Logistic Centre where they’re set up in Mount Forest about 75-kilometres away. They had a fleet of trucks there. That's a transportation division chief that you see on the left and, on the right hand, you had part of the command centre that they were using to dispatch resources out to different parts, and primarily, for the non-nuclear part of the emergency, but -- because in a large scale event that we have, there's many things happening.

A couple of quick pictures of some of the other things: You see the emergency medical assistance team set up here next to the Southampton Hospital. This was one module of their tent. It includes an operating room, beds, examination facility. It can be quickly expanded to a much bigger facility should you want.

High school students decided that they were going to be our patients here and so we had them show up in great droves with all kinds of blood and gory parts hanging off them. As usual, they enjoy this type of opportunity, so it gave the medical staff a little bit of a test.

Emergency Worker Centre also set up; in fact, we set it up in Kincardine and then had a disaster strike it and moved it to Port Elgin to the fire station there just to see that we could do it.

That is one of the key bits in an emergency. It allows the emergency folks responding from the outside to work in the area to be checked after they're done to determine whether they did pick up any contamination and, if they did, to get it cleaned off rather than tramp it around the countryside.

So that's one of the real key elements of an emergency response organization.

So just to give you where we are: We've done that proof of concept exercise; our plant changes are now complete. We have that one enhancement with the interunit feedwater tie-in in progress. Emergency mitigating equipment is complete. The response procedures are done, the responsive plant training is done. Response times are right now 60 minutes up to 120 for both water and power.

Positive impact on safety analysis we're seeing, although that's not finalized. I think we did raise public awareness through the videos and the brochures and a lot of work we've done since.

We'll be done this year, so what we need to do is finish off that interunit feedwater tie. All hazards here, all training will be completed in October. The ERO here I'm referring to here is actually EMC staff that run the emergency centre rather than the field staff.

Final test drill in October: Emergency Management Centre or upgrades. So that's a big diesel generator that makes sure the place runs and that some of the VSAT comms and independent networks still need to be finalized in there.

And CNSC acceptance of our new emergency plan sometime around the end of this year. That's it.

THE CHAIRMAN: Thank you.

I must tell you, on a personal basis, I like photos.

So why don't we jump into the question period and let me start with Ms. Velshi.

MEMBER VELSHI: Thank you.

So for this round, I'll start off with some fairly general questions and the first one is for staff.

How is this plan, action plan kept current as new learning's come out from Fukushima?

DR. RZENTKOWSKI: We continue to evaluate lessons learned from Fukushima and if any update to our Fukushima Action Plan would be required based on international lessons learned right now -- because this is being internationally discussed -- the action plan would be amended accordingly.

So, of course, the licensees would like to have some regulatory predictability going forward but, nevertheless, from the onset, we have this agreement that the action plan can be eventually reopened.

MEMBER VELSHI: So from the issuance to now, nothing has changed; right? We still have those 36 actions?

DR. RZENTKOWSKI: Generally speaking, nothing has changed in terms of the actions.

I believe we modified slightly the acceptance criteria based on additional information received but this is a relatively minor point because this affects only the closure of the actions.

MEMBER VELSHI: My second one, again ---

THE CHAIRMAN: Sorry, but you do continue to benchmark?

For example, the Europeans just came up with a big test -- stress test and Japan is continuing to issue a report.

So I assume you are benchmarking it continuously?

DR. RZENTKOWSKI: That's correct.

We continue to benchmark against international understanding of lessons learned from Fukushima.

And as an example, we included also, as an attachment to our CMD, a high-level comparison against the IAEA Action Plan. Of course, this doesn't get into the details required to decide on the design options but, nevertheless, this directs our thinking towards the right solutions.

MEMBER VELSHI: Right.

I think the key message here is that this is a dynamic plan subject to change? Right.

DR. RZENTKOWSKI: Absolutely.

And, you know, our work doesn't stop on the action plan because, if required, we can always trigger an action outside of the Fukushima Action Plan to address an issue of concern.

MEMBER VELSHI: My second question was: Is there a way to show how much -- if you call this Fukushima

Action Plan a project, how much of it is complete?

Whether it's by level of effort that's estimated by the regulator, by the licensees; whether it's, I don't know, dollars or investment that's made, some measure of us being able to track percent complete?

DR. RZENTKOWSKI: That's an interesting question because, up front, there was a lot of conceptual work in developing strategies, methodologies, et cetera.

So this work, maybe, is not manifested yet in the physical improvements to the plan, but nevertheless this work left a very heavy footprint on our path forward. If I would like to put a number on this, I would say that we are about 50 to 60 percent complete, not in terms of the design modifications, but in terms of the overall work required to put the improvements in place.

MR. JAMMAL: Ramzi Jammal, for the record.

Just to complement this answer, I think you’re making a very good point on messaging to the public from a resource perspective and cost. So we will be taking this comment and updating. As we update the plan, we will start to structure and place the improvements in both dollar value and expansion of resources and physical expansion.

MEMBER VELSHI: Thank you.

And my last question for this round, and I know, Dr. Rzentkowski, you took a fair bit of time to explain how an action is seen to be closed and not necessarily complete or implemented and I still didn’t get it, so let me give you an example.

So you’ve got emergency mitigating equipment, an action to implement those. If the licensees have submitted a plan for doing so, it’s a generic action; do you report that as complete once you receive that or is it complete when all of them have actually completed the action?

DR. RZENTKOWSKI: It’s reported as closed the moment we receive an action plan for implementation of measures identified and then we have to raise specific actions to follow-up on the implementation of those improvements. There is just a simple reason. If we haven’t done it that way, we would probably have hundreds, if not thousands, right now, of Fukushima-related actions. Besides that we have a very well-developed compliance process which we use for the purpose of tracking the implementation; the end point, which is December 2015, applies generally to both generic and station-specific actions. There could be some exceptions because actually the industry may not be able to schedule the outages needed to put some improvements in place, but, nevertheless, the expectation is that by December of 2015 this action will be complete.

MEMBER VELSHI: So for the non-NPPs is that the same rule for something that's closed; that all of them need to complete for it to be closed?

MR. ELDER: Peter Elder, for the record.

When we're looking at that overall table, I guess for this update, we applied the same rule that we would look at close when everybody had done it. I'm saying in future one we'll look at it because we're probably going on a case where after next year, it's only going to be Chalk River that has ongoing, so we come back and say, "We're going to close it for everybody else and just react to Chalk River specific ones going forward."

THE CHAIRMAN: And you will, of course, on an annually report on any issue in terms of the implementation itself?

DR. RZENTKOWSKI: Yes, that's the reason behind the meeting we are having today and also we can report it in the NPP Report because generally speaking the assessment of safety performance is very close to a compliance report.

THE CHAIRMAN: Okay, thank you.

Dr. McEwan?

MEMBER McEWAN: As I've looked through this and listened to it, it seems to me that there are two quite distinct elements to emergency preparedness; the first is the onsite and the activities that you've taken, and the second is all of the offsite societal activities.

As I read through the document, there are five, six, seven, eight different agencies that could be involved that have to be integrated, that have to be coordinated to ensure that whatever is happening on the site is rolled out into the communities that have to be served.

There's not a lot of confidence, to me, in this document that any of that integration is going to work, in fact, with so many different agencies, and it seems nobody is the master.

MR. JAMMAL: Ramzi Jammal, for the record.

Your points and your question is very valid, and that's a challenge that has been to date from nationally, internationally on who is in charge and who makes the decision. But as this onsite and offsite -- mainly offsite -- emergency response is being developed and put in place. That's why in the Record of Decision the Commission itself has directed on multiple occasions the operators to work with the offsite agencies in order to put in place an emergency program. An emergency program that would serve the community rather than serving the operators themselves.

Now, as you can see, that CSA -- there will be more presentations coming up on the enhancement to the emergency plans offsite and those will be -- we can get into the precision from that perspective, but it's work in progress. So I'm not going to deny the fact that we have a robust plan; enhancement is required and that work is taking place right now to put it all together.

THE CHAIRMAN: Just to remind everybody that the next item is about emergency planning and we're going to have EMO people -- they may be connected already -- so we can get into ---

MEMBER McEWAN: Yes.

THE CHAIRMAN: --- some of these discussions a little bit more in depth.

Dr. McEwan?

MEMBER McEWAN: Some of the other things around the broader educational activities that are described in Appendix C. Do you have any QA around that? Do you have any QC? Do you have any idea of how well your educational offerings are accepted by the public?

MS. GIBB: Timothea Gibb, for the record.

We have some web analytics on how frequently they're being used. They haven't received a significant number of hits. Our new channels on Facebook and YouTube are growing, so we're seeing increasing uses of those and with each new video or module we post we're increasing our likes or our subscribers. So bit by bit it's growing.

We're also exploring new partnerships with organizations that already have access to, say, curriculums and school boards to look at other ways where we can increase that dissemination of information.

MEMBER McEWAN: Do you have any feedback, though, on -- I mean, it's all well and good that lots of people are looking at it. Are lots of people understanding it and taking home the message and understanding what you're trying to do? Do you have a way of checking that?

MS. GIBB: I'll be honest; we don't really have a good way of measuring that because people are taking it home with them. So we gauge our reaction based on the comments that are sent in to us by email or the comments we receive when we're out at different events. But I don't have a solid way of measuring how effective it actually is, you know, when a child takes something home from a classroom.

MEMBER McEWAN: That strikes me as an important thing to do because if lots of people are looking at it and nobody is understanding it, it's not a useful activity.

MS. GIBB: We gauge level of understanding, again, by the feedback we get directly. So when a staff person takes some of the information into the classroom, generally we will get feedback directly onsite from those users. So whether it be the children in the classroom or a conversation with the teacher afterwards, if we participated in a special event at the museum, we'll take that feedback directly onsite and that's generally we find the most valuable is that face-to-face feedback we get.

THE CHAIRMAN: Just if I may, some of the students that we hire -- the summer students, I had a little pizza lunch with about 20 of them and they all said to me that they never got exposure to nuclear issues until way late in university, definitely not in high school. So there's a real issue in reaching into the science teachers and making nuclear power part of the curriculum. I think it's at least nationwide, and we're trying to produce products that can be used by teachers, but if they don't use it, we can't force them.

Mr. McEwan?

MEMBER McEWAN: I've asked my question.

THE CHAIRMAN: Dr. Barriault?

MEMBER BARRIAULT: Thank you, Mr. Chairman.

My first question deals with NRU and the timeline really for integration of their action plan, and

I guess I couldn't help but wonder why is it at the time when they won't have a licence anymore that you're asking for that. It's 2016 when their licence runs out and that's when you're going to ask them to finish the work that they're supposed to do to integrate into the system, so maybe you can explain that.

MR. ELDER: Peter Elder, for the record.

I think you remember when AECL to support the last licence renewal, well, it's a five-year licence. They had actually done the safety case for NRU over a 10-year period. So their analysis went out to potential operation to 2021.

So the improvement plan is not all going forward in terms of -- to 2016, but we did fix it based on the licence term.

MEMBER BARRIAULT: So was it because you wanted this as a condition of licensure at the time?

MR. ELDER: No -- well, it was, yes, because it was associated -- remember, that action plan was put in place a few months after Fukushima.

So we adjusted things and brought certain actions forward based on the knowledge that we had at the time and what the activities were in the plan.

MEMBER BARRIAULT: So is there any reason why it can't be done sooner, like all the nuclear power plants?

MR. ELDER: We'll look at them and it's just that I think, when we have a specific update on Chalk River, we can look at the timing of issues around that as well.

MEMBER BARRIAULT: It's just that ---

MR. ELDER: But their plan is just that, you know, with the announcements and everything to date has been not -- you know, they owe us a decision on the future of NRU ---

MEMBER BARRIAULT: Yes, exactly.

MR. ELDER: --- next calendar year and the announcements to date and everything is about -- have been about isotope production, not necessarily the future of the whole reactor.

MEMBER BARRIAULT: Thank you.

Next question deals with the, I guess, station boundary monitoring and those modelling for the different plants.

And I guess I can't but wonder how far outside the plant or the plants does this actual testing or monitoring carry?

I mean, is it a mile, two miles?

And I know that Health Canada is also involved in this.

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

We can ask Mr. Luc Sigouin to provide with precision. We had those discussions and he’s got the precision with respect to how far out they go.

Luc?

MEMBER BARRIAULT: Thank you.

MR. SIGOUIN: Luc Sigouin, for the record, Director of Emergency Management Programs at the CNSC.

So what each of the -- what the action plan required and what each of the licensees has either implemented or implementing is gamma radiation monitoring at their physical boundary and I guess they could provide more specific details about how far that may be from the reactor site but it’s -- from the reactor per se, but it’s on the order of a kilometre in general.

MEMBER BARRIAULT: A kilometre or eight?

MR. SIGOUIN: One kilometre.

MEMBER BARRIAULT: One kilometre.

MR. SIGOUIN: Yes.

MEMBER BARRIAULT: Okay.

MR. SIGOUIN: But that will vary.

In addition to that, more specifically at Bruce Power, their plan entails adding additional gamma monitoring systems off the site into the 3 and 10-

kilometre ---

MEMBER BARRIAULT: Okay.

MR. SIGOUIN: --- area.

And that is to complement the existing Health Canada fixed point monitoring systems that are installed in regions around all of the plants already.

MEMBER BARRIAULT: And Health Canada, how far do they go out or do we know?

MR. SIGOUIN: I don't have the specific information with me but they go out tens of kilometres away from the plant ---

MEMBER BARRIAULT: Okay.

MR. SIGOUIN: --- and they have monitors installed in regions and cities where there are no nuclear power plants.

So they can track radiation distribution across the country.

MEMBER BARRIAULT: Okay, thank you.

I guess the next question really is to the nuclear power plants and you're going to have all this equipment sitting around that, hopefully, you will never have to use: generators, fire trucks, pumpers, whatnot.

How are you going to maintain this to make sure that it's available when you need it?

I have visions of the diesel fuel being

congealed in your tanks when it comes time to use it and it won't start and a whole variety of things.

So maybe you can explain to me what the procedure is?

MR. ELLIOTT: Mark Elliott, for OPG, and I'll let the others chip in as well.

We recognize this is an issue. In fact, the operating experience from other jurisdictions is when some of this equipment was put in place years ago after 9/11, that it wasn't properly maintained at certain places. There was modifications made that didn't take it into account.

So we're aware of this operating experience and, with every new piece of equipment, we've got a preventive maintenance program ---

MEMBER BARRIAULT: Okay.

MR. ELLIOTT: --- that has people go out and check and run it.

Plus our drills. We have to keep our skills honed on this and so there'll be continual drills with this.

Frank?

MR. SAUNDERS: Yeah, well, the intent there -- Frank Saunders -- the intent was to use common equipment that we could easily run and test.

So the fire trucks, for example, so we have five fire trucks. Two are always in service, so we rotate them monthly. So those trucks will always be running and tested and the crews will be familiar with them.

The things like the generators, we have a test bank and, again, there's a PM schedule that you have to run up the generator, put it on the test bank and test that it works on a regular schedule.

So all the equipment is set up that way. We've treated it very much analogous to a safety system in that sense in that there's a continuous set of call-ups to run and test the equipment.

MEMBER BARRIAULT: Any idea of the recurrent cost of keeping this equipment on site or is it fair to ask that really?

MR. SAUNDERS: It's a tough question to ask because I don't think we really appreciate the maintenance costs yet.

It's the equipment is new and we haven't had time to do that analysis. But it won't be trivial because there's a lot of equipment and it takes a fair amount of work as you know as things age to keep it going.

So my guess is that it won't be trivial. I can't tell you exactly what it's going to be at this point.

MEMBER BARRIAULT: Thank you.

Thank you, Mr. Chairman.

MR. ELLIOTT: Any comments from Sean or Paul?

MR. GRANVILLE: Yeah, Sean Granville for the record.

So, at Point Lepreau, it’s a very similar approach. You know, as we deploy this equipment, we’ve developed preventive maintenance and testing strategies so -- to ensure that it stays fully available and our people, you know, get to drill on it. So they stay tested as well.

MEMBER BARRIAULT: If I may, you’re relying on the adjacent community fire trucks.

Will you be having your own fire trucks available?

MR. GRANVILLE: Yes, we -- at Lepreau, we are in the process of putting together emergency mitigation equipment this fall.

So, yes, we will have our own dedicated equipment.

MEMBER BARRIAULT: Thank you.

THE CHAIRMAN: And I assume that staff will incorporate all those new equipment into your inspection program?

MR. JAMMAL: That's correct.

Ramzi Jammal, for the record.

Or as part of the implementation, and site-specific action plan will include staff inspection verification of both the in-progress and implementation and the testing required because those will be considered as integral parts of the safety system.

THE CHAIRMAN: Okay, thank you.

MEMBER BARRIAULT: That's all. Thank you.

THE CHAIRMAN: Monsieur Harvey?

MEMBER HARVEY: Merci, monsieur le président.

Mr. Elliott, in your presentation, you -- right at the beginning, you mentioned that you now have a common objective among the utilities and you have established a set of principles and derived actions.

I just want to know, in what it is -- are you adding to the staff expectations with that or is a response to the Fukushima Action Plan?

It is another way to say the same things?

MR. ELLIOTT: Mark Elliott, for the record.

It's a good question, one we were thinking about actually today because the Fukushima Action Plan is very comprehensive.

And we did want to decide amongst

ourselves, you know, how far to go, what procedures to put in place and they ended up being different and we were concerned about that.

So we invented these principles that we may be different in detail but we're common the principle. So that's what drove this.

When we compare this to what we're being requested to do by the Fukushima Action Plan, there's a lot of commonality. There is a lot of commonality and, you know, partly, the Fukushima Action Plan will ask us to take action and investigate and report back on what we're going to do about this particular issue.

Well now, we'll be able to tell as a country what we're going to do.

So it jives with -- I think it matches very well the Fukushima Action Plan from the CNSC and what we're doing as an industry.

MEMBER HARVEY: So let me turn to the staff.

Were you surprised certain items?

DR. RZENTKOWSKI: Greg Rzentkowski, for the record.

Was I surprised? No, probably not.

I was very happy to see this kind of alignment because, of course, this allows us to accelerate all the actions related to the Fukushima Action Plan if we have a good understanding of what needs to be done on both sides of the fence and this is exactly the case here.

