Canadian Nuclear Safety Commission

Commission canadienne de sûreté nucléaire

Public meeting

Réunion publique

August 14th, 2012

Le 14 août 2012

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
Ms. Rumina Velshi
Dr. Ronald Barriault
Mr. André Harvey
Mr. Dan Tolgyesi

Commissaires présents

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

Secretary:

Mr. Marc Leblanc

Secrétaire :

M. Marc Leblanc

Senior General Counsel:

Mr. Jacques Lavoie

Avocat général principal :

M. Jacques Lavoie

TABLE OF CONTENTS

Ottawa, Ontario

--- Upon commencing at 1:38 p.m./

La réunion débute à 13h38

1. 12-M37

Opening remarks

MR. 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.

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

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 dès la semaine prochaine.

I'd also like to note that this proceeding

is being video webcasted live and that archives of these proceedings will be available on our website for a three-month period after the closure of the proceedings.

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

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

President Binder.

LE PRÉSIDENT: Merci, Marc.

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

Mon nom est Michael Binder. Je suis le président de la Commission canadienne de sûreté nucléaire. Je vous souhaite la bienvenue and welcome to all those joining us via webcast or by teleconference.

I would like to begin by introducing the members of the Commission that are with us here today. On my right, I have Dr. Moyra McDill and Mr. Dan Tolgyesi. On my left is Ms. Rumina Velshi, Dr. Ronald Barriault and M. André Harvey.

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

MR. LEBLANC: The *Nuclear Safety and*

Control Act authorizes the Commission to hold meetings for the conduct of its affairs. Please refer to the agenda dated August 9th for the complete list of items to be presented today and tomorrow.

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

Monsieur le président.

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 12-M38.A.

Do I have concurrence?

2. 12-M38.A

Adoption of Agenda

THE CHAIRMAN: For the record, the agenda is adopted.

I would like to call now for the approval of the minutes of the Commission Meeting held June 21st, 2012. The minutes are outlined in Commission Member Document CMD 12-M39.

Any comments, additions, deletions?

Dr. Barriault?

MEMBER BARRIAULT: Merci, Monsieur le président.

Just Item Number 10 where we're describing the standards for heavy water leaks in kilograms, I was wondering if we could have next to it in litres just to make it simple for people to understand what 10 kilograms of heavy water is per hour or 100 kilograms?

That's just a clarification, an editorial comment, if I may.

THE CHAIRMAN: Okay. We'll follow up on that.

Any other comment, observations? Okay.

Do I have approval?

3. 12-M39
Approval of minutes of
Commission Meeting held
June 21, 2012

THE CHAIRMAN: So for the record, the minutes are approved.

The next item on the agenda is Event Initial Report regarding Cameco Corporation on a

contamination incident at Blind River Refinery, as outlined in CMD 12-M43.

4. Status Report

4.1 Event Initial Report

4.1.1 Cameco Corporation: Contamination Incident at Blind River Refinery

THE CHAIRMAN: I will first turn the floor to Mr. Elder for comments, and after that I will ask Cameco Corporation for their presentation.

Mr. Elder.

MR. ELDER: Thank you. Good afternoon, Mr. President, Members of the Commission. For the record, my name is Peter Elder. I'm the Director General of the Directorate of Nuclear Cycle and Facilities Regulation.

I just have a few brief updates from our Initial Event Report, recognizing that Cameco will be doing a presentation.

First, I'd like to note that the worker involved received the highest exposure to the uranium, has been medically cleared to return to work. The estimated

doses for the incident remain in the range that we indicated in the event report. So that's in the two to three millisievert range.

However, this still represents to us a very serious near miss to a significant chemical exposure that could have significantly impacted the kidney function of the individual.

So we, going forward, are looking at this more as a near miss and how to prevent such near misses in the future.

And we're also focusing, going forward, on making sure that existing procedures were followed and if those procedures remain adequate.

In terms of the actions by Cameco, Cameco has confirmed that they will continue the temporary measures, including the use of respirators, until a permanent solution is in place. Cameco has responded to our formal 12-2 request, and their root-cause report will be submitted by August 24th, 2012.

Similarly, the operators of the Canadian uranium mills -- this is Cameco and AREVA -- have submitted the information required by the 12-2 requests where we ask them to look at this event from the opposite end, given that the drum came from a mill.

We can say this information is currently

under review, but it does confirm that only the Rabbit Lake mill uses a similar process to the one that was used by Uranium One in Wyoming. So there are two standard processes that are used to make the uranium concentrate, and only one was involved in this event, using hydrogen peroxide. The only one mill in Canada that uses that process is Rabbit Lake.