And also what I would like to point out is that the actions in the Fukushima Action Plan are written at the level of general objectives: for example, assess the means of protecting containment it’s up to the industry to decide on the best design options and those design options may differ from site to site; it may be simply performance-driven or risk-driven decisions.

So we are okay with that and we do recognize the fact that the final means could be different but, nevertheless, as long as the actions taken meet the overall objective of the action plan which are reflected in our actions, we will accept the proposed solution.

MEMBER HARVEY: The last comment maybe is the fact that when you had all the efforts made during the last two years and all the equipment presented here today, we will be far away from where we were before.

So one could say that we were insecure before.

So is it a good?

DR. RZENTKOWSKI: I wouldn't say that the station were unsafe.

There was a different philosophy related to the safety of the site. The focus was on so-called design basis accidents and the probability of the design basis accidents extends to 1 in 100,000 years. Below that, we're beyond design accidents.

After Chernobyl in particular, the industry and the regulators decided to pay some attention to BDBAs, but everything was done predominantly as voluntary activities undertaken by the licensees. There was very little guidance or requirements stemming from the regulatory decisions.

This situation has changed drastically after Fukushima. We still don't have clear requirements written down but, nevertheless, we are very aligned with the industry. Effectively, what has happened is, I think, we moved this line from 1 in 100,000 to probably one in a million years. And, in addition, what is the most important, we took the approach: Expect the unexpected. This means that we assumed that accidents will happen.

Because of that, we focused on designing mitigating measures which would be very effective in mitigating consequences of the most severe accidents; not even talking about the probabilities here, but simply evaluating certain accident scenarios. No matter what the probability, we decided we will implement mitigating measures in place.

So the safety gains are really incredible. It's very difficult to put a number on that but I really believe that the Fukushima Action Plan and effort implemented by the licensees will move the safety bar incredibly high.

MEMBRE HARVEY: Merci.

THE CHAIRMAN: Thank you.

Mr. Tolgyesi.

MEMBRE TOLGYESI: Merci, monsieur le président.

Nous avons entendu les interventions de OPG, du Nouveau-Brunswick, de Bruce en ce qui concerne leurs actions aux Actions de Fukushima.

Qu’est-ce que vous faites au Québec?

À Gentilly 2, est-ce que vous faites quelque chose? Vous participez?

M. GÉLINAS: Claude Gélina.

Comme vous le voyez, je suis resté pour la présentation. C’est parce qu’on participe avec le groupe sur toutes les actions de Fukushima à la différence près qu’il y a certaines actions qui nous sont plus applicables chez nous.

On avait déjà, avant le 20 septembre, avant l’annonce de la fermeture, mis en place certains actions dont les parts étaient toutes installées à Gentilly, les recombineurs pour l'hydrogène, une génératrice d'urgence pour ramener de l'électricité en cas de perte totale d'électricité, pompe d'urgence pour remplir la piscine si on a et on est encore rendus là.

On continue à s'améliorer de ce côté-là. Par contre, je regardais les neufs principes qu'ils ont mis en place, les trois derniers s'appliquent puis je vais m'assurer qu'on continue dans la même ligne de pensée que nos confrères.

Les six premiers qui sont plus du côté du cœur du réacteur, bien entendu, y sont moins pertinents mais la pensée, la philosophie derrière ça est excellente.

Donc, je participe au groupe, le CID, le groupe d'intervention sur Fukushima et je participe aux rencontres des 'Chief Executive Officers' à tous les mois par conférence téléphonique.

Donc, je suis les sujets et je m'assure que, à Gentilly 2, on continue à suivre.

Notre piscine est là encore pour sept ans, donc, on a encore des choses à faire.

MEMBER TOLGYESI: Mr. Elliott, you were talking about cooling, that when you add water -- eventually, the principals in Japan, they were adding water to cool it down and they used ocean water, et cetera.

You were saying that if you add too much water, it could be -- it could generate damage.

What kind of damage? What's the consequence of adding too much water?

Because, you know, public perception is that we can cool it down. That's why the problem was there. And now you are saying: Be careful because if you add too much, it will be a problem also.

MR. ELLIOTT: Mark Elliott.

I'll ask Fred Dermarkar to answer that question.

But in terms of the structural integrity of containment, if you keep adding water and fill containment with water, you start to put pressure on the inside walls.

And I'll let Mr. Dermarkar explain further.

MR. DERMARKAR: Thank you.

For the record, Fred Dermarkar, Ontario Power Generation.

Several things occur when you start to add an excessive amount of water: You can flood equipment that you may need for the longer-term recovery effort.

In terms of containment integrity, one of the first issues is that you can challenge the air lock seals. You know, we have these doors that go into containment. These doors -- the containment boundaries preserved by rubber seals around the doors that inflate and they're a weaker point than other parts of containment.

So if you fill above that point, you can put -- you can start to challenge the integrity of those seals.

Most importantly, though, in terms of the longer-term response, beyond the first few days, you don't want to create a liability with a large amount of contaminated water. You want to keep the contamination inside the building as much as you can.

So the notion of being able to recirculate and cool the water or allow the water to vent so that you're maintaining a low -- the steamed event -- so you're maintaining a low inventory of water within containment enables a much more effective and much earlier recovery so you don't deal with the longer-term liability of contaminated water.

So those are the issues.

There's issues around equipment, around containment integrity and around the long-term liability of managing contamination and keeping it inside the plant.

MEMBER TOLGYESI: Which means that, as long as you don't have a leak, it's okay because you could control your water, the volume and recycling, et cetera.

But as soon as you have a leak, as it was in Japan, there is always a leak -- that's why they were adding the water and they were -- they had a problem not with the pressure but with contamination.

MR. DERMARKAR: Fred Dermarkar, for the record.

In Japan, the biggest problem is that their containment integrity was violated. Containment is broken.

Once containment is broken, it's not possible to keep the water contained. It's not possible to keep the air contained.

Our objective -- as Mr. Elliott pointed out, our objective is to make sure that we never get to that point where containment integrity is threatened and that's why we've introduced these multiple layers that ensure the fuel is cool, that energy that's built up inside of containment just due to the heat is appropriately vented or cooled and containment pressure is kept low.

As long as containment integrity is maintained, there is little or no leakage and we don't -- we won't have the issues in Japan.

Once you break containment then it becomes very difficult to control leakage either by water or by air, which is exactly the issue that they're having in Japan today.

THE CHAIRMAN: Thank you.

Dr. McDill?

MEMBER McDILL: Thank you.

I have a number of questions. I'll just go through them in order.

In staff's presentation, you refer to a “cost-free CNSC expert”.

To whom is the cost free?

(LAUGHTER/RIRES)

MR. JAMMAL: Ramzi Jammal, for the record.

Yes, we always get beaten up by this "cost-free". It's cost-free for the agency, and it's not cost-free for the CNSC.

So it's a cost-free expert to the agency in order to ensure that the Canadian interests and the CNSC interests are being looked after.

MEMBER McDILL: Thank you. That's clarification. I assumed that was the answer, but I thought I'd better ask.

In the crisis website, I think it was -- this was explained in the presentation, but the website will activate even if there is media interest in some international event.

Is that true?

So Fukushima, for example, or, I don't know, a ---

MS. GIBB: Timothea Gibb, ---

MEMBER McDILL: --- reactor site.

MS. GIBB: --- for the record.

The crisis website would only be activated, it would -- first of all, it would have to be triggered by a significant nuclear emergency or accident or incident.

And the decision would then be taken by our executive committee whether or not to launch that home page.

But it likely would not be simply as a result of media interest in an event.

MEMBER McDILL: Or maybe an example then. There’s some Three Mile Island like incident somewhere in the U.S. What about a Three Mile Island type incident?

MS. GIBB: Yes, it would apply to either a domestic or an international nuclear emergency, yes.

MEMBER McDILL: And are there rules in place to know when that would happen or is it going to be whoever is working that day kind of decision around the table?

MS. GIBB: Timothea Gibb, for the record.

No, there are rules in place. We

established sort of criteria for what would be an acceptable reason to launch it but that would need to go to the executive committee who would ultimately make the decision.

THE CHAIRMAN: That’s going to be an executive decision. I can tell you for Fukushima, we could have used one of those to explain what is an isotope and what does a nuclear plant looks like. So it’s for really answering the basic questions.

MEMBER McDILL: That’s my first two.

THE CHAIRMAN: Okay. Let’s go to -- let’s start again.

Ms. Velshi.

MEMBER VELSHI: So I’ll stick to the communication angle here. And, Mr. Jammal, you’ve talked about how it would be kind of difficult to communicate what the impact of this investment is to the public.

But is any thought being given to that because I think it’s saying all our plants are safer now. They were always safe, but they’re much safer now.

What is being planned on being able to communicate in meaningful terms? What does all this investment really mean and how can I now sleep better at night?

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

I will start and I will pass it on to my colleague Ms. Gibb.

What I meant is the impact. It's as we educate the public on what needs to be done and look at the cultural aspect of the -- you're going to see the presentation from our co-op student who went to Fukushima and myself to visit Fukushima. And currently I'm working as a co-chair of the work group on the comprehensive work at Fukushima for the IAEA.

So the impact is to measure. The studies have shown and the actual event of Fukushima have shown educating the public, transmitting the information to the public in the manner they understand and educate them what to do when there is an event. So in other words, it's not an instantaneous meltdown. It's not instantaneous evacuation. There are some measures the public can take and understand.

The biggest problem becomes is how the public believes authority and how we are going to implement it in a manner the public will have this trust. And that's where the Commission decision or the record of decision to ask the operator to work with their communities in order to put in place the communication aspect and for the public to know what to do during an emergency will lessen the reaction and mitigate the overreaction from the public.

Now, on the communication end, we have multiple things we put in place at the CNSC itself. There is the CNSC 101, which is open to the public, on what is the role of the CNSC, what's the role of the Commission. We have uptakes.

Unfortunately, the nuclear is always a bubble. People will have to -- either we have to open up this bubble or break into this bubble. And the disadvantage we've got is a lot of special interest groups, they thrive on the fear-mongering aspect rather than trying to provide factual responses to what is occurring or what potentially could occur.

So for us, putting in place this action plan and communicate that, we do now consider an event is going to take place. We have plans in place that if the events occur, here's the action that will be taken.

We are hoping to bring in on board most of the individuals who are on the fence to accept that there are mitigation measures in place. There are agencies that do exist and the raison d'être is to literally ensure safety of the public and the environment.

On the communication specifics, I have to refer to Ms. Gibb who is the expert in their plans from a communication perspective.

MS. GIBB: Thank you. Timothea Gibb, for the record.

To give you some tangible examples on how we try and demonstrate sort of the lessons learned and the changes that have been applied as a result of Fukushima and what we're doing through the action plan, we've updated various sections of the Web site, including providing descriptions on the safety systems within a nuclear power plant. And we specifically highlight what changes are as a result of the lessons learned from Fukushima.

In the video, I mentioned where we walk through this extreme accidents scenario, we also do the same thing. We highlight what are the new measures that have specifically been implemented as a result of the lessons learned. So we look for opportunities like that where we can provide tangible examples of what is the fruit of all of this labour.

MEMBER VELSHI: Maybe I'll ask the licensees if they can share anything as you go out to the public and tell them what you have done and are doing post-Fukushima in making the plant safer.

How do you communicate it so that it's more meaningful rather than we put in more equipment and more systems in place?

MR. ELLIOTT: Maybe I can start. Mark Elliott for OPG.

What we've said at kind of the end of every session where we talk about the equipment is that our plants were safe in the past, they're safe now and they're getting safer, and that part of our safety culture is to continuously improve, to respond to operating experience, to respond to events around the world, keep learning, keep improving safety. That does seem to resonate that we're in tune with what's happening and we're not complacent.

I think one of the things is that's very important to the public that we aren't complacent and we are continuing to improve our safety.

Frank?

MR. SAUNDERS: Yeah, I mean we've put a lot of time and effort into communicating with the public. Here our challenge was, you know, as much about that as it was about proving the capability we have in place and we did create a couple of videos, which we've shared widely, and a number of books that's along in that regard.

We've been very careful to tell people that, in reality, we haven't actually found an external event that can do the kind of damage that was done in Fukushima, and I think most people actually accept that as being reasonably true. But these efforts are there as a just-in-case and people seem to accept that.

Another area we've talked to them a lot about is the communications we will provide if we're in an emergency, you know, to the point where we're creating our own radio broadcast capability so that we can broadcast local signal if we need to.

Unfortunately, in Canada, our capability in that regard is still somewhat limited but so we'll do a local one so we can make sure we can cover the local area and at least reach our own staff that we need to get into site.

And in my view, if there's an area that really stands out from Fukushima and an area where Canada has not done the job it needs to do, it's in public communications because that area was, in my view, the biggest problem in Fukushima. It created the most concern and created some of the biggest areas was a lack of trust in the information that people were provided because there just wasn't very much of it flowing. If you remember the event, it was full. So that's been my pitch for a while.

It's very hard to move the establishment in this area, but we're trying to encourage them to -- we've got lots of technology that we could use. We're just not really set up to use it yet.

MR. GRANVILLE: Yes, Sean Granville, for the record.

At Lepreau, we've done a lot of dialogue with our Community Liaison Committee, First Nations groups, when we've used things like newsletters or Web site, et cetera, to sort of get the message out. And, you know, certainly our local community is very supportive.

We've had some challenges in broader New Brunswick population with the, you know, challenges we had during refurbishment, but we continue to work at it.

MR. POWERS: Kevin Powers, for the record, with OPG.

If I could just expand on what Mark Elliott had said, there are really two components to public communications around nuclear and nuclear safety.

The first is communicating the safety of the plant and the safety systems in the plant to ensure the safety of the public.

The second is what the public could and should do in the event -- in the unlikely event of a nuclear emergency and we have, since Fukushima, put quite a bit of effort into communicating these aspects to the public.

We have done advertising to the public in and around our nuclear stations and our host communities.

These have sent people to enhanced Web sites with videos to help them understand the systems that keep them safe in the event of a nuclear emergency and the actions that we've taken around Fukushima. We've sent out newsletters to over 200,000 people.

In the event of Fukushima, we sent out a special newsletter on Fukushima and the emergency measures and safety measures that were in place.

Brochures have gone out to all of the residents around the nuclear plants in the Durham area, and we have presented in front of community councils, city councils, our community advisory groups and health committees.

However, our work is not done and we recognize that there is still a lack of public awareness and a need to further enhance our efforts, and that's what we're going to be working at extensively over the next days, months, years.

MR. JAMMAL: Sorry, it's Ramzi Jammal, for the record.

Ms. Velshi, allow me to add, it's when I spoke of cultural aspect, and this is with the upcoming exercises, where they're going to be stressing the system and actually engaging the community as part of the response. Those are going to be the tests where we're going to transform not us, but the transformation of this virtual discussion to action.

And that's where I spoke about the education, and this is the public recognizing, realizing what they have to do.

They might not accept the risk being next to a power plant, but they have to accept the fact that they need to know what to do in a case of an event. So those exercises will be a benchmarking on the engagement of the community and how the communities are responding.

So the cultural aspect is: the more exercises that are taking place, the more the public will know what to do, hence there is success in the response itself.

MEMBER VELSHI: Thank you.

I want to commend the licensees for getting together and collaborating and coming up with the objective and the principles. I'd be very interested to hear what staff have to say. I was, frankly, a little surprised that they hadn't been involved in the process earlier.

But my initial reaction on looking at the principles was that, again, it would seem very much focused on equipment and processes and systems. It's similar to when the action plan was first presented in front of the Commission and many intervenors said, well, where's the organizational, the human factor side.

So in line with my earlier question, I didn't see a principle around engagement of the public, around the communication about reducing the anxiety level, working with international or whatever, but some principles around that whole human side of things.

And maybe it's buried in the training and the drills and so on, I'm not sure. But again, as I said, I'd be interested. I mean, I've just seen this now and, on further reflection, maybe it's all there. It just seemed missing on first look.

MR. ELLIOTT: Mark Elliott, for the record.

We'll take that feedback. I mean, that's good feedback.

We -- this is its first open discussion of these principles, and so we'll -- I'm sure we'll get more feedback and certainly we'll get feedback from staff when we present to them.

It was filling a need that we had right away. We had a need to get consistent on our -- I guess our technical response, and it's done that. But we'll take that away. We understand that comment.

MEMBER VELSHI: Thank you.

THE CHAIRMAN: I'd like to piggyback on this.

So the process will be you will submit this formally, those principles? I actually personally liked your layout of those principles. But our ability to complicate life in this sector is breath-taking.

So between your nine principles and the action plan, I think there's room for, again, integration into some more -- because the human factor is in the action plan and the communication is in the action plan.

And I'm just wondering whether -- well, first question, very precise question, if that will be submitted, those nine principles, to staff, are you planning to extract from it whatever you can put into your LCH?

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

Of course we'll be putting in the LCH certain elements, but I would just like to clarify one thing.

We commend the industry to have the nine principles. I have no problem with it. But I'm going to be a bit harsh. Industry didn't do it on their own, so we had the action plan as the prescriptive requirement in order to establish what our objectives are. So hence, they put this performance based in order to meet our requirements.

We commend them. We accepted to do such things.

And in relation to the LCH, as we said, the site-specific action items are an integral part of the compliance activity and as part of the regulatory oversight.

Of course we're going to take the principle and we're going to do an analysis to make sure did we miss anything from staff perspective? And Mr. Harvey asked the question, "Is the industry going beyond expectation of staff", if it is, then probably next year you'll see fully satisfactory, so -- not just satisfactory. So all seriousness now, yes, we're going to evaluate.

Communications, they have no choice. They have to put communication in place. We're going with the RD documents, so 99.3 is already in the LCH to establish a proactive disclosure, to establish communication with the community. So all these things are being put in place.

Yes, we -- I personally did not see the principles, but there is nothing surprising in those principles.

But again, I do commend the industry to come together, which will make our life a lot easier, and then we will integrate what needs to be done. And the LCH will have the follow-up on these things to complete them on time.

THE CHAIRMAN: All I meant by this is there's a different way of packaging the same thing, and the integrated action plan is not exactly easy read when you get into all the small actions, so you might want to consider now, moving forward, as to going on in seeing if there's a different way of packaging the same actions.

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

We fully agree with you. We struggled with this document, and it becomes into two component, the technical actual component that we have to track on regulatory oversight basis and then the messaging aspect, as Ms. Velshi mentioned, is how do you measure and evaluate success with respect to this action plan.

THE CHAIRMAN: Okay, got to move on.

Dr. McEwan?

MEMBER McEWAN: So again, I’m going to stay on the same theme, if I may, because I think -- two things.

If I read through the summary of the recommendations for the external advisory committee report, one of them is working with other regulators, working with WANO. And it seems to me that the principles are at least an evolutionary step to doing that.

Are you getting traction from the other regulators or from other members of WANO for this type of structured approach?

But I think the other element to is, I mean, it seems to me the principles are in an enormously valuable potential educational tool because what you, as an industry, are saying is we're eventually taking steps to understand and we've taken steps to articulate responses to that understanding.

But I would agree, I think the absence of a human factor is a gap.

MR. ELLIOTT: Mark Elliott, for the record.

I can answer on the WANO side and the industry side, and then I'm sure the staff will want to answer about the regulatory side.

The question was asked earlier about, you know, are we continuing to learn from issues as they are developing.

There was a recent WANO significant operating event report that came out that took the latest learning, and we're all responding to that now. And some of those are those higher level learnings that we got, how did the utility react when they got information about potentially higher tsunami and how would we react and, as an industry, how can we react better in the future.

So we are continuing to learn from the event and working together as an industry.

As far as these principles, it's -- this kind of discussion is happening all around the world right now. And it's not clear what the outcome will be yet.

As a group of Canadian utilities, we wanted to be at the forefront. You heard me say that. And so we got together and made this statement.

So I'm not sure where the world is going on this, it's being discussed. We are contributing to that discussion, and we've already brought this -- you know, this construct to the attention of some industry people around the world. We'll just have to see where that goes.

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

From an international perspective, regulators, we are in constant communication with the regulatory bodies. And there are multiple indicators or, if I can say, regrouping of the regulators on not annual, but bi-annual basis to review where are we against the action plan.

I, myself, and Dr. Rzentkowski has been asked to appear before other regulators to talk about the filtered venting that Canada has been recognized for post-refurbishment of one of the elements for containment protection and maintaining containment integrity.

So these discussions are taking place at all levels and the challenge the regulators will face and very bluntly is -– and that’s why you hear us and the external advisory committee talk about transparency -- safety at the international scene doesn’t have a champion as much as security-safeguard, from political perspective.

And that’s where the enhancement will have to take place from a regulatory perspective because under the IAEA, it calls for every government to put in place an independent regulator, but the reverse is true that every government should ensure that the regulator is carrying out its function in order to maintain safety in an appropriate manner.

So the regulator is independent from government but not isolated from government. So that independence is taken to the extreme and that’s where Canada and the CNSC, in specific, is pushing for the review at the political level to make sure that if there is no responding regulator, that the politicians are being involved.

And we have one current case. I’m leading an IRRS follow-up mission to a member state. I’m going to call it Russia, where actually the president of the federation itself requested an IRRS follow-up mission by an international group to see how good they are implementing the suggested recommendations of 2009.

So this is where the change with respect to the political input into the oversight of the regulator from functionality perspective, not decision-making perspective.

THE CHAIRMAN: Dr. Barriault.

MEMBER BARRIAULT: Just a brief comment, Mr. Chairman.

I honestly think that we have to thank the industry and the CNSC for the work that’s been done to date and the progress that we’ve seen since Fukushima.

Je voudrais dire la même chose à Gentilly-2 pour le travail qu’ils ont fait et aussi pour la sécurité de leur usine, puis même qui continue à faire avec la piscine pour refroidir.

Alors, j’aimerais remercier tout le monde dans l’industrie pour ce qu’ils ont fait jusqu’à date puis ce qui reste à faire.

It will be interesting next year to look at the final product and see where we’ve landed. I think we’ve come a long way since, if I remember just not too long ago, we were talking about sirens and we’ve come a long way since the sirens.

So thank you very much everyone for making our work maybe easier. Thanks. Merci.

THE CHAIRMAN: Thank you.

Monsieur Harvey.

MEMBER HARVEY: I just support what has been said by my colleague here.

THE CHAIRMAN: Monsieur Tolgyesi.

MEMBER TOLGYESI: Two short ones.

One is you were talking about this auto –- how you call them –- vessels which are autocatalytic recombiners and you were saying that there is some -- the hydrogen is passing through these catalytic recombiners but there is some residual hydrogen which is rejected to the air after passing.

So what’s the efficiency of this recombiner? How much hydrogen it could eliminate?

MR. DERMARKAR: Fred Dermarkar, for the record.

The capacity of the passive autocatalytic recombiner in terms of how many kilograms or kilograms per hour it can take depends very much on the conditions in containment, and it’s not a simple answer.

For example, if you have inerting conditions, conditions where there’s not a lot of oxygen, such as when you have a lot of steam, there’s less recombination of hydrogen simply because the chemistry is not there.

When we do our studies, to put it into perspective, for the very severe accidents that we look at, we get up to a thousand kilograms of hydrogen being generated and typically these passive autocatalytic recombiners would recombine something on the order of 850 kilograms.

The key point isn't so much the number. The key point is, are they keeping the hydrogen below the flammability limit? So these recombiners, what they do is they take the hydrogen and recombine it with oxygen well below the flammability limit and they maintain it at that value.

And so for the well progressed severe accidents that we look at where hydrogen is generated, we're finding that the mitigation that they provide is effective.

Now, not all the reactors have been analysed but at this point we've got both Lepreau and Pickering, Pickering B, have been analysed and they've confirmed that the recombiners are effective. Analysis is in progress at Darlington and at Bruce to confirm effectiveness.

THE CHAIRMAN: Can I intervene here? This is a Canadian technology, if I'm not mistaken, and I think it was invented by AECL and maybe CANDU; there's still CANDU energy here.

I want to know, if this is such a great technology, are you selling tonnes of them all over the world? And if not, why not?

MR. LEE: For the record, Albert Lee from CANDU Energy.

The passive autocatalytic recombiners that were originally designed by AECL and are now part of the portfolio product supplied by CANDU Energy have been supplied to CANDU power plants, both domestically and internationally.

We've also supplied these recombiners, first, to PWRs in Finland. We've supplied the basic recombiner –- the catalyst plates to fabricate recombiner units for 14 of the PWRs operated by Électricité de France and we've supplied recombiner units to Japan for some of the reactors in Japan, and we've had interest from other PWRs.

THE CHAIRMAN: Sounds good. The market is talking.

Monsieur Tolgyesi.

MEMBER TOLGYESI: Okay. My second is –--

THE CHAIRMAN: Thank you.

MEMBER TOLGYESI: This is to staff. To what extent non-nuclear power plants, like Slowpokes, Port Hope, uranium mines, are involved in the post-Fukushima action plan, because if there is something, I'm talking about seismic activity along the Lake of Ontario, it could be Port Hope will be affected, uranium mines? So how far are they involved in this process?

MR. ELDER: Peter Elder, for the record.

So we asked everybody the same basic questions to look at the initial lessons learned and look at them from two perspectives, which is defence in depth and then from emergency response.

Going forward, we would use and expect them to use this continuous -- the same continuous improvement mechanism. So if new information came out of what comes out of NPPs, we have mechanisms through our normal licensing compliance to ask further questions of these facilities if there are relevant questions coming out.

So they're not being involved necessarily in the industry working groups to the same extent as NPPs, because there's really a different hazard that has to be managed for the NPPs. But like any changes, I mean, you'll see some examples tomorrow when we look at changing our regulatory documents.

The driver for that document may be coming of what came out of the NPPs and Fukushima. Then we look and say, well, is this applicable to other facilities? Does it make sense to ask other facilities to do the same thing?

It's a continuous lessons learned. As more of the lessons learned come forward, we will review all of them as we've done to date and see which are applicable to a wider range of facilities.

And to give you a very specific example, there was action about the offsite emergency plan to formally submit that plan. It came from the NPPs as they formally submit that. We said that's applicable to anybody. If you have an offsite emergency plan, you collaborate with someone offsite and the mines do this. They collaborate with -- around forest fires and things like this one.

Submit those plans so we can see that they are appropriately integrated with the onsite plans. So it's a one measure that came from the NPPs that we determined is applicable to everybody.

MEMBER TOLGYESI: I just want to say that probably conditions are different on those. They don't need necessarily -– they don't have conditions necessary like power plants. It's like don't want to impose Ferrari regulation for high speed 300-kilometres to a smart, you know, because it’s not ---

MR. ELDER: No. Peter -- this is Peter Elder, for the record.

I mean, this has been to make sure that when we propose something is appropriate to the risks that are there.

So when we say offsite plans, you know, when we're talking to OPG, it's a very big plan that's being submitted. When you're talking to a SLOWPOKE, it's actually probably their university -- you know, do they have -- but we’ve asked this in plan. Do they -- does the local fire department know what hazards they may have to account.

You know, it's -- we've always asked those questions, just formalizing those questions and what the appropriate level is for the risk to the facilities.

THE CHAIRMAN: Just as an observation, the licensees push back when we impose a Ferrari on them.

(LAUGHTER/RIRES)

THE CHAIRMAN: Dr. McDill?

MEMBER McDILL: Thank you.

One last, most of the rest have gone. With respect to the mutual aid pact, obviously New Brunswick is a little bit physically far away to have a heavy lift vehicle drop a fire truck, for example, properly drop a fire truck. So how does the mutual aid extend to NB Power, and presumably, on the way over, Hydro Quebec for the time that it needs such a thing?

MR. ELLIOTT: Mark Elliott, for the record.

Really, the Mutual Aid Agreement is a commitment by the utilities, kind of in good faith, to support each other to the best of their ability, to provide experts, to provide equipment that they could do, and it kind of paves the way, as I said earlier, so there's no impediments to that.

Nobody's going to say, well, what if this happens or are we liable or anything like that, they'll just help. So it's on a best effort basis as a mutual aid.

MEMBER McDILL: So the obvious one is technical support from a distance?

MR. THOMPSON: For the record, Paul Thompson.

Our emergency plans call for the notification as part of the callouts to our utility partners if there was an event that happened at Point Lepreau.

So they would be made aware promptly of what the event is and the details of it. That is then setting the scene for if we need any assistance we can call out and use that, whether it be technical assistance or what have you.

But at that stage, it's really looking at do we need any technical assistance, and I know the phone would be ringing the other way, coming back to say we -- is there anything we can do. And what the mutual aid does is it really just re-establishes a smooth highway in terms of all the logistics of the interfaces.

MR. ELDER: And I guess that, you know, these events go on for some number of days as well, so you could supply respirators, dosimeters, even bigger equipment to replace equipment that might be in service.

MEMBER McDILL: Thank you.

THE CHAIRMAN: I'd like to piggyback on this. I was surprised that nobody mentioned the U.S. in all of this.

They're making also -- supposedly doing regional centres, and you mentioned that there's going to be offsite, kind of a possibility of a regional centre. Have you made a decision where it's going to be, what it's going to contain, how it's going to work, how you're going to liaise with the Americans? How come it's nowhere the relationship with the U.S. is there?

MR. ELLIOTT: Mark Elliott, for the record.

I think it's because we haven't made final decisions about things like locations, costs, which utilities are involved.

We have been talking to the U.S. The U.S. are interested in this potentially being another centre that could be used by them and perhaps we can use -- access some of their equipment.

I think the reason we're not talking about it is we've -- those discussions just haven't got to the stage where we can announce anything, but we are working on that.

THE CHAIRMAN: But it is part of the plan, eventually, to have this kind of a offsite centre or solution, whatever the solution might be?

MR. ELLIOTT: Correct.

THE CHAIRMAN: Okay. Thank you.

Ms. Velshi?

MEMBER VELSHI: So it's rare that we get typos in CMDs, so I've picked up a couple that I just want to share with you.

On page 8 of the report, the fifth bullet, the fourth line and the fifth line. Water connections and piping to the steam generators. And it's fuel pools as -- page 8.

MR. JAMMAL: Sorry ---

MEMBER VELSHI: Page 8 of ---

MR. JAMMAL: I need a number, a CMD number.

MEMBER VELSHI: Oh, I'm sorry. It's ---

MR. JAMMAL: M-34?

MEMBER VELSHI: M-34.

MR. JAMMAL: Okay. Third bullet?

MEMBER VELSHI: Fifth bullet, third line and fourth line, piping to the steam generators and then it got expend fools as opposed to pools.

My second very -- it's more a heads up for tomorrow's discussion when we talk about the red dots, but in today's discussion on this Fukushima action plan I heard the terms, "extreme accident, credible, design basis accident, beyond design basis, severe, design extension condition, review level conditions".

You know, my head was reeling because I suspect some are interchangeable, but others may be on a spectrum that I think some clarification and a better understanding, because I know there is some debate on what applies when. So I just wanted to put that out today and we can talk more tomorrow on these things.

THE CHAIRMAN: Okay.

Anything else? Anybody else?

First, I got a couple of questions. First of all, quickie, the filter venting, did I hear correctly if there's total blackout you can vent manually; is that correct?

MR. THOMPSON: For the record, it's Paul Thompson.

That is correct.

THE CHAIRMAN: That's true everywhere, OPG, Bruce?

MR. SAUNDERS: At Bruce, we have a filtered air discharge system and one of those generators powers that system.

What we're still evaluating is that four unit scenario as to whether that needs to be expanded in a four unit scenario. So still some decisions to be made about that, but currently, the system is there, it's in place and a generator is there to power it.

THE CHAIRMAN: It needs power?

MR. SAUNDERS: It needs power. It's a forced air system, so it needs to run the fan.

THE CHAIRMAN: Staff, are we looking for a manual, if all else fails in a blackout, are we looking for a manual ventilation or not?

DR. RZENTKOWSKI: That's our objective. As a matter of fact, this is the action which needs to be completed or closed by the end of this calendar year, so we are expecting the design options and solution for venting of the containment. However, one can look at many different approaches, not only venting but maybe coolers to condensate the steam which will reduce the pressure in the containment.

The make-up water can contribute also to lowering the containment pressure quite significantly.

So there are many options, that's what I want to say, and we will see by the end of this year what would be the strategy going forward.

THE CHAIRMAN: Okay ---

MR. ELLIOTT: Just, Dr. Binder, the Darlington filtered vent that is being put in for -- with refurbishment will be a passive, a manual type of filter.

THE CHAIRMAN: Okay, thank you.

I just want to confirm, I heard that time to boil for the pool, for the fuel pool, I assume when it's completely empty, is 72 hours. Is that the way I understood it?

So I'm trying to understand what is this -- what's happening here, how did this 72 hours got calculated?

MR. ELLIOTT: What we're assuming -- Mark Elliott, for the record.

What we're assuming is that at the time of the accident there would be no power, there would be no pumps pumping the fuel bay water through coolers. So the water is just sitting there.

THE CHAIRMAN: Just sitting there, okay.

MR. ELLIOTT: It's sitting on top of the fuel. The fuel is covered and that water will slowly heat up and it will get into boiling. The reason we talk about boiling is that's when you start losing water through steaming. So that's why we talk about boiling is kind of the time when there would need to be an intervention by that time, and we can intervene much sooner.

THE CHAIRMAN: Okay, but you said also the intervention; the emergency management is less than four hours?

MR. ELLIOTT: Correct.

THE CHAIRMAN: I'm trying to -- see, there is no gap between 72 hours and 4 hours is there?

MR. ELLIOTT: No, that just means that ---

THE CHAIRMAN: There's one hour -- which I'm trying to make sure you're never going to be in a position not to be able to deploy?

MR. ELLIOTT: We're never going to be in a position where the fuel is uncovered and at risk.

THE CHAIRMAN: But in doing -- once you start boiling, presumably you've got ---

MR. ELLIOTT: You still have time ---

THE CHAIRMAN: --- time to ---

MR. ELLIOTT: --- to boil down to the level of the fuel. So there's still additional time, but we kind of talk about boiling as an intervention.

THE CHAIRMAN: No, I just wanted to see some of those parameters.

On Bruce Power, the Huron Challenge, did I get you right, in this slide you say 70 agencies were involved?

MR. SAUNDERS: That's right. Agencies, municipalities, governments. You get them all in there. Red Cross.

THE CHAIRMAN: That's a small test, right?

MR. SAUNDERS: Well, it's about 1,000 people.

THE CHAIRMAN: And that's not a high -- this is not kind of a disaster beyond design kind of -- I'm trying to get a feel as to did you feel that that was a fully integrated kind of a plan?

MR. SAUNDERS: Yes. I mean, we deployed everything that we would deploy from the plant and we deployed everything that would be deployed in the community and, on top of that, we added significant damages to the community and the surrounding area that people had to respond to.

So emergency worker centre, of course,

really only gets set up if you've got a release of material, but you would set it up in advance. You wouldn't wait until you had that do. You would pre-emptively do it.

So we set up everything that we would normally set up, so evacuation centres, transportation, hospitals, all that material was set up and included, like I say, much broader than a nuclear emergency. The nuclear emergency was just a piece of it.

THE CHAIRMAN: But what I'm driving at, you didn't -- were there any boundary problems between agencies? I'm talking about ---

MR. SAUNDERS: It actually worked very well. I mean, I've heard it said that this is confusing, but I can tell you from our point of view, who's in charge where is actually very clear to us. We know who's in charge where.

We don't know whether everyone will make the right decisions, but on site, it's us and then CNSC, right, because the licence predominates on the federal site, so it's us who are licensed personnel and CNSC, if they choose to intervene, and outside of that, the province is in charge unless the thing gets inter-provincial, in which case the federal government will get involved.

So the who that's in charge is actually fairly clear. What's not as clear is the total capability of all those people, I think, and that's part of what the test will do.

In this case, it worked rather flawlessly, to be honest with you. The communications were good. We threw an awful lot of stuff at them. We had a ton of simulated media. We had all kinds of things coming at these centres out in the community.

That whole control centre that was set up in our auditorium in B-10 was simply to run the exercise, so they were dealing with all these 70 agencies and throwing -- we called them injects, but what they were is problems, right, so ---

THE CHAIRMAN: But when you're doing such tests, do you ever get the feedback from the non-nuclear household, the citizens? Do they feel everything is smooth and they know what to do, et cetera, et cetera?

MR. SAUNDERS: Yeah, it's harder, right? We try our best, but of course, you know, people going on about their day-to-day life sometimes don't take a lot of interest in what we're running around and doing as an exercise.