That said, we're looking at all the handling procedures in all the mills.

Actions by the CNSC update, we mention that we would be holding inspections. We're arranging to do inspections at both Blind River and at Uranium Mills to allow for a comparison of the handling procedures and particularly also focusing on incident response and making sure that best practices and medical aid are being followed at all facilities. Those inspections are being planned for September of this year.

We also continue to share information with the USNRC, both the information on events and on our regulatory reviews, and this will continue.

CNSC staff propose, since a number of activities like our inspections and the root cause analysis remain outstanding at this time, that both us and Cameco come back in the first quarter of 2013 with a complete picture of this event and also at the time when

Cameco has developed a comprehensive corrective action plan that responds to their root cause investigation but also about anything that comes out of the CNSC inspections and reviews.

That concludes our comments for now. Thank you.

THE CHAIRMAN: Thank you.

Before opening the floor for questions, I'd like to hear from Cameco, and I understand that Mr. Chris Astles from Cameco will make the presentation. Please proceed, sir.

12-M43.1
Oral presentation by
Cameco Corporation

MR. ASTLES: Good afternoon. For the record, I am Chris Astles, General Manager of Cameco Corporation's Blind River Refinery.

With me today are Andy Thorne, Vice-President of Cameco's Fuel Services Division, Liam Mooney, Vice-President of Safety, Health, Environment, Quality and Regulatory Relations, and Joe DeGraw, Superintendent of Quality, Compliance & Licensing at the refinery.

My presentation today will outline an

incident that occurred at the refinery in June 2012 and provide information about actions taken by Cameco since the event.

The Blind River Refinery has maintained a safe operation for many years, having recently achieved six years without a lost-time accident.

The site has built its safety success on a number of key factors, with a highly engaged workforce, comprehensive training by all the employees and utilization of employees' commitment to safe work practices.

Cameco takes worker radiation and chemical exposure incidents very seriously and has already taken steps to prevent this type of incident for occurring again.

I will provide details of the preliminary findings from the root cause analysis later in my presentation, but one of our key lessons learned from this event is to remind ourselves of the importance of a rigorous hazard identification process.

This highly unusual incident occurred during a routine task; one that had been safety performed hundreds of thousands of times over the 30 years of the refinery's operation.

To recap what was outlined by the CNSC

staff, on Saturday, June 23rd, an employee was de-lidding drums of uranium ore concentrates from the Willow Creek Mine which is owned by Uranium One and is located in Wyoming.

Two other operators were working in relatively close proximity to the de-lidding station. As a normal precaution, the drum lid removal procedure occurs under negative pressure with the dust collection system in place. The process involves a loosening of the bolt on the drum ring that clamps the lid to the drum.

As the operator began to loosen the bolt, the lid popped up unexpectedly and approximately 26 kilograms of uranium powder was expelled. This equates to approximately five to six litres. Some of the powder came into contact with the employee as well as nearby equipment.

The area in which the incident occurred was immediately restricted; clean up began later that day and was completed on Sunday. This incident did not result in any release to the environment.

This photograph shows the drum in question as well as some of the powder that was released within the area. The release of the uranium concentrate was directional and occurred with sufficient force to escape the dust collection containment.

You will also note that the only physical damage visible to the drum is a slight bowing of the lid, most of the lid, which is attached by a clamping system, remained in contact with the drum which significantly reduced the risk of physical injury to the operator.

After the release, the employee called for assistance and two nearby operators responded immediately to begin decontamination activities.

Once decontamination was complete, the employee as well as his co-workers were asked to provide a urine sample to determine whether they received an uptake of uranium during the incident.

The Blind River Refinery has an established procedure for urine sampling to monitor uranium uptake by employees. In this case, we initiated an enhanced program of sampling the following week to ensure we had a good understanding of the magnitude of the uptakes for the three individuals.

Over the next week, urine samples were collected on a regular basis. Samples from the two co-workers were within the normal range -- the normal expected range within a few days. The initial sample taken from the employee directly involved in the incident exceeded the action level. His recent uranium in urine samples have returned to normal levels.

On June 27th, that employee traveled to Port Hope to undergo a lung count. Results indicate no uranium lung burden resulted from this incident. Cameco's health physicist has estimated that the worker received a dose of 1.8 millisieverts as a result of this incident which is far below the annual regulatory limit of 50 millisieverts for nuclear energy workers.

The employee went to the local hospital on Monday, June 25th for medical diagnostic procedures. Medical diagnostic tests conducted by the occupational health and safety physician show that the employee's kidneys are functioning normally. All of the information collected to date indicate that the employee has not suffered any adverse health effects.