They show a certain amount of interest. We put it on the website. We mail stuff out to them. We ask at the public meetings what people want to know. We include it in our tours. We do all sorts of things to get their interest.

We don't get a lot of concern generated, to be honest with you. And part of that is, I think, there's a fairly high level of confidence that we will tell them what to do when the time has come that they need to know.

In our area, that's relatively simple. We're talking a couple of thousand people that are immediately around the plant. If we had to, we could go knock on every door.

So our problem is a little less severe, but I think there's a pretty high level of confidence there. I'm not saying that we don't have any detractors, but all the interactions we get with the community is actually quite positive.

THE CHAIRMAN: Just my last comment. It's a comment, really, that thanks for reminding me.

I always like your Slide 7, Mr. Elliott. I think we should borrow it and put it up because it's the best explanation I've seen about how the various emergency planning and responsibility in terms of the multiple barrier. I think it's really easy to understand.

So anybody, anything else?

MR. ELLIOTT: Just one follow-up for Ms.

Velshi.

I took the feedback about adding human factors and the human element to the principles. There is a lot of work done, as you've kind of suspected, behind the scenes on that, things like when you -- how you transition from normal procedures or normal emergency procedures to these severe procedures, what kind of guidance do you give when it's a flexible response. It's not a point by point like operators are used to.

So that kind of work has been done, but I take your point that it's not referenced in here.

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

We need another break. I'm looking at a 10-minute break. We will reconvene at quarter to 7:00.

--- Upon recessing at 6:39 p.m./
L’audience est suspendue à 6h39

--- Upon resuming at 6:51 p.m./
L’audience est reprise à 6h51

THE CHAIRMAN: Okay, staff. We are already behind quite a bit, and we've still got two items to deal with.

MR. LEBLANC: Three.

THE CHAIRMAN: Three, sorry.

So I would like to move on, quickly, and the next item is a presentation by OPG on the inter-agency integration of emergency plan in response to a nuclear event as outlined in CMD 13-M45.1 and 45.1A.

This presentation is in response to a request made by the Commission during the December 2012 Darlington licence renewal hearing.

And I understand that we have lost the two EMO people who were supposed to be online, and they're no longer available. But they are available tomorrow morning if we have some questions of them.

And many of those issues that are in this have already been touched upon, so maybe you can actually go fast through this presentation.

Thank you.

And I understand that Mr. Coles will make the presentation. Please proceed.

5.4 Presentation on Inter-Agency
Integration of Emergency Plans
In Response to a Nuclear Event

13-M45.1/13-M45.1A
Oral presentation by

Ontario Power Generation Inc.

MR. COLES: Yes, thank you. Good evening.

For the record, I am Jim Coles, Director of Emergency Management and Fire Protection for OPG.

Thank you for this opportunity to present to the Commission an overview on inter-agency integration of emergency plans in response to a nuclear event.

Nuclear emergency plans are legislated and responsibilities are well-defined. All agencies involve the share of common goal to protect the health, safety and welfare of the public and protect the environment.

This presentation supplements written Commission Member Document 13-M45.1, which was previously submitted. Attachment 1 of that document called "Nuclear Emergency Management Program Overview" identifies the applicable legislation as well as the accountabilities of each agency in accordance with their respective nuclear emergency plans.

Over the next few minutes, I will speak to the integration of emergency plans and highlight the immediate actions that would be taken in the unlikely event of a severe accident with an uncontrolled radioactive atmospheric release. These include the notifications to and response by offsite agencies as well as the default and ongoing actions that would occur during an emergency.

Some of the information I will describe in this section is similar to that previously presented by Emergency Management Ontario during the Pickering Day 2 licensing hearings in May of this year. However, it has been revised to highlight those actions taken during a worst-case severe accident with an uncontrolled release.

I will also provide the Commission with an update on exercise-unified response and finish with an update on the draft CSA standard and 1600, which is currently in development.

The offsite response to a nuclear emergency in the Province of Ontario is the jurisdiction of the province under the *Emergency Management and Civil Protection Act*. While the province leads the response, you can see from this slide that is clearly a multi-jurisdictional response.

The Provincial Nuclear Emergency Response Plan or PNERP prescribes the overall concepts, organizational structure and responsibilities for nuclear response. The PNERP includes implementing plans for both Pickering and Darlington nuclear stations with specific details applicable to each site.

The PNERP is implemented by the Provincial

Emergency Operation Centre or PEOC and it is the PEOC commander that, through the course of the response, directs the actions of the municipalities and the provincial ministries.

Municipal emergency plans assign specific functional responsibilities to their respective regional departments, police services, emergency medical services, school boards and other agencies. These plans operationalize such things as emergency worker centres, reception centres and manage local evacuations.

OPG's nuclear emergency plan provides OPG staff with the direction required to stop or mitigate the emergency. This plan also provides logistical support to the offsite response and sends staff to the provincial and regional emergency operation centres to act as liaison officers.

Public Safety Canada is the lead agency for coordinating federal support to the province and will use the all hazard federal emergency response plan in conjunction with Health Canada and other federal partners providing radiological or technical support in accordance with the Federal Nuclear Emergency Plan.

Other supporting plans address joint traffic control, assurance monitoring, radiation health response, all of which integrate support from both the appropriate municipalities and federal departments.

CANDU units are very safe since their design is based on multiple lines of defence. This means providing multiple technological and operational safety measures that act first to lessen the chance of an accident and then, if an accident does take place, reduce the possibility of harmful effects on employees and the public. No member of the public has ever received a harmful dose of radiation from our plants.

Although the probability of a severe nuclear emergency is remote, it is important to plan and prepare as if it could happen. This type of accident would likely develop over several hours or days, allowing time for mitigating and protective actions to be taken.

In an emergency, the level of response by onsite and offsite agencies will reflect the significance of the event. Accordingly, nuclear emergency notification categories are scaled by significance and are outlined in detail in both the OPG and provincial nuclear emergency response plans.

The most serious emergency category is for a general emergency which applies to an accident where there is an ongoing radioactive atmospheric emission or one is expected within 12 hours. This would represent a worse-case scenario event and the activities which follow on the next few slides reflect those actions which would be taken in accordance with the emergency plans currently in place.

When an upset at the station occurs, our certified staff are in a position to respond immediately. OPG staff are trained and qualified to fulfill their roles during an emergency in accordance with our nuclear emergency plan and supporting emergency procedures. This response is tested and assessed five times per year at each station with the most recent one being at Pickering on Wednesday, July 3rd.

In any accident scenario, the first action by OPG staff is to mitigate and stop the event.

Operations staff will monitor critical parameters to ensure that the reactor power is controlled, that the core is being cooled and that containment integrity is being maintained. The severe accident scenario with an ongoing or imminent uncontrolled radioactive atmospheric release is appropriately addressed by the nuclear emergency plans discussed on the previous slides.

Using OPG's nuclear emergency plan, a ship manager will categorize the event as a general emergency -- which, again, is the most serious event category -- and approve the formal notifications to offsite agencies.

Within 15 minutes of event categorization, OPG will complete notifications to the provincial emergency operations centre and the municipalities.

The next action is to ensure that the CNSC is notified within 30 minutes of categorization. Again, the integration of these notification procedures is tested at least 10 times a year during drills and exercises at OPG.

Within 15 minutes of receiving the OPG notification, the PEOC duty operations chief will confirm the default response level is full activation and notify the designated municipalities and OPG of that response level.

Immediately following the municipal and OPG notifications, the PEOC duty officer notifies the rest of the provincial emergency response organization. This entire process is outlined in detail in the Provincial Nuclear Emergency Response Procedures.

After receiving OPG and provincial notifications, the municipalities will also fully activate their facilities based on the provincial response level for a general emergency. In this worse-case scenario with ongoing emissions, provincial and municipal nuclear emergency plans contain default protective actions which are to be initiated immediately upon notification of a general emergency.

I have already touched on the full activation of the emergency operation centres and emergency response organizations. However, activation of offsite reception centres and emergency worker centres is also a default action in this scenario.

Public learning systems are activated and emergency bulletins and news releases are issued by the province providing the public with information on the protective actions to be taken. The three-kilometre contiguous zone and lake sectors are evacuated as a default action and all traffic through the contiguous zone is suspended.

Evacuation traffic is managed by the Joint Traffic Control Centre in accordance with the Durham Regional Nuclear Emergency Response Plan. The Joint Traffic Control Centre is located in the City of Toronto and includes staff from MTO, police services from Durham Region, Toronto, York Region as well as the OPP.

Evacuations will be expanded as required and as directed by the province.

In this scenario, radioactive emissions are ongoing. So in accordance with the Provincial Nuclear Emergency Response Plan, members of the public evacuating from within 3 kilometres of the plant will also be directed to ingest potassium iodine pills to block the uptake of radioactive iodine.

Potassium iodine pills are pre-distributed in advance of an emergency to schools, child care and health care facilities, as well as emergency services and pharmacies. During an emergency, potassium iodine will also be available for the public at all evacuee reception centres.

As a default action, members of the public within 10 kilometres of the plant that are not being evacuated immediately will be directed to take shelter indoors.

Evacuees not at risk of contamination would be advised to evacuate to a destination of their choosing. However, evacuees who may have been exposed to the emission will either be directed to a reception centre for monitoring and decontamination or advised to self-decontaminate upon reaching their chosen destination. Instructions for self-decontamination would be included in the emergency bulletins issued by the province during the emergency.

Ongoing actions in a general emergency include the monitoring of station parameters, as I mentioned earlier. And the provision of this information to the province on an hourly basis to all offsite agencies.

OPG staff are performing environmental monitoring as are provincial assurance monitoring teams who sample air, water and food and federal assets who perform aerial and ground monitoring activities in accordance with the federal nuclear emergency plan.

The scientific section at the provincial emergency operation centre continuously analyzed the plant status information provided by OPG and the field monitoring data to inform protective action decision-making being made by the PEOC commander.

Emergency bulletins and media releases are issued throughout the event by the province to communicate to the public the ongoing protective actions that should be taken.

And lastly, emergency worker centres and reception centres will remain activated to provide dose monitoring and decontamination services for the public and emergency workers supporting the response.

To summarize the last few slides, I will reiterate that nuclear emergency management is a planned, integrated process that includes all levels of government and the nuclear power plants. The response to a general emergency is well integrated, OPG activates the plan, notifies offsite agencies and mitigates the emergency.

The province is the lead agency coordinating the offsite response through the provincial emergency operation centre and provides direction to the designated municipalities while Public Safety Canada coordinates the response of federal partners in support of the province.

Clearly, there are many stakeholders involved in responding to a nuclear emergency and the respective emergency plans must be validated using multi-agency exercises to ensure they are well-integrated and can support an efficient, coordinated response.

So let’s move on now to discuss a major exercise, which will do just that.

Exercise unified response is a large-scale, multi-agency integrated exercise that will require participants to activate their respective emergency plans in response to a severe nuclear emergency at Darlington nuclear station.

This exercise was planned in response to lessons learned from Fukushima, nuclear accident and the CNSC action plan for task force Recommendation 6, dealing with offsite emergency plans and programs.

A joint exercise planning team was established in December of 2012, and has been meeting monthly ever since. In May of this year, OPG awarded

International Safety Research with the contract to coordinate the planning and execution of this exercise, which is scheduled to take place in May of 2014.

The objectives of the exercise are to test the preparedness and integration of nuclear emergency response plans for OPG, provincial and federal governments, municipalities and non-government agencies.

Secondly, the exercise will demonstrate that the provincial nuclear emergency response plan is an effective tool for managing the response to a nuclear event. Thirdly, this exercise will be used to validate the revised federal nuclear emergency plan.

Given the complexity of this scenario and the level of participation for this exercise -- sorry -- and the level of participation, this exercise will offer all participating agencies a unique opportunity to validate their plans and gain insight into potential strengths and areas for improvement.

The number of agencies participating in this exercise is extensive and goes well beyond the provincial, federal, and international stakeholders listed here on this slide. It’s worth noting that the U.S. Federal Emergency Management Agency, or FEMA, may be an observer of the exercise. However, the Institute of Nuclear Power Operations will use this exercise as an opportunity to test elements of their recently developed U.S. nuclear industry event response framework, which is established to ensure resources and support are provided to assist a nuclear operator in mitigating an emergency.

In addition to the monthly joint exercise planning team meetings, the schedule shown on this slide shows the key milestones, which will be achieved along the road to a successful -- sorry, along the road to successfully completing the exercise. This includes preparation of a final after action report so that the valuable lessons learned are documented for future reference and follow-up action.

You can see from the overview that the first kick-off meeting was completed on May 24th and preparations are well underway for the planning, conference, and workshop to be held in Toronto this September 4th and 5th. The goal of the planning conference is to introduce existing and potential exercise participants to the exercise objectives, scope and constraints so that they can confirm their intent to participate in the exercise.

The workshop on September 5th will be conducted for those organizations that have a role in gathering technical data for decision-making purposes during a nuclear emergency. Specifically, this event allows the exercise design team to gain a better understanding of the methods that are used for communicating technical information between stakeholders, as well as determining the specific content of the transmitted information.

Additional workshops are scheduled for later this year and early next year prior to the exercise controller briefings in May.

And I apologize, for some reason that particular slide I just spoke to was not on the screen but it is in your package, I believe.

At the Pickering Nuclear Day Two public hearing, I provided the Commission with some preliminary information on the development of a new CSA standard and N1600 General Requirements for nuclear emergency management programs and I can now provide you with an update on that effort.

You may recall that the technical committee charged with developing the standard includes representation from federal and provincial government agencies, such as the CNSC, Public Safety Canada, Health Canada and Environment Canada, as well as nuclear operators and public safety interest groups from Pickering, Clarington and Durham Region.

Professional services and general interest groups like Canada Red Cross and the University Health Network are also represented.

It's worth noting as well that each agency that sits on the joint exercise planning team for exercise unified response is also participating in the development of this standard.

When published, N1600 will be a new Canadian standard that outlines the requirements for onsite and offsite emergency management programs to address nuclear emergencies at nuclear power plants.

Although the five pillars of emergency management include prevention and mitigation, the focus for this standard is on preparedness, response and recovery from a nuclear emergency. This is a very comprehensive document and includes all the elements for an effective emergency management program, most of which are listed on this slide, including public awareness and education, which we were speaking about earlier today.

One of the goals for the standard is that it be aligned with the new CSA regulatory document, 2.10.1, Nuclear Emergency Preparedness and Response, which has just been released for public review. And I believe that we've achieved that goal with the current draft version of this standard.

As I indicated at the Pickering Day Two

hearings, the technical committee did a thorough review of all recommendations received by the Canadian Environmental Law Association. Some of the 30 recommendations were not applicable to the standard itself. However, some were and each of those recommendations was given due consideration when the technical committee developed the language for the applicable requirements.

And with that, I'm pleased to report that the draft standard was posted yesterday on the CSA website shown on this slide. The draft will be available for public review and comment for the next 60 days.

This ends my presentation, and I'd be happy to take any questions you may have.

THE CHAIRMAN: Thank you. Thank you very much.

Let me start with Dr. McDill.

MEMBER McDILL: Thank you.

I think the flow of that will be very helpful to the public. It seems to capture some of the things that have been said before in a slightly more easily understood way.

My only question for tonight is, where does the CNSC fit into the federal Emergency Response Plans with Public Safety Canada, Health Canada, CNSC? How do we ---

MR. SIGOUIN: Luc Sigouin, for the record.

That's a very interesting question, Dr. McDill.

The CNSC, CNSC staff and the Commission as well play two roles during an emergency, two complementary roles.

One is our collective role as a regulator, the Commission's role as a regulator continues. It's the same role as a regulator before, after, during an emergency.

So independent of the provincial response and the federal response and what the federal government is doing, the CNSC will continue to discharge its function as the regulator overseeing what is happening at the station, overseeing the actions of the operator as well as the response of other agencies, so that that role is clearly laid out in the CNSC's Nuclear Emergency Response Plan where there's objectives that we have to evaluate the safety significance of the accident, evaluate the actions of all involved and keep the public informed of that.

In addition to that, the CNSC staff is part of the larger federal government machine and we need to recognize that we have a lot of expertise that is -- that would be of use to the federal government during a response.

So in addition to the role as the regulator and doing the regulatory response to the emergency, we've also planned to provide liaison officers to other agencies so that we can support and ensure that we integrate with the federal response.

So we've covered both aspects in our plans and we have exercised them and plan to exercise them in the upcoming national exercise in 2014.

MEMBER McDILL: And the crisis centre is where that would be monitored from?

MR. SIGOUIN: Yes, that would be monitored from our emergency operation centre that is primarily located on the third floor in this building.

MEMBER McDILL: Thank you, Mr. Chair.

THE CHAIRMAN: But I think that -- let me try to put some of those responsibilities a little bit differently.

As the regulator, we are in charge of setting up the framework that will make sure that everything will work according -- so we don't have to intervene. It's that way of saying it.

In fact, many of the documents being consulted on is trying to build a framework that everybody understand what needs to be done.

Did I get it right?

MR. SIGOUIN: Yes, that's right, Mr. President. And -- Luc Sigouin, for the record.

And in addition to having created the framework, you know, before an event to ensure that all of the players undertake the appropriate actions in response to an event, the CNSC would continue to monitor what is happening to confirm that the appropriate actions are being taken.

THE CHAIRMAN: Okay. Thank you.

Monsieur Harvey?

MEMBER HARVEY: Just to follow with that, so the CNSC will not take any decision, suppose the OPG and other, takes an option which does not appear to be the appropriate option, so what will you ---

DR. RZENTKOWSKI: Greg Rzentkowski, for the record.

As the President mentioned, our primary responsibility is to develop regulatory framework and implement regulatory framework, so we will provide only oversight. And we can intervene only if we see that some of the actions are deficient and not meeting the established objectives. This would be the only condition.

Otherwise than that, the licensee is primarily responsible for the safety and for the proper evacuation of affected populations.

MR. JAMMAL: Just to add to Dr. Rzentkowski -- it's Ramzi Jammal, for the record.

Yes, I mean, you're correct; it establishes framework, put it in place, monitor. But you still -- the Commission still has phenomenal power that you can issue orders under emergency powers to anybody. And that's the strength of the Commission.

So in addition to monitoring -- and the question was if someone is acting in a manner that's not acceptable to the Commission, we can force them to -- yes. But we're not responders.

THE CHAIRMAN: Dr. McDill?

MEMBER McDILL: Thank you.

I just wanted to follow up. Several years ago, the contact to the Commission tribunal was exercised, and that hasn't happened for some time. So when you've said that certain things have been exercised, that's one that has not been exercised for some time.

Someone else is coming up.

MS. JAMIESON: Tara Jamieson, Vice President, Technical Support Branch.

Staff are currently in the process of developing a series of presentations which will ultimately go before our operations management committee, our management committee on their way to a presentation to the

Commission Members to advise them of the full extent of the play of all the organizations, and particularly the CNSC staff, and we'll seek your input on desired level of play by the Commission.

THE CHAIRMAN: Monsieur Harvey, finis?

I'm going in order here. Ms. Velshi.

MEMBER VELSHI: A couple of quick questions.

So this exercise that's being planned, are you using this CSA standard that's being developed as the basis for planning and then assessing how well the exercise went?

MR. COLES: Jim Coles, for the record.

No, we're not. The CSA standard will not be released until this current schedule in June of next year, and the exercise is in May.

So, in fact, with the document just being now released for public review, what we're doing is we're planning and coordinating an exercise to test the existing plans that we have in place today, as well as to validate recent revisions that have been made to other plans.

MEMBER VELSHI: So I guess the results of the exercise will then inform the standard. I’m just wondering what the relationship will be between the exercise and the standard.

MR. COLES: Jim Coles, for the record.

The standard does include requirements for exercises and so organizations that choose to adopt this standard will be making modifications to their programs to address lessons learned from the exercise that we'll execute in May.

The standard gets pretty prescriptive insofar as the sort of things to consider from exercises, and drives the organization to make improvements to their program based on lessons learned through exercises.

So although the document itself, the standard itself is not going to be published until after the exercise, the expectation is that organizations that adopt the standard will be driven to incorporate lessons learned from the exercise.

MEMBER VELSHI: And where you are at today, what do you see some of the biggest challenges? Maybe give me the top three challenges or risks to this exercise.

MR. COLES: Jim Coles, for the record.

One of the biggest challenges is the sheer numbers of people involved in planning an integrated exercises involving dozens of agencies. That's why the joint planning team has been working since December of last year and meeting every month to ensure that there's alignment on objectives and plans to -- for scope.

So coordinating the number of people, coordinating the budgets and finances around executing an exercise like this. Every agency is limited with funds and they need to be able to execute this exercise and participate to the fullest extent possible within their allowable budgets.

Thirdly, just the planning to execute on the day of, it's a matter of ensuring that we can safely execute an exercise with absolutely zero impact on the safe operation of the nuclear power plant.

Darlington will be putting power to the grid that day and that is the first priority. We wouldn't let -- we never let an exercise or drill jeopardize the safe operation of the plants, and we're doing our -- we will ensure that that is the case during this exercise. So we have to take that into consideration as well.

THE CHAIRMAN: Thank you.

Mr. Tolgyesi? Non, pas de questions ici.

Dr. Barriault?

MEMBER BARRIAULT: So if this applies to OPG, but do we have the same scenario applying to other nuclear plants in Ontario, and the same thing with Gentilly-2, the same thing with Lepreau?

I mean, are we going to have presentations on each one of these plants as to what their plans are to comply with CSA standards?

MR. SIGOUIN: The presentation that was delivered today by OPG was in response to a direction or request from the Commission. That has not been requested from the other plants for the other licensees, but similar presentations can be done.

Certainly, the aspects that have been covered are covered during relicensing hearings, and these topics come up. If the Commission feels that it would be of use to have similar information from New Brunswick and from Bruce Power's link to Ontario, that can be done.

I can tell you that the exercise that is being undertaken with OPG and Ontario in 2014 is not unlike what was done with Huron Challenge in 2013 with Bruce Power and what was -- in 2012, I'm sorry -– and in 2012 with Point Lepreau in New Brunswick.

MEMBER BARRIAULT: Oh, I'm sorry, is there a template that you use for assessing these things or is this a template that you're using?

I'm just trying to understand what the -- I know it's going to be interesting to see what OPG's going to be doing here, and the timeline for doing it and all those things, but I guess what I'm asking really is that do we have same requirements of other plants, and if we do, then do we assess and is there a way to rate them or whatever it is that you do with that? CNSC, yeah?

MR. SIGOUIN: Luc Sigouin, for the record.

I'll give the first part of an answer and pass it on to Dr. Rzentkowski.

The aspect of evaluating OPG's performance during this exercise will not be very different than what we've -- we do on an ongoing basis. Mr. Coles explained that the exercises, some of these exercises are done five or 10 times per year. Each one of the licensees undertakes a large-scale exercise every year. Bruce Power ---

MEMBER BARRIAULT: I'm sorry, is this new? Five years ago was this going on?

MR. SIGOUIN: The nuance that -- what is new here is the involvement of all the external agencies.

But I think it's important for everyone to understand that the licensees undertake large exercises, to have a large commitment to do exercises to test their systems and to test them reaching out to the appropriate agencies, and CNSC staff evaluates their performance as part of the compliance program.

MEMBER BARRIAULT: Right.

MR. SIGOUIN: What is different this time around, and what was different in Huron Challenge and what was different in New Brunswick was the involvement of additional agencies responsible for ---

MEMBER BARRIAULT: Well, what we found in the past was that there was no involvement of external agencies. It was a planned exercise but nothing beyond the plant walls, is what was going on. At least that was my understanding. Now, this is new, if I understand correctly?

MR. SIGOUIN: That's right. The multi-agency full-scale exercises have not happened for several years.

MEMBER BARRIAULT: Okay, thank you.

Thank you, Mr. Chairman.

THE CHAIRMAN: Okay, I guess I'm hearing some different kind of interpretation of what is that we expect.

You'll remember that we had a long discussion in Pickering and in Darlington about whether the licensee is responsible only inside the fence or inside and outside the fence, and we had different legal debates about this.

We -- as far as I'm concerned, we gave a license for operation, we are responsible for anything that happened as a result of that particular license. So that's what different, and we now want site-specific, integrated, integrated emergency plan for every site, and that's what we're going to be driving to.

Tell me if I didn't -- if I'm right in what I’ve just said?

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

You are correct, and this is the elements that's arising from the Fukushima action plan and in specific the Commission has gone to great length in its regulatory decision to put in place the integration of the offsite.

So that's what you're seeing is the implementation with respect to the offsite integration, because you are correct, the licensing doesn't -- or if there's an event it's not going to stop on at the fence but integration is a direction from the Commission, and all the utilities are putting it in “the operators”.

THE CHAIRMAN: Thank you.

Dr. McEwan?

MEMBER McEWAN: So just a sort of a comment and a question.

I was less sanguine when I looked again at your flow diagrams than I was after your presentation. They're frankly incomprehensible if I'm a member of the public.

The other thing that concerns me is that both the first and the third diagram, basically, I know the intent isn't this, but what it looks like to me is you have three different silos on the first diagram managing the program. You have the CNSC, then you have the provincial government, and then you have the federal government all operating in silos and the only point of integration is the NPP Emergency Management Program.

If I look at the third diagram, you've again created those silos. And my concern is that this is a very well-planned, understandably very well-planned exercise, but in the real environment there is not going to be that opportunity for getting everybody together to have a chat about how they're going to respond and integrate.

So how do you actually build that, if you like, fear factor into it, and how do you build into these flow diagrams some confidence that integration is occurring at every level, rather than as you've described it, only at the level at the bottom.

And just one example, at the Pickering hearing one of the intervenors said that she had gone -- scoured the area looking for potassium iodide tablets and she hadn't found anybody, and people just looked at her blankly when she went into pharmacies.

Presumably, you're going to plan that everybody has potassium iodide tablets in this exercise, so how do you build that component into it?

You're spending a lot of effort and a lot of money, I worry that you're going to end up with a slightly artificial outcome. Or is that unfair?

MR. COLES: Jim Coles, for the record.

I would say it's an unfair question. I would offer a different perspective on what you've indicated as silos. In fact, what we're trying to convey here is parallel activities across multiple organizations.

If we looked at Attachment 1 to the written CMD, which provides the program overview, the intention here is really to show the legislation, the high level of reference to the plan, and then mention which each agency is doing in parallel.

The black lines are really lines of communication that our emergency plans will drive the communication from agency to another to share plant status information, protective action information for the public, media releases, that sort of thing.

So I would take a different perspective from a silo position. Again, it's trying to convey that there's parallel activities going on by multiple agencies.

MEMBER McEWAN: But you say that there is communication, but I see no communication diagram between the provincial nuclear emergency response plan and the federal emergency response plan, just based on what you describe on this diagram. There is no black line between those two boxes.

MR. COLES: Well, that's a black line between plans. So where we're trying to speak to Emergency Management Ontario, the CNSC would be liaising with federal agencies. I’m not sure how best to approach that question, though, really.

THE CHAIRMAN: Staff?

MS. SWAMI: Laurie Swami, for the record.

I think that there are many agencies involved and one of the directions that we were required to provide was a single-page overview of how these would progress.

Simplifying something that, as you heard Mr. Saunders talk from Bruce Power, 70 agencies onto a single page is almost impossible to do. We are continuing to work on how best to communicate this to the public because I think, ultimately, that’s where we want to go with this.

I think that Mr. Coles described a lot of the things in our presentation today that we do have a significant amount of cooperation and integration between the plans and between the agencies. It’s just the communication of that on a single page has challenged us to provide that.

So we’re continuing to work on that. We have further direction in the Pickering licence decision to continue to do that and, as Mr. Jager said at that hearing, we plan to do that and we’ve been working to get there, I suppose, is the best way to say it.

THE CHAIRMAN: So that’s very encouraging because I think I’m reaching the same conclusion.

Look, I’ve been in the bureaucracy long enough to know the difficulties with integrating big plans and everybody has big plans, very detailed plans, very good plans for each agency. It’s when you have to integrate them that you run into problems.

However, I think we can be very innovative here.

By the way, some of you, if you get a chance, try to dig up the Fukushima Emergency Plan. They had a wonderful plan. I think you heard me say a couple of times, it was like a printed circuit of a very complicated machinery because, in their reality, you couldn’t implement it. It’s the implementation issue.

So what I would like to know is and what we would like to see is the household -- the non-nuclear people living in the region, within the 3 and the 10 kilometres, what is the one page or maybe two pages or three pages, what does that page looks like?

And I've got a couple of questions before I want to hear the answer.

First of all, when you put together the CSA 1600, were any of the NGOs who had strong views about emergency planning, were they part -- did they participate in putting together the standard?

And did you have any, you know, general public inputting it in or is that sort of unusual?

We know that CELA spent an awful lot of time and effort on this particular subject. I thought they would be not a bad kind of advisor on putting together something that makes sense.

Did the committee do any of this?

MR. COLES: Jim Coles, for the record.

In reference to NGOs, specifically CELA as you mentioned, CELA and all members of the public have the opportunity now to participate in the process.

The development and crafting of the language around individual requirements was addressed through representation as I spoke to earlier on Slide 14.

So we did not just have the utilities and the key government agencies at the table. As I mentioned, we had other professional services and general interest groups at the table as well but the opportunity for NGOs and the public to get involved in the process is right now with the posting of the document.

THE CHAIRMAN: Is it unusual to have NGOs in CSA process?

I have the CSA people here maybe you can illuminate us on this?

MS. CIANCHETTI: Mary Cianchetti from CSA group, for the record.

No, it’s not unusual and we usually -- at the beginning of a project, we outreach to whoever is interested and we did quite an extensive outreach and the problem is people being able to come to the table and provide the time and the kind of contribution required to develop an exercise like this.

So we invited quite a few people. Only a certain amount accepted. There are other people who said: “We can’t participate. We can’t provide the time or the travel to get to CSA to develop the document but we’re interested in being kept aware of what’s going on in your progress.”

So we’ve kept a list of people that we’re keeping aware of, for example, public review in making sure they’re -- they know it’s out now and what their period is to respond.

So it’s not unusual. In this case, we don’t have NGOs at the table, but we have quite a large stakeholder base.

MR. COLES: If I might add again, Jim Coles, for the record.

In particular, as I mentioned earlier, the CELA report that was presented back in May, I committed to the Commission that we would consider those 30 recommendations and we did do that activity.

We did review every recommendation put forth by that organization and dispositioned and considered their comments when we wrote the final language on the various recommendations that were applicable.

THE CHAIRMAN: Okay, so I assume that now there are three documents that are being consulted I assume on -- it’s the two from CNSC and one from CSA.

But you now know what the contents of those documents are. I’m trying to follow-up on Ms. Velshi’s comment.

In your exercise, presumably, there’ll be -- should not be any surprises, anything new that will come through those documents that you will not -- that will be counted to you -- exercise parameters.

Am I making sense here or not?

MR. COLES: I'm sorry I'm not sure I understand your question.

THE CHAIRMAN: Well, those regulatory documents are not going to impose on you something new that you're not testing here now?

MR. COLES: No.

Jim Coles, for the record, no.

There should be no surprises from a regulatory perspective. There should be no major changes that I'm expecting that we will not be able to test and execute through our exercise and joint program, in this case.

THE CHAIRMAN: So I got two quick questions.

So where did you come on the iodine distribution?

MR. COLES: Jim Coles, for the record.

I anticipated that question and I'm happy to tell you that the standard does include requirements for the distribution of iodine in advance of an emergency to members of the public ---

THE CHAIRMAN: To the public directly?

MR. COLES: Yes.

THE CHAIRMAN: Okay, my second question is: You mentioned that, in your scenario, it will take 12 hours to unfold.

How do you explain to the public that 12 hours is quite sufficient because, you know, one of the arguments was that you couldn’t evacuate this particular area because of the high density population and you are shutting down some of the other things. It looks like chaos.

How do you explain that this can be done in an orderly way in 12 hours?

MR. COLES: Jim Coles, for the record.

The reference to 12 hours was part of the criteria to help categorize an event as a general emergency and so the 12 hours is strictly a time threshold that the province uses in assessing the offsite response that’s required for an event.

In fact, we’re expecting that our plant systems are going to give us much more time than that for an accident scenario. We’re not expecting to have a release to the public. Our systems are in place to prevent that but you have to plan for that eventuality.

If the situation were to occur where we did have a release that was ongoing, immediate or within 12 hours, that’s when the 12 hours comes into play to help define the offsite response that’s required.

THE CHAIRMAN: Thank you.

My very last question: In devising or in constructing this communication to the public, to the household, are you planning to bring in some household in front of you and test what is it that they need, would like, that'll give them a comfort level that they know what's going to happen?

They don't care about who is in charge. They don't care if it's Health Canada or Public Safety or whatever. All they want to know is: What do I need to do when I get the siren running or the radio running, et cetera?

What do I have to do?

MR. COLES: Jim Coles, for the record.

And I'll pass that question on to Kevin Powers from OPG Public Affairs.

MR. POWERS: Kevin Powers, for the record.

I think we heard loud and clear at both the Pickering and Darlington hearings that the public is very interested and wants to know more about what they should do in the event of an accident.

Best practice in developing a product along the lines that we are planning would involve focus grouping, a number of different concepts, finding out what they're looking for, finding out what works best to satisfy the need that they're looking for.

And we do plan on using focus groups extensively in the creation of these products.

THE CHAIRMAN: Thank you.

Anybody? The very last?

Okay, thank you. Thank you very much.

(SHORT PAUSE/COURTE PAUSE)

THE CHAIRMAN: The next item on the Agenda is a presentation by CNSC Co-op Students, “Experience with the International Commission on Radiological Protection (ICRP) in Fukushima” as outlined in CMD 13-M46.

5.3 CNSC Co-op Students’ Experiences with the ICRP in Fukushima, Japan

13-M46
Oral presentation by
CNSC staff

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

I’m too old to be “Co-op student” so he’s coming up here.

(LAUGHTER/RIRES)

THE CHAIRMAN: And we know some of the gentlemen that are coming forward are not the students.

MEMBER McDILL: It's never too late.

THE CHAIRMAN: So who is going to introduce the subject?

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

I guess, good afternoon, good evening, we're getting late. But I would like to give you a briefing a little bit on -- before we start the presentation, I've got next to me is -- I'll refer to him as "Max". Right next to Max is Mr. Peter Gilmour and, in the back seat, Mr. Chris Clement who's the Scientific Secretary of the ICRP.

Most of you know Chris who used to be a Director at the CNSC and now he's Scientific Secretary of the ICRP.

So just a brief discussion on the Co-op Program at the CNSC: In 2006, we enrolled 33 students in this program. Nineteen (19) of them have graduated from the program and 15 were hired to the CNSC.

Currently, we have nine Co-op students and they do four-month rotation per sector. The group of students come to us from University of Ontario Institute of Technology, McMaster University and the Royal Military College, the Civilian Graduate Program.

The funding of the program started in my cost centre, a risk managed cost. However, now, we have a much more established program in place and to give you an idea, even though it's cost-free to the ICRP, the cost to the CNSC is roughly $38,000 in salary to the Co-op students -- because we use them as cheap labour -- and the operating program itself is around $40,000 for the group of students.

So the exposure of the students to the program has actually allowed them to have experience on the industry that the CNSC regulates from NPP, medical, educational, industrial applications and also provide us with the capacity of future workforce replacement.

Slide No. 2. Sorry, I have to let you know that we've changed the slides and we should be on a slide entitled "CNSC ICRP Co-op Arrangements".

So the rotation with the ICRP started two years ago. Mr. Clement and I had a discussion -- Mr. Clement in his capacity as Scientific Secretary -- and we agreed to have a rotation with the ICRP and the ICRP will receive a Co-op student at no cost to the ICRP.

The Co-op student is to support and learn of the ICRP operations and provides our Co-op students an insight into the science and international policy-making under radiological protection. And, of course, there is special interest to Canada and CNSC because our radiation protection regulations and the dose limits and the radiation protection regulations arise from the ICRP recommendations.

So without any further ado, I'll pass it on to Max to provide you with -- representing the collective Co-op students and, in specific, their experience in Fukushima post the accident.

So Max, over to you.

MR. HAYWARD: Thank you, Mr. Jammal.

So my name is Maxwell Hayward. I was a Co-op student with the CNSC from May 2012 until July of this year.

Along with two other Co-op students, Ian Steadman and Rohan Ram, I was able to participate in ICRP dialogues in Japan. In September of this year, I will return to the University of Ontario, Institute of Technology in Oshawa, to complete my fourth year of Nuclear Engineering.

And the purpose of this presentation today is to share with the Commission my personal experiences, along with Rohan Ram and Ian Steadman, from what we saw and experienced in Japan.

So I'll start with an overview of the ICRP as an organization.

So it’s an independent, international organization that works to develop and maintain a system of radiological protection, guidelines and recommendations.

They publish these publications and they’re up to 122 publications as of today. Two hundred members are part of the ICRP across 30 countries, six continents.

Within the ICRP, they’re divided into five separate committees that each have their own responsibilities and areas that they look at and working parties who work together in the ICRP to create the publications. The Scientific Secretary, excuse me, is Chris Clement, as Mr. Jammal explained, and he’s located here in Ottawa.

So the dialogues that the ICRP created started in the fall of 2011 and, to date, four CNSC Co-op students have attended. The first one was Ravi Patel in 2011 -- sorry, 2012, and then I was the second one in November 2011 -- 2012, sorry. This year, Ian Steadman and Rohan Ram attended. Rohan Ram attended in February of this year and Ian Steadman most recently in July 2013.

The activities of the local dialogues. It brings members of the ICRP, radiological experts, together with affected community members and has this open dialogue. We call it a “dialogue”. It’s an open discussion where they can ask questions to the experts and they can respond.

It also -- it’s beneficial to both the inhabitants who attend these dialogues and to the ICRP because they can gain an understanding of the problems that -- and the concerns of the inhabitants and they can use that in their recommendations and in their publication to improve them.

The dialogues are themed and the themes change based on what the ICRP hears in previous dialogue sessions. So, for an example, the one themed event that I participated in was on educating children and protecting children. More recently this year, they dealt with questions related to whether the evacuees of the region could return to their homes and to their previously-inhabited areas.

On top of these main dialogues, the ICRP also holds much more intimate, smaller dialogues with -- it’s less formal and, for example, like we’re sitting on the ground and we’re right beside them, we’re breaking bread, sharing food and tea and the people can come to the small community centre located in their area, the ICRP experts, again, are answering their questions and concerns directly with the affected community members.

So Ian Steadman, Rohan Ram and I, we sat down a while ago to create this presentation and we all sat down and we talked about the common themes that we noticed because we were all able to attend these different dialogues and speak and interact with different members of affected communities, evacuees.

We concluded that the living conditions in Japan remain complex. They have a lot of questions and concerns still two years later. Some regions are now safe to return but the evacuees are asking: Do we actually want to return? Is this something -- if you’re saying it’s safe to do, do we trust you?

There are a lot of questions and the situation does remain complex.

And while a lot of the focus on these dialogues was on the radiological risks, radiation experts are attending, we noticed a lot of other concerns that were brought up by the inhabitants and these were related to the health care and education and how Japan can move forward after this event based -- caused by the radiation, but leading to all these other problems that have stemmed, educating children and so on.

The bottom two points there are loss of culture and social stigma, and this was related to concern that inhabitants of Fukushima were experiencing discrimination knowing that they were from Fukushima, miseducation that radiation was perhaps contagious and people knowing you're from Fukushima kind of staying back. And that was a big concern that residents of Fukushima explained with us.

And the loss of culture as well. I'll speak later about a mushroom foraging culture where they would go out into the forest. It was a 2,000 year old tradition that they weren't able to do any more because of fears of contamination.

They would go and eat the mushrooms, but were unsure if the contamination had affected that ancient tradition.

Finally, though, we did see it was very positive in these dialogues. The individuals showed a strong willingness to return to normality. They wanted their lives to return to that before the accident, and they were working individually and with the experts to get that goal of return to normality. And that was a common theme that we all noticed in these dialogues.

When we all sat back and we were sitting back from the experts and from the citizens, we saw the role that the experts play in this kind of scenario. It's a critical support role, and that's a theme that I'll speak to more of experts working with the citizens and those affected instead of for them.

And it's the idea that we're helping them but we're not doing the work for them.

And I'll show in one of the dialogues how we were testing contaminated food, and instead of going into their gardens and taking the foodstuffs back, the residents had detectors in the community centre and were working with the experts to test the food together. And they would find out if it was safe or not for consumption.

The counter to that would be the experts going in and taking their own samples, doing their own analysis and then maybe sending a letter to the residents telling them, "We found that it was safe," but seeing these dialogues and seeing the interaction, it was much more friendly and a much more positive environment. And you can see that in this one picture here.

So pictured on the left is Dr. Ohtsura Niwa. He's the main Commission member at the ICRP. And there's a young mother and her daughter. They're sitting, testing contaminated or possibly -- they're testing foodstuffs grown in their home-grown garden for contamination.

This was 2013. These pictures are from Ian Steadman.

It provides that perspective that I was speaking of, and we've called that perspective a radiation protection culture. And it's what we thought a radiation protection culture should look like.

Like I said, each time a foodstuff was tested and it came up non-detectable, below the regulatory limit, the residents were willing to share that food with the ICRP experts and it was passed around and everyone -- it was a rejoiceful, positive ceremony when they were able to consume their foodstuffs because it showed that they were making progress, the decontamination remediation efforts, their food could be consumed once again. And it was more of a return to normality.

The three of us agreed that this was a picture of what we believe a practical radiation protection culture looks like.

And I'll show you three more pictures from this, our idea of radiation protection culture.

So this is in Suetsugi, which is just outside of Iwaki City, around 30 kilometres from the plant, Fukushima Daiichi.

We saw that they have a willingness to tackle these problems. You can see in the bottom right picture, they are happy. There are smiling faces. We saw that. It was evident.

Hearing from them, older residents who attended, they explained that their children and grandchildren who lived outside of the region were -- their parents weren't letting them come into the Fukushima prefecture to visit with their parents and they were able to pose these questions to the experts and the experts would look at the data and say, "It is safe in your region. We've done decontamination work or the levels were never very high to begin with."

So the grandparents would then pass that on to the parents and their children, grandchildren could come and visit them in the region.

Excuse me.

Just to conclude, yeah, so these basic pictures, they show the positive attitude.

Like I've said, it was a positive, trust-worthing and a welcome -- welcoming community when myself, Ian Steadman, Rohan Ram, we went in with the ICRP.

That was the main radiation protection culture that we were surprised to experience.

I'll speak to some of the local initiatives in the region. So we were able to hear from stories some members presented to us to share what they had happened -- what decontamination efforts they had done.

So one lady I was able to hear from was Mrs. -- Miss Satsuki Katsumi, who was an elementary school principal in a school, Tominari Elementary School, in the

Fukushima region. And this is a picture of the school before the tsunami taken around 2009-2010. And Mrs. Katsumi, she presented on the pilot decontamination project at her school.

And the main point from her presentation was that the average dose rate on the school grounds was reduced from 6.5 microsieverts an hour to under 1 microsievert an hour. That's the average dose rate from the pilot decontamination project.

And in her presentation, she shared multiple pictures both before and after the decontamination work was progressing.

So Tominari Educational School. Mrs. Katsumi, she presented with the Mayor of Date City, Mr. Soji Nishida.

Mrs. Katsumi first spoke about the conditions shortly before the accident.

So in the bottom picture, you can see a detector. It was the detector that was available initially at the time of the accident, and it was deemed to be inadequate for detecting contamination.

So the Mayor and Ms. Katsumi, they explained that they went out and the city purchased their own detectors outside of the -- what was provided from the government and brought them in and were able to detect the radiation and -- with adequate detectors. They were able to actually see and find contamination in the area.

The Mayor also explained that on top of these detectors that they had to replace, they also bought initially, very early on, personal dosimeters to distribute to members of Date City and the town. And these detectors were handed out so everyone could have their own -- the Mayor called it a personal talisman where residents, they would hear detection and dose figures from the media, television, newspapers and would see all these dose figures that were just bombarded, but being able to look down and look on your own personal detector and see exactly what kind of reading you're giving was very reassuring to them.

So the Mayor explained that he spent -- it was a billion yen, $12 million Canadian, approximately, to buy these detectors to give the school finding contamination and to give to the residents so they could have their own personal dosimeter to find their own dose rate -- committed dose.

Mrs. Katsumi, she spoke about experts and how, very early on, 2011, in the pilot project, they brought in local experts initially and then, as the international community became more involved, more international experts, brought them in to speak to the children and to the teachers and to the parents.

And I know initially I thought you'd be speaking to the children because of the dialogue I was at, the theme was protecting and educating children. But it turned out it was so much more important to educate all three groups because the parents, the teachers, all the adults and the children, it's a new experience for them completely.

Nobody had ever experienced this before. We see the children as a young susceptible, naïve group, but it's the adults as well, that they need to be included in this education.

And she spoke about that importance. You can see on the chalkboard there, it's an explanation on one side of natural background radiation and on the other side of medical uses of radiation.

So just building that education for parents, teachers, and the children on what actually radiation is, what -- excuse me, what radiation is outside of the contamination that they're all aware of from the media.

So this is more decontamination work ongoing at the school, Tominari Elementary School.

When asked about the decontamination work, Mrs. Katsumi explained, and in a quotation, she said it was more than fighting the becquerels, not just reducing the contamination, stripping the topsoil, sandblasting the asphalt. It was about restoring the peacefulness and the heritage of the land.

The elementary school, Tominari, was 138 year old elementary school and grandparents and generations of this region fondly looked back on this elementary school. Like I said, generations had passed through this school. Their children were currently attending it.

So you can actually see in that bottom picture there, it's not only decontamination workers, official decontamination workers doing this remediation effort, it's also parent and teacher volunteers who are coming in and have volunteered their time to come in and help with the remediation work.

So like I said, it was showing this decontamination project, it led to restoring the peacefulness of the land. And that was the theme of all the dialogues.

You can see here children playing outside. That picture is from 2012 and the decontamination work is late 2011, early 2012.

So Mrs. Katsumi is showing us these presentations. She spoke about one of her teachers that had transferred to another school in the area still within the Fukushima prefecture and she said that, in communicating with this other teacher, she found out that this other elementary school, the children were still wearing protective masks and they weren't allowed to go outside and play during recess because part of the early contamination was it was very cautious.

But at Tominari, at the exact same time, the children were allowed to go outside and play. They had consulted with the experts and Mrs. Katsumi believed that this was the difference that the experts could make, bringing them and getting the advice they knew the dose rates at their school were safe and that the children could resume playing outside. And she explained that that's why she consulted with experts, and that was the difference that she believed experts can make.

And I'm not sure if I mentioned it but the dose rates at the other school were actually lower than her school. So the children weren't allowed to go outside and play and they were wearing protective masks but, when asking the experts, their school was actually less than Tominari. And it was just the experts telling them: "We know the dose rates. You can go outside and play. The children can go outside and exercise." And exercise was another big point. Going out and having recess.

Another teacher who presented with Ms. Katsumi, she explained that a noticeable effect was childhood obesity shortly after the accident and within those months; was the lack of exercise, the lack of outdoor play had created a childhood obesity problem. And it was one of those serious non-radiological effects, kind of an indirect effect of the contamination and of the radiation.

But using the experts, using their advice, being able to resume outdoor activities and exercise created a better lifestyle for these children at that school.

Another facility that was contaminated was the pool and that's again related to exercise. So this pool was closed in the summer of 2011 during the hot summer months. In late 2011, it was drained, the interior was sandblasted and then it was refilled and the pool, in the summer of 2012, the children were allowed by the experts to return to the pool. They could use it again.

And Mrs. Katsumi explained that the parents had to always give permission. They always went back to the parents for permission to see if the children -- for allowing them to do outdoor activities.

And the parents initially, summer 2012, they were hesitant. They said, "We've heard you've done decontamination work. We're still hesitant to let our children swim in the pool."

So this was another one of those meetings where you're bringing together teachers, parents and experts to sit down and explain what they've done to decontaminate the pool, showing them on the meter, taking a sample of the water, showing them the concentration right from your meter right in front of them that the pool is safe to use.

So that was another dialogue that Mrs. Katsumi -- not dialogue, excuse me -- another meeting that Mrs. Katsumi, as the principal, organized with the teachers and the experts.

Finally, resulting from the decontamination, the recorded doses to the children and to the teachers were recorded over a three-month period that summer of 2012 and the average dose rate was extrapolated to -- I'm going to get it right -- 0.4 millisieverts per year, above background.

So you could see the efforts of the decontamination work over that one year recording their doses, they're under the regulatory limit at 30 kilometres from the plant.

Continuing on with local initiatives that we saw at the dialogues.

Mr. Endo, he was a rice farmer in Iwaki City, and he came to multiple dialogues. I saw him, Ian Steadman saw him; Rohan Ram saw him and explained, and we were able to see his progress as he went through.

So, initially, as a rice farmer, he had cesium-137 contamination in his field and he went out and he bought his own detector and he started sampling his field to get an idea of the contamination rates.

This is 2011, summer/fall 2011. He bought his detector. He then went around to his community and did sampling in their yard. And taking this data, he was able to create his own contamination map, 2011, before any decontamination work or any official work started in his area.

It was actually a full year later that the official decontamination work began in this area and he had already created this contamination map.

And it wasn't actually only a contamination map. So he created that map and it was shown in 2012 and he brought it to the meeting. He was able to show the ICRP experts this contamination map and consulted with the experts, got their advice, and they told him decontamination work could be done here safely.

And the result of this was soil washing. So he went back to his field in the summer and he flooded it, agitated it and drained it. So the contaminations on the topsoil were removed. He had his crop for that year, brought it in. It was tested and it was safe for consumption. It was below the regulatory limit set by the government for consumption.

So this self-starter decontamination work, like I said, I was there in November and he had had the results of the foodstuff that was tested and that was early November. Late November of that year, that's when the official decontamination work had started. So it was a full year where he had mapped, decontaminated, gotten a positive result from his decontamination before any official work had even begun.

Also at these local initiatives that I was going on, let's skip to the bottom, the local man. He is pictured at the head of this small intimate session, where we're sitting on mats. He's the one at the head sitting on his knees. He took it upon himself, he volunteered to collect and tabulate the data from all the personal dosimeters that every resident had.

So every resident would have their own dosimeter and they had a logbook and they would record what they were doing; if they were doing an activity, how long they were doing it; where they were in the city, kind of of creating their own contamination map and the readings from their dosimeter.

So they would provide this log book to this man and he would return to them a cumulative dose chart showing how their dose is changing, highlighting events that maybe were causing them to get a higher dose or events that stood out compared to other daily routine.

And one example of this is an older woman who had provided her dosimetry results to this gentleman. She was -- like I said, she was elderly but she had gone out in her backyard, like Mr. Endo, doing her own decontamination work, removing dead leaves, dead grass from her garden. The result showed that she had gotten -- let me get this right, 4 microsieverts in that couple of hours of doing decontamination work, working directly with the grass.

We've found that her annual dose was projected to be 2.5 microsieverts per hour -- sorry, 2.5 microsieverts for the year. Her annual dose would be 2.5 microsieverts -- sorry, yes, millisieverts, yes, that makes much more sense. It was microsieverts within that hour expanding to the year, it was millisieverts, 2.5 millisieverts.

So we explained to her, the ICRP experts, and the recommendation is 1 millisievert. So we told her, yes, you're going to be over the recommendation guideline, and I was so amazed at her education about radiation because she flatly responded when we asked her if she was concerned: "No, I'm not concerned because I understand that the effects of radiation are long-term and that I am very unlikely to see any kind of health detriment to a higher than normal dose of radiation, even at two and a half.

But I was so amazed that, coming to these dialogues, speaking with the experts, she knew the health effects from radiation are long-term. Yes, I wanted to highlight that.

Like I said, Ian, Rohan and I, we sat down and we spoke to each other about the major themes.

What did we all notice at these hearings -- at the dialogues?

We each had our notebooks with us the entire time, writing stuff down. We all had circled and highlighted memorable quotes that we had heard from the residents, and I would like to share those because they fit well into the major themes that we noticed.

So the major theme is uncertainty in the community. I spoke about that earlier on; a lot of questions. Should I return to the region? Can I return to the region? Do I want to return to the region? Jobs were affected, evacuees leaving, losing their employment.

Returning, is there going to be employment when I return?

And the second one concerns transcending radiological protection like the childhood obesity indirectly affected with radiation.

The final one was the support role, where we were able to kind of stand back and watch the interaction between the experts and the community members, how the experts worked in a supporting role working with the community members instead of for the community members.

Moving on to the second one: Transcending radiological protection. The one that I personally attended, the one dialogue that I attended, my major realization, like I said, was that education is not just for the children. It's for the parents. It's for the adults. It's all a new experience to them and they'll remember this experience and they're going to pass it on to their children and to their children's children and it's going to move through the generations.

But this experience isn't just shared with them. It's shared with the whole world and by sending people to Japan, being able to experience with them, see these dialogues, we can share this whole experience, the lessons learned, with everyone. And it's not just the triumphs; it's also the setbacks. It's all lessons learned, what we saw from these dialogues, what we've heard from the residents.

Moving beyond radiological protection, like I said, it was the indirect and it was the local traditions of mushroom foraging that are at risk, their society, their heritage.

The bottom picture there was one of my personal photographs. A drumming troop from the area, from Fukushima, they came and they presented to us, and they told us their story, that in 2011, their big drumming ceremony with the children all the way up to teenagers, in the summer it was cancelled, in the summer of 2011. And in 2012, they did the drumming ceremony again and they were promoting it, and along with their promotional material for the drumming ceremony, they published dose rates and the dose rates were low in the area but they noticed that attendance at their drumming ceremony in 2012 was sharply down. They just couldn't get the numbers that they had pre-Fukushima because of contamination and fear.

And that's a local tradition. It was a 22^{nd} -- 2012 was their 22^{nd} annual drumming ceremony, something that's gone on for generations that -- not generations, but 22 -- it's something that's gone on for a while that has been affected by the contamination and affected by the accident.

And the final one that I've spoken to is supporting role of the experts. And I would like to highlight the second quotation:

> "To feel secure and to be safe are two different things." (As read)

And that's not something that Ian, Rohan, and I had really thought of before, that experts can come in and talk to you and tell you we've looked at the dose figures, we've looked at the lifestyle, seen your chart basically, and you are -- you're safe. The area you're living in is safe. You're getting a low dose, but that doesn't necessarily mean those people feel secure.

There could still be a mistrust of the expert or a misunderstanding or some kind of confusion that is causing you to just not feel right about your situation. And that's a difficulty that where we think, yes, you're telling them they are safe, they are actually safe; we know they're safe as experts, but that's not the end of that. They still have to feel safe. They have to feel like they're normal again.

And on top of the support role of these experts, going back to Mrs. Katsumi, it's not just the experts who play a supporting role. It was a newspaper reporter from Tokyo who asked her, what did she want the residents of Tokyo to do, how could they help the people of Fukushima. And instead of saying money or supplies, she flatly responded, I just want them to be aware. I'd like them to know what it's like in Fukushima. Come visit. See what it's actually like outside of what's reported by the media and see it with their own eyes.

And the same could be said for experts who are advising and providing calculations in a cubicle in an office building around the other side of the world, where you're not getting that experience firsthand, really able to sit down and talk with somebody and find out what their actual concerns are, and we saw this with experts. To obtain their goal of solving problems, they need to listen and find out what is the actual problem. Understand the problem, then use your own expertise, go off, solve the problem, and then communicate it back to the representative that you were talking to. Communicate it back in a way that they can understand.

Finally, with these themes, we were able to look forward and we tried to determine some key requirements moving on and they focused on consistent guidance, consistent education, and it was the ultimate goal of reducing fear, uncertainty and discrimination in the region.

Moving towards a conclusion, I'd like to share some more personal photographs that we took while we were in Japan. These ones were taken by Rohan Ram in February of this year. They show the decontamination work progressing in Iwaki City, like I mentioned previously, 30 kilometres from the site.

Speaking with the decontamination workers, it was determined that each home that was being decontaminated took about a week to remove the topsoil and the cost was around $50,000 Canadian.

Removing the topsoil, placing it in these large black bags, you can see them piled and moving them with a crane. That's Rohan Ram pictured in the top picture, pictured standing beside the bags in the top picture. These bags, they each had a posted dose rate, contact dose rate on the soil bags, and it was 0.9 microsieverts per hour on contact and when full, each bag weighed around 2,000 kilograms.

Once that soil was removed during the decontamination work, it was placed into soil containment facilities. These pictures are from Ian Steadman, taken most recently, July of this year. The biggest shows a soil containment facility, and we noticed the over-engineering of this facility.

You see the soil in the middle and bags and concrete and this very high fence with barbed wire at the top, but it's removed soil. The contact dose rate on one of the bags was 0.9 microsieverts an hour and it creates kind of a negative view in the public where they think looking at this facility it's really dangerous, but in actuality it's just removed soil but it doesn't really pose that much of a radiological risk.

Moving on to the smaller top picture, it was a picture of tsunami damage that we observed, and we realized we have to keep that perspective in the back of our mind when we're looking at the consequences of the accident and when we're trying to advise people.

They were affected by a tsunami first. There was a lot of damage caused by that tsunami. So when we're making recommendations, we have to be cognizant of the living conditions that they're living in, whether it's a temporary evacuation community or a community that is still recovering from tsunami damage.

And the bottom picture is a picture of Fukushima City. It's about 60 kilometres from the site and all three of us stayed in Fukushima City while we were in the area and we observed it to be what we thought was business as normal.

Restaurants were open, hotels were open, commuters were taking public transit to go to their jobs, and it was kind of shocking because some of us may have pictured more like that top picture, where you're seeing the tsunami damage, but no, it's not all like that. There are cities that are basically operating fine and they're the triumphs. They are the cities that have managed and coped with the accident and have started to return to a normality.

If I can conclude with some personal conclusions from Ian Steadman, Rohan Ram, and myself, we've personally really gained a perspective on the scientific community and how they can work to educate and empower affected residents. That dovetails with the importance of working with the people instead of for the people and as well as experts listening and adapting to their unique conditions.

Really, we were all extremely honoured to be able to show solidarity with the Japanese people, to be invited into their community centres, to hear their stories. They were inspiring and it was an excellent experience that Ian Steadman, Rohan Ram, and myself, we will never forget, and it's allowed us to grow as engineering students, professionals, future professionals in the nuclear and radiological industry.

We're sincerely thankful to the CNSC and to the ICRP, and like I said, to the Japanese people.

So thank you for listening. Thank you for giving me the time to present here today. I'd be happy to take any questions.

THE CHAIRMAN: Okay, thank you.

Questions. Dr. Barriault.

MEMBER BARRIAULT: Thank you for your presentation, I appreciate it. Did you run across any, "pseudo-specialists" who will go around scaring people trying to make a major issue out of minor problems?

MR. HAYWARD: I've heard that initially, early on, there was a problem with these pseudo-specialists giving their advice and people trusting them, seeing them as an expert and taking their advice seriously. But eventually, as time went on, they kind of stopped giving that advice and they ---

MEMBER BARRIAULT: Thank you.

MR. HAYWARD: --- moved along.

THE CHAIRMAN: Dr. McEwan?

MEMBER McEWAN: So congratulations, very nice presentation. I think obviously, a great opportunity for you guys.

Did you get any sense, particularly in the smaller communities, of the overall health of the population? Were there issues with psychological, psychosocial issues? Were there broad health problems that you would not normally expect to find in that type of any sense?

MR. HAYWARD: I'm not sure if somebody else wants to answer, I personally didn't see that. Like I explained, in these dialogues where people are invited and a message is sent out to the community telling them that this event with experts is going to come, I don't think they would be participating in that.

The -- it was more people who are aware and were friendly and happy and they were fit. I got to see the students from the drumming troupe and they were excellent drummers, they were happy, they were -- you know.

THE CHAIRMAN: So you did not visit some of those places where people were sheltered? You know, one of the argument was that more people got injured, let me put it this way, from the evacuation rather than from radiation because of the elderly, et cetera, et cetera. So those location where people are still living in temporary shelter, you didn't visit any of those?

MR. HAYWARD: Maxwell Hayward.

No, I didn't visit those facilities, but Chris Clement from the ICRP has and can probably speak more to that.

MR. CLEMENT: Thanks Maxwell. Chris Clement; Scientific Secretary of the International Commission of Radiological Protection.

Yeah, Maxwell did a great job of talking about what he and the other interns saw during their time in Fukushima, but I can give you a slightly broader perspective, I guess. I've been there quite a bit in the last two and a half years, totalling maybe 100 days over 10 or 12 trips.

In the early days, there was a lot of frustration, a lot of anger, a lot of pseudo-experts who had a lot of influence. A lot of that changed over time. I would say in 2013, there's still some of that, there's a residual of that, but most people are much more positive in the spirit that Maxwell discussed.

However, there are still many people in temporary housing. I've spoken to some of them. And those and others who are also not returning yet to their homes full-time have experienced some health problems, real health problems associated with, not radiation exposure, but all the difficulties in the social disruption.

You can call them psychosocial, you can call them secondary effects, call them whatever you want, but there are real medical effects in terms of increased levels of stress, increased childhood obesity, increased alcoholism and so on in parts of the communities, particularly those who are still away from their homes.

In addition, there are some communities who -- where the people haven't recovered quite as well as Maxwell described. In most of the communities, it's going quite well.

In particular, I can give an example of a small town called Hippo, which is a Miyagi Prefecture, just 1 kilometre outside of Fukushima Prefecture. Here, people have not received the same level of support because they're not within the same political unit, it's not the same prefecture. They're not citizens of Fukushima.

As a result, they felt quite isolated, they haven't recovered anywhere near as well as Maxwell described in Iwaki, and there's still a lot of social disruption as a result.

So there is a lot of good, a lot of positive things going on, but still a lot of problems remain.

THE CHAIRMAN: Anybody else?

MEMBER HARVEY: Who chose the area where you visited? I mean, was it an area very -- a typical area that represents a larger area where you could go and have almost the same perspective and the same impressions?

MR. HAYWARD: So the dialogues were organized by the ICRP and related the organization and where the locations are chosen. I know my personal dialogue was in Fukushima City -- or sorry, Date City. I know it moved later on with Ian Steadman and Rohan Ram.

Related to if that's applicable, I spoke to the -- within the Fukushima Prefecture, you can go to Iwaki and see the reconstruction and speak to the residents there and then go to Fukushima City, which is further away from the accident site where it's a bustling -- it's a city, it's not a little community anymore.

And then speaking about Hippo, where outside of the Fukushima Prefecture, where it's completely different from Iwaki. So I think it's hard to kind of find one region that generalizes. Maybe within the prefecture, but once you move outside, I'm not sure.

MR. CLEMENT: If I can add to that, in November 2011 when we began, we began in Fukushima City, a dialogue there, because we were welcome. ICRP is not -- we don't do interventions, we're not an aid organization. We were welcomed into the community to talk to people there.

From there, it built, we expanded based on community interest, both positive to hear about what we have to say and really we act mainly as facilitators rather than experts, per se, we don't give a lot of expert advice, to be perfectly honest, in these meetings. We give a little, we give a bit of experience, but we really help get community members to talk to each other and to talk to people outside of their area in Japan.

So we started at Fukushima City, expanded to Date City, which is not very far away. And then slowly, these expanded to other communities throughout Fukushima Prefecture and even beyond, as Maxwell said. None of them can really be considered typical because there are very different stories in very different places.

MEMBER HARVEY: Thank you.

THE CHAIRMAN: Ms. Velshi?

MEMBER VELSHI: Maxwell, with this very unique first-hand experience that you've had, do you see any opportunity to translate any of this radiation protection culture, as you called it, into a non-emergency crisis setup, like on a preventative basis?

MR. HAYWARD: Maxwell Hayward, for the record.

So a lot of the lessons learned could be applicable to that. One of the -- in my dialogue, it was a theme on education, and they've realize now -- and we actually spoke about that earlier today -- integrating actual radiation education into the curriculum. Because I remember when I was in Fukushima, hearing them talk about this, I looked back online at the Ontario curriculum and the closest we get is electromagnetic radiation, and that’s it, that’s where we stop.

So having that built into the curriculum ahead of time, having people with at least a general knowledge of radiation, radiation protection, nuclear power plants, that would obviously be beneficial before an accident were ever to occur.

Even world-wide, where something’s happening in another country, having our students here in Canada knowledgeable about what is actually going on in other countries and getting that education in before the accident occurs, instead of working after the fact to try and educate everyone.

THE CHAIRMAN: Is the perception in Japan still you got to go down to 1 millisievert and nothing but 1 millisievert so 2 is not good enough? Which causes some unusual clean-ups that you can -- are questionable.

MR. HAYWARD: I did have, in my notebook, from my -- all my notes that I took in Japan, I remember them talking about the decontamination process and it was kind of a triage, that this is the contamination and it’s kind of a spread. These are the areas we’re going to focus on. I don’t specifically remember anything related to where you do get close to 1 millisievert and this is your firm limit.

Speaking to the foodstuff contamination, it was a set -- not detection limit -- a set regulatory limit where food above this was rejected and all foodstuffs had to be under that in terms of decontamination. Sorry, I don’t know how that really worked, it’s a fine line.

THE CHAIRMAN: Well, you’ve got a nation with dosimeters now walking all over and detectors they will become the world experts about various radiation. And as you know, we, as regulator, advocating the 1 millisievert as a health, but we also know there is even natural background variation that's way, way beyond that and for workers, we have a 50 millisievert limit.

So under what condition you can go back is a big topic and a big issue that I'm not sure we've got a handle on.

Chris, do you want to clarify?

MR. CLEMENT: Yeah. Chris Clement, ICRP.

I think outside Fukushima Prefecture in particular, but also a bit inside Fukushima, there's a lot of focus on numbers, becquerels per kilogram, millisieverts per year, and these things are important because it is important to make sure people are safe.

But as Maxwell said, one of the quotes, it's not enough to be safe. People have to feel secure.

Inside Fukushima Prefecture where people are actually living with this every day, they worry about the numbers a little bit, but what really matters is they can return to their regular activities.

They don't really care so much about 1 or 2.5 in the one example Maxwell gave or .1, they like to see that they're, you know, less than their neighbours. They like to know that their children will come visit them with their grandchildren. They like to know they can eat things from their garden. That's what they really care about.

And they like to be and need to be reassured, they need to feel reassured that what they're doing is safe, so that's important, but most important is returning to some kind of normality rather than numbers specifically.

THE CHAIRMAN: Has the media been helpful on this?

MR. CLEMENT: Chris Clement, ICRP.

Of course, yes and no. One of the nice features of this dialogue is right from the very first one, we included several members of the media. There were a lot there to cover the event, if you want to put it that way, but there were several there as participants as well, and particularly -- in particular local media because they're facing their own challenges.

It's not like the media is only a way to communicate from experts to the public. They have -- are dealing with the same emergency and aftermath that the rest of us are dealing with. They didn't know how to respond what the public needed. They didn't know how to explain becquerels and curies and sieverts and rems and rads and all these strange units.

I would say the local media has been quite helpful. I would say that today, most of the national media in Japan has been quite helpful. That's -- there have been exceptions to that as well.

I think the media needs help as well as the governments and residents, so I don't want to blame them too much, with a few exceptions.

THE CHAIRMAN: Okay. Thank you.

Just one last question; are we the only -- have this deal with ICRP to send students?

MR. CLEMENT: Chris Clement, ICRP.

We actually have one other cost-free expert that works with ICRP on a slightly different basis. He's here on a two and a half year term, so a different arrangement.

At the moment, CNSC is the only one with this deal, but CNSC does not have an exclusive deal on having interns with ICRP.

THE CHAIRMAN: Well, we'd like you to keep it exclusive. It's a very valuable tool for some of our kids here.

MR. CLEMENT: I have to say it's been really great to have CNSC working with ICRP on this. I think it's been good for ICRP. They do work. I think it's been quite good for CNSC. I think it's been fantastic for the students who go through this program, as you heard Ramzi say earlier, many of whom return to CNSC to work full-time later.

So I think it's worked out very well for all parties. And if a few others get involved, I won't be offended.

THE CHAIRMAN: Well, thank you. We'll see if you come back. Thank you.

Okay, we still have one more item which we are determined to go through. And this is -- it's the annual update on the new nuclear project as outlined in CMD 13-M32.

And I understand that Mr. Howden will take us through this. And OPG is here to clue us in as to what's going to happen in this file.

5.5 2013 Annual Update on the Darlington New Nuclear Project

13-M32

Oral presentation by

CNSC staff

MR. HOWDEN: Okay, good evening, Mr. President and Members of the Commission.

For the record, my name is Barclay Howden; I'm the Director-General of Regulatory Improvement and Major Projects Management. With me today are, next to me, Mr. Ken Lun, Senior Project Officer of the new major facilities licensing division. Next to him, Mr. Doug Miller, Director of the new major facilities licensing division.

Directly behind me, Andrew McAllister, environmental assessment specialist of the environmental assessment division, and the rest of our team working on this project.

This presentation is here to provide an annual status update on activities related to the Darlington New Nuclear Project, or DNNP. This update is undertaken in accordance with the records of proceedings for the issuance of the licence to prepare a site to Ontario Power Generation (OPG).

OPG is also required to provide an annual report to the CNSC on site preparation activities.

The first report was submitted by OPG in March 2013. In the report, OPG stated that they have completed one deliverable so far which deals with archaeological excavation for two dig sites.

OPG did not have any reportable events in the reporting period.

Please note that OPG is currently awaiting for a decision by the Province of Ontario in the selection of a vendor, and many of the activities undertaken by OPG so far have all been preparatory work. Their main focus is on the collection of information which will assist in preparing plans, schedules, and estimates for the project as it goes forward.

I'll now ask Ken Lun to make the rest of the presentation.

MR. LUN: Mr. Chairman and Commission Members, for the record, my name is Ken Lun; I'm the senior project officer responsible for managing the licensing and compliance activities associated with the regulation of the Darlington New Nuclear Project.

Here is the outline of the presentation. First, I will begin by providing some background information on the DNNP. I will then go through the activities that OPG and CNSC staff have undertaken thus far in preparation for the project.

Next, I will go through the work that CNSC staff has performed to get ready for new builds in Canada, specifically updates to our regulatory framework address lessons learned from the Fukushima accident as well as international best practices and pre-licensing vendor design reviews that provide CNSC staff with an opportunity to assess the design prior to any licensing activities, and to identify to the vendors any potential issues that would require resolution.

Finally, I will end my presentation with an overall summary.

So the next few slides I will go through the project description, project elements, and project chronology.

So in the application for a licence to prepare a site, OPG sought to prepare the Darlington nuclear site for the future construction and operation of up to four Class 1A nuclear power plants with a maximum combined net electrical output of 4,800 megawatts electric.

So here you can see an aerial view of the proposed Darlington nuclear site in relation to the existing site.

So the elements of the project were to conduct an environmental assessment, or the EA, and prepare the site based on the assessment.

Some of the activities allowed under the site prep licence include construction of site access control measures, excavation of grading of site to 78 metres above sea level, construction of environmental monitoring and mitigation systems and construction of flood protection and erosion control measures.

So here's the project chronology. The Joint Review Panel, the JRP, was established in 2009 to consider EA and the licence to prepare site, or the LTPS application. Public hearings took place in March to April 2011.

The JRP report was released with 67 recommendations. The Government of Canada accepted the intent of all but five of the JRP recommendations.

These five recommendations were made to other levels of government, which were mostly directed to the Province of Ontario and Clarington.

So far, one recommendation has been fully addressed to date. This will be discussed in detail in the upcoming slides.

The JRP recommendations were made to ensure that a number of technical studies regarding site characterization, site evaluation and analysis of accidents would be carried out. Mitigating measures regarding habitat impact and environmental impact will be put into place and a policy for land use around the new NPP will be developed.

The JRP was satisfied that OPG is qualified to carry out the site preparation activities and a licence was subsequently issued on August 17th, 2012.

The current LTPS only permits activities that are independent of reactor technology. Two items to note about the LTPS is that it contains, one, a major hold point such that OPG must submit several documents governing site preparation activities prior to commencing the licence activities.

These documents include a number of procedures, plans and other documents such as an updated project execution plan, environmental monitoring, an EA follow-up plan, training security, et cetera. This item will be covered in detail in upcoming slides.

Number two, a licence condition requiring the implementation of EA follow-up program related to the JRP recommendations. So, as mentioned earlier, OPG is currently awaiting the selection of a vendor, which is assumed to occur in 2014. Note that the target dates mentioned throughout this presentation are based on this assumption. As previously mentioned, current effort by OPG is focused primarily on collection of information in preparation for the project.

There are currently two judicial challenges under review for the DNNP related to EA and LTPS. These issues are expected to be resolved in the fall of 2013.

In June 2013, OPG received detailed construction plans for the Westinghouse AP1000 and CANDU Energy EC6 reactor designs. Licence to construct application is currently planned for 2014 to 2015.

So, in the next few slides, I will go through activities that OPG and CNSC staff have undertaken in preparation for the project. You will see in the slide heading whether the activity was to address a specific licence condition or a JRP recommendation being dealt with through the EA follow-up program.

First, I will go through the OPG activities that require oversight. Then I'll go through the CNSC activities.

So in the LTPS, there's a major hold point, which requires OPG to submit several documents prior to commencing the site preparation activities. As previously stated, OPG indicated that it will contract a vendor to perform site prep activities while OPG will be in an oversight role.

The vendor will have their own set of management system documents. Both OPG and the vendor's management system documents have to be submitted as part of the licence condition.

OPG's management system documents consist of a top-level project charter, seven supporting documents describing OPG project management arrangements, 21 supporting procedures and standards providing process-level details and three plans addressing emergency preparedness, site security, environmental monitoring and EA follow-up. This activity is considered to be ongoing.

In terms of public information for the reporting period, OPG has provided information on reactor cooling technologies and deep water sampling to key stakeholders. No issues have been identified.

OPG will continue to communicate with key stakeholders on LTPS activities throughout the life of the project. This activity is also considered to be ongoing.

This slide deals with the cost benefit analysis for reactor cooling technologies. This activity is associated with JRP recommendation number 3. Conclusion of the assessment conducted by OPG for the environmental impact statement on choice of cooling technologies was not accepted by the JRP.

Thus, JRP recommended that CNSC require, as part of the application for licence to construct a reactor, OPG to undertake a formal quantitative cost benefit analysis for cooling tower and once through condenser water systems, applying the principle of best available technology economically available, or the BATEA.

The BATEA methodology was submitted in August 2012. It was reviewed by CNSC, DFO and EC. The conclusion was that there are no fundamental barriers to licensing a once through cooling water system for the proposed DNNP, subject to several conditions.

These conditions include an acceptable baseline condition by which to measure impingement and entrainment reductions, design requirements around a live fish return system and approach velocity, and satisfactory completion of OPG commitments and JRP recommendations related to the selection of once through cooling.

It is noted that CNSC staff opinion does not bind future decisions by the Commission. CNSC staff review of this activity is considered to be complete.

Round whitefish population has been on decline for reasons that are not well known. This species appear to be limited to the shoreline from Pickering to Brighton, which is east of Port Hope. The panel recommended that OPG continue to conduct adult fish community surveys in the site study area and reference location in an ongoing basis.

The Round Whitefish Action Plan, or the

RWAP, was developed as a means to manage a wide range of potential issues affecting the aquatic environment from the DNNP.

The issues include thermal discharge, impingement, entrainment and habitat alteration or loss. OPG has proposed scheduled tasks for determining whether population studies are needed. Any such determination by OPG will need to be reviewed for acceptability by CNSC with advice from DFO and EC. A workshop will be organized by November 2013 to discuss method for the study. This recommendation will be addressed by 2014 to ‘15 based on the vendor selection assumption. This activity is considered to be ongoing.

Construction and operation of NPP require removal of natural bluffs which provide habitat for bank swallow. In the picture, you can see what a typical bank swallow habitat looks like.

The JRP recommended the construction of artificial bank swallow habitat to maintain their population. OPG is currently performing census study and once enough data has been obtained, the results will be used to develop bank swallow mitigation measures and plan.

Census study has been performed since 2008. OPG will continue this work in 2013 to further improve their understanding of the bank swallow colonies. This recommendation will be addressed by 2014 to ’15 based on the vendor selection assumption. This activity is considered to be ongoing.

For once through condenser cooling option, which is the current preferred option, OPG will need to mitigate risks of adverse effect that were previously discussed.

In March 2013, OPG submitted results of two aquatic baseline studies. Preliminary conclusion by OPG is that site processes do not appear to negatively alter water quality in Lake Ontario. However, more water sampling will be needed. Results of the deep water sampling for three seasons, which includes summer 2012, fall 2012 and spring 2013, will be provided by November 2013.

This recommendation will be addressed by 2014 and '15 based on the vendor selection assumption and is considered to be ongoing.

For JRP Recommendation Number 38, OPG is required to perform site geotechnical and seismic hazard investigation.

Previously there were over 100 boreholes drilled as part of the study for the existing DNGS, or the Darlington nuclear site. OPG will need to do more confirmatory data collection for the NPP.

At this time, eight boreholes have been drilled to date. These were primarily done for the costing purposes for the vendors.

Final results will be provided to CNSC after selection of the vendor. The results will need to verify and confirm that there are no undesirable subsurface condition exist, there's no signs of ancient earthquakes by looking at geologic sediments and rocks, there is absence of surface-faulting and overburden and bedrock at site.

This recommendation will be addressed by 2014-15 based on vendor selection assumption and is considered to be ongoing.

For Recommendation Number 43, the Panel recommended that CNSC engage appropriate stakeholders, including OPG, Emergency Management Ontario, municipal governments, and the Government of Ontario to develop a policy for land use around nuclear generating stations given that a severe accident may have consequences in the surrounding area of the plant.

CNSC staff has engaged the provincial, regional and municipal stakeholders, as well as OPG in developing a policy for land use. The work with the stakeholders will continue into the fall of 2013.

This recommendation will be addressed by

2014 and is considered to be ongoing.

This slide presents information with respect to the communication that CNSC staff has undertaken. As previously stated, the LTPS authorizes OPG to prepare the site for future construction and operation of a new NPP.

However, it is recognized that certain decisions will have to be made on construction-related activities during LTPS stage. Therefore, a protocol was developed to govern communication between OPG and CNSC staff, provide framework to prepare and perform technical assessment of information and to establish pre-application statement of activities, high level project schedules, CNSC review approaches, assess access to project information for members of the public, interfaces with other jurisdictions and CNSC inspections and project communication.

This protocol is strictly administrative in nature and does not fetter the discretion of the Commission.

In the reporting period, CNSC staff provided letters to the identified Aboriginal groups with information related to the site prep licence and record of decision. No issues have been identified by the Aboriginal groups.

A number of regulatory documents have been developed to assist licensees in preparing for potential constructions of a new NPP. The documents will be also useful for reactor vendors and will help inform the design activities.

The documents listed on this slide were approved by the Commission and have been issued. Note that these documents are being revised to take into account Fukushima lessons learned and international best practices.

On this slide, you will see the documents that are being developed to be ready for other licensing steps. This includes regulatory documents on construction and commissioning of reactor facilities.

A pre-licensing review is an optional service provided by the CNSC. The review can be undertaken by reactor vendor prior to an applicant's submission of the licence application to the CNSC.

This review can provide early identification and resolution of potential regulatory or technical issues in the design process, particularly those that could result in significant changes to the design or safety analysis.

The objective of a pre-licensing review is to increase regulatory certainty, ensuring public safety.

Phase I of a pre-licensing vendor design review determines if the design intent is compliant with CNSC requirements and expectations.

Phase II goes further into detail to examine if there are any potential fundamental barriers to licensing.

In Phase III, the vendor chooses to follow-up on specific aspects of the Phase II review findings by requesting the CNSC to review activities taken by the vendors towards readiness of the reactor design for licensing.

For each review topic, CNSC determined whether there were any potential fundamental barriers to licensing, key findings or technical clarifications.

It should be noted that a pre-licensing vendor design review does not pre-judge the conclusions of future licensing reviews.

So Phase I of the AP1000 design was completed by CNSC in January 2010, while the Phase II review was completed in June 2013.

CNSC staff did not identify any fundamental barriers to licensing the AP1000 design in Canada. However, there were a number of key findings and technical clarifications that had been identified. Westinghouse is expected to address these issues during construction licence application stage.

So Phase I and Phase II review of the EC6 design was completed by CNSC in March 2010 and April 2012, respectively. Phase III review was completed in June 2013.

CNSC staff did not identify any fundamental barriers to licensing the EC6 design in Canada. However, there were a number of key findings and technical clarifications that have been identified. CANDU Energy is expected to address these issues during construction licence application stage.

So in conclusion, the work permitted under the existing LTPS is independent of reactor technology. OPG cannot commence any of the site prep activities until the prerequisites under the licence have been addressed.

Although the Province of Ontario has not made a decision in selection of an NPP vendor, OPG and the responsible authorities have undertaken a number of actions associated with the JRP recommendations, including the Round Whitefish Action Plan, cost benefit analysis for reactor cooling technologies, Bank Swallow mitigation measures and plan, deep water sampling, site geotechnical and seismic hazard investigation program, and land use planning.

Overall, CNSC staff is satisfied with the work that OPG has undertaken and will continue to monitor OPG's progress in the future.

Thank you. CNSC staff is now available to respond to any questions.

THE CHAIRMAN: Before we get into the questions, I'd like to hear from OPG to tell us what is real about all this and what is fiction.

MS. SWAMI: Laurie Swami, for the record.

THE CHAIRMAN: It's late. I'm taking liberty with language here.

MS. SWAMI: As I said, Laurie Swami, for the record; I'm the Vice-President of Nuclear Services with Ontario Power Generation.

I'm going to provide a short update on the Darlington New Nuclear Project. I've tried to limit my points here as I was listening to the presentation by the CNSC staff.

So as the staff mentioned, the Province of Ontario has not yet made a decision on whether to progress the new nuclear at Darlington project to construction, and a vendor for the project has not been selected.

As a result, OPG has focused its work activities supporting new nuclear at Darlington by gathering information that will be needed to support future design efforts and advancing work associated with mitigation or compensation of the potential effects of the project should it proceed.

OPG has also been engaged with the vendors to develop more refined cost estimates, construction plans, and schedules for new nuclear at Darlington.

We have made some progress on the recommendations by the Joint Review Panel. I will not talk about all of those. I'll just mention a few highlights.

With respect to the BATEA evaluation that was done on the potential cooling water technologies, we did perform a multi-attribute decision process and that involved public consultation. And using this information, we reached the conclusion that once-through cooling water was the preferred option.

With receipt of the CNSC staff review of our documentation and an indication that there was no fundamental barrier to licensing once-through cooling water with, of course, the stringent environmental protection requirements specified, allowed us to give certainty to informed potential vendors for the design requirements of the cooling system. That was a very important step for OPG.

With respect to the recommendation No. 27, artificial bank swallow nesting habitats, we have got two designs that we, I suppose, learned from the United Kingdom. Those were successful there. Unfortunately, at this point, the bank swallows, while they have come to look at our features, they have not actually created a habitat there yet. However, we understand that that takes two to three years before we would expect to see nesting in that area. So we intend to continue with that habitat work going over the next number of years.

The last item I will update you on is the ongoing effort to provide the Province of Ontario with a nuclear option pricing schedule that it can use as it explores its decisions and policy options for electricity in the province. As noted in the media, service agreements were signed by Ontario Power Generation with two potential vendors; Westinghouse, which sells the AP-1000, and SNC Lavalin Nuclear and CANDU Energy, which sells the enhanced CANDU 6. Both vendors provided the required information on the dates required and currently this information is being assessed by OPG, provincial ministries, and Infrastructure Ontario, and there will be a report provided to the Province of Ontario. Any decisions to proceed with new nuclear at the Darlington site rests with the Province of Ontario.

That's my brief update for this evening.

THE CHAIRMAN: Can I try to push you one step further? Is the Ontario government decision going to be before vendor selection or simultaneous? In other words, are you committed to do the assessment for the two vendors and recommend one to the government or are you going to make it all in one presentation to the government to choose?

MS. SWAMI: Laurie Swami, for the record.

I believe that our report will provide the information that's required for the government to make future decisions with respect to vendors or whether to proceed with this project.

THE CHAIRMAN: Okay, thank you.

Questions? Who wants to go; Dr. Barriault?

MEMBER BARRIAULT: Thank you, Mr. Chairman. I guess my question is around your cooling system that you're looking at. And one of the problems we've been having with the once-through cooling system with the reactors has been entrapment and impingement really of aquatic life.

What studies have you done, I guess, to show that there will be no impingement or entrapment that will occur with the once-through cooling system?

I would like to address that to CNSC for starters and then go from there.

MR. HOWDEN: Thank you. Barclay Howden speaking.

So in terms of reviewing the methodology that OPG provided, we did extensive review of that. And in doing the review, there was a set of criteria that -- performance criteria that their design will have to meet, and I'm going to ask Don Wismer to just give you very quickly a high level review of that criteria.

MR. WISMER: Don Wismer, Environmental Risk Assessment Specialist.

The criteria for the velocity of the water going in the intake so that it would be low enough that sensitive fish larvae like round whitefish wouldn't be sucked in, it would be below their swimming speed. And right now, there aren't species at risk but the whole lake system is changing because of invasive species affecting the food web.

So if that was to change in future, then the design will be able to include a live fish return system, and that will be a part of it.

But in response to your question about once-through relative to impingement entrainment, the other part of this, you heard the term multi-attribute analysis, is under our Act, we have to look at all the effects. And when we did that, the once-through cooling system can be made to perform equivalent to towers for aquatic effects, given proven mitigation technology that's been shown internationally and in the U.S. But some of the other non-aquatic effects, the mitigation wasn't nearly as clearly able to happen.

So on balance, the conclusion was there would be less environmental impact from once-through compared to towers when you look at all the effects. One example is there seems to be adverse community perception about the towers themselves and the visual plume that might be coming from it. And that's a very difficult one to mitigate if there's an adverse community perception.

THE CHAIRMAN: I really don't think we should spend a lot of time with you. CNSC published a paper on this, did you not? Did you not publish the whole argument about why that was acceptable and you'll have to wait until a construction licence comes in to see what is going to be proposed? Did I get it right?

MR. HOWDEN: Yes, all our work was published on our website about five or six months ago and with all the criteria that we applied in assessing it and the performance objections that the design will have to meet in order to be deemed acceptable in the future.

THE CHAIRMAN: Thank you.

Dr. Barriault?

MEMBER BARRIAULT: I would like to ask --

go ahead.

MS. SWAMI: Laurie Swami, for the record. It’s been a long day.

MEMBER BARRIAULT: A very long day.

MS. SWAMI: We've done many studies over many years. It was part of the environmental assessment to do fish studies, and I appreciate that Mr. Wismer didn't refer back to those, but that has been an ongoing process. The Darlington design itself was originally designed to mitigate impingement effects. And so this would -- the work that was done now to look at this future potential once-through cooling water has some enhancements to that existing design, and that would be proposed as part of the construction licence, as Dr. Binder has mentioned.

MEMBER BARRIAULT: Thank you. Thanks, Mr. Chairman.

THE CHAIRMAN: Ms. Velshi?

MEMBER VELSHI: Perhaps a couple of questions. I'll start with OPG. I know 2014 as vendor selection is a planning assumption, but if that were indeed the case, what impact does that have with Darlington refurbishment also scheduled for the beginning of 2014?

MS. SWAMI: Laurie Swami, for the record.

The Darlington refurbishment would -- actually, the outage would begin in the fall of 2016. So it is a somewhat separate timeline. However, there would be activity at the site for both of those projects, in some point in time overlapping, if 2014 was the actual year. Twenty fourteen (2014) for this project would begin the process of detail design and project planning. It wouldn't be the process of actually beginning physical work at the site.

And in addition to that, part of the work that we did for new nuclear is to look at ensuring there is separation of the site, so that you wouldn't interfere with the two projects. And of course, that was considered in both environmental assessments what that impact would be in terms of community impacts and environmental impacts.

So that's something that's been well studied but just to confirm that the timelines are slightly different and the activities are slightly different in those periods as well.

MEMBER VELSHI: Yeah, I got my dates wrong. We’ve been to selection 2014, but you wouldn't start construction for a few years after when refurbishment would be beginning as well?

MS. SWAMI: That's correct.

MEMBER VELSHI: My other question was for staff and the design reviews.

In the report, I read that for the AP1000, in your conversations with the NRC, the requirements are slightly different between the two regulatory agencies, and it talked about small and large release frequencies being different and dose rates being different, and so on.

And so with the findings that have come up from your design reviews, would the vendor be required to make design changes? Because I thought one of the goals of the industry was to have harmonization and standardization of design, and would this mean that if one were to go with AP1000 in Canada that it would look quite different than the AP1000, say, in China or the United States?

MR. HOWDEN: Barclay Howden speaking.

So when we're dealing with the vendors, we deal with them on Canadian requirements, as outlined in RD-337 which you're going to see an update of called REGDOC-2.5.2 tomorrow.

However, in terms of the harmonization, there is a group called the Multinational Design Evaluation Program, which is run out of the NEA. Part of it is designed such that vendors such as Westinghouse, who have more than one country interested, the regulators can get together and work together and look to the extent possible that harmonization can occur, but if harmonization doesn't occur, to understand what the differences are between them, and part of that is to share that.

At the same time, with Westinghouse as a vendor, because they have had a certification with the USNRC, and it's a fairly old certification now but still valid, we were able through MDEP to liaise directly with the USNRC and get information, but at the same time, the Chinese were able to sit in on that if they wanted. They didn't do that too much, so it ended up more as a bilateral type thing.

But in dealing with Westinghouse is a good example, if you look at page 25 of our CMD. One of the things that we found in our requirements is we really want to have the control system and shutdown systems to be as separate as possible. And so Westinghouse, in our reviews, did commit to making actual design changes that they would expect to implement if they were to go forward with the project with OPG.

So there were some changes there for sure, but we do try to harmonize to the extent possible.

MEMBER VELSHI: Thank you.

THE CHAIRMAN: Anybody else? Anything else?

Okay, thank you. Thank you very much. We look forward to progress on this file.

So I guess this concludes the public meeting for today, and believe it or not, we're going to be back here at 9 o'clock tomorrow.

Anything you want to say, Marc?

MR. LEBLANC: No, just this. Anyone took some of those interpretation devices, don't leave with them because you're going to be without a driver's licence. Thank you.

THE CHAIRMAN: Okay, see you tomorrow. Good night.

--- Upon adjourning at 9:16 p.m.

L'audience est ajournée à 21h16