This schematic illustrates the refining process at Blind River. Over one million drums have been safely sampled since the facility began operation in 1983. The incident on June 23rd was the first time for an occurrence of this nature.

Auger sampling is a manual process involving three operators. The drums of uranium ore concentrate are loaded on the conveying system that moves the drums along to different job tasks.

At the first station, the drum is weighed to obtain a gross weight of the contents. Next is the de-

lidding station where an operator uses a pneumatic wrench to remove the ring bolt and the lid is lifted off the drum. This station is under dust collection; this is the location where the event occurred.

The next step in the Auger sampling process, also under dust collection, is where a core sample of uranium ore concentrate is removed from the drum using an automated Auger system.

The final step, which is also under dust collection, is the re-lidding of the station where the lid is fastened back onto the drum prior to the drum being sent to storage. The dust collection systems help prevent uranium from being released to the environment.

Early on in our investigation, it became clear that the primary cause for the unexpected release of the material was that the drum had become pressurized since being packaged by the producer.

Drums arriving at the refinery are usually not pressurized so this was an unusual situation that had not been previously identified as a potential hazard.

When the operator began to loosen the bolt on a lid, the pressure within the drum escaped, resulting in the release of powder. Cameco informed the CNSC and the producer of the incident on Monday, June 25th.

Uranium One has begun its own investigation

to identify how and why the drum became pressurized. The Uranium One investigation will be submitted to the U.S. Nuclear Regulatory Commission with a copy provided to the CNSC.

In response to the incident, the refinery has segregated all the drums from this producer pending completion of the parallel investigations being conducted by Cameco and by Uranium One. In the interim, Cameco has taken several steps to enhance worker safety for those involved in de-lidding activities.

The interim corrective actions to enhance worker protection include physical and procedural changes to the de-lidding station. This photo shows that operators are now required to wear respirators while opening drums. A section of Plexiglas has been installed at the top third of the enclosure, adding a barrier between the employer's upper torso and the chrome top.

An example of a procedural change is the implementation of a new work instruction for visually inspecting drums. Additional changes to the design of the Auger station as well as to cite procedures in work instructions may be identified once the investigation root cause analysis has been completed and corrective action is developed.

Cameco has retained a third-party expert to

conduct a root cause investigation to determine the cause of the event and to identify any corrective actions that can be implemented to prevent a similar event from occurring in the future.

The investigation is being conducted in accordance with Cameco's quality management program to ensure that it is systematic and thorough. A summary report of the investigation will be provided to the CNSC by August 24th.

Uranium One is also conducting a root cause investigation to identify how the drum became pressurized. Cameco is keeping in contact with Uranium One to ensure that both parties fully understand all of the factors that led to this incident.

Although neither of the investigations are completed, the incident is likely to provide significant lessons learned to both parties. Uranium One needs to ensure that its drums of uranium ore concentrate are not pressurized, thereby reducing the risk to downstream processors.

The refinery now recognizes that pressurized drums present a potential hazard, a risk which must be mitigated.

The Blind River investigation report will include a number of recommendations for corrective actions

including notifying all producers present and future of this incident and requiring them to take steps necessary to ensure drums are not received at the refinery in a pressurized condition.

In closing, we have outlined the details surrounding the highly unusual incident that occurred on Saturday, June 23rd, during a routine task that has been safely performed for 30 years.

The response of the employee and his co-workers was immediate and effective in ensuring that dose was kept as low as reasonably achievable. Cameco's response since the incident has been systematic in accordance with well-established programs and procedures. The incident did not result in any release to the environment.

Cameco's follow-up actions included ensuring that the employee received appropriate medical attention and investigating the root cause of the incident. A final report on this incident will be provided to the CNSC by August 24th.

Cameco takes this incident seriously and will implement the recommendations necessary to ensure that operations at the refinery continue to be safe, clean and reliable.

This concludes my presentation. At this

point, we'd be pleased to respond to any questions the Commission may have.

THE CHAIRMAN: Okay, thank you.

Let's open the floor. Who wants to go first?

Mr. Tolgyesi?

MEMBRE TOLGYESI: Merci monsieur le président.

What kind of training do you have or your employees have on this task? Because what you were saying that it could be two or three different types of yellow cakes? And is there specifically -- specific training to prevent -- to inform them and to make sure that they prevent any accident?

MR. ASTLES: Chris Astles, for the record.

The training of the employees is currently within the systematic approach to training process that we have in place. And the training is based on the materials handling of the drums, the Auger sampling and weighing procedures.

What we have recently implemented is an inspection of the drums to recognize the potential of possibly a pressurized drum so that they will recognize it prior to removing the lid.

MEMBER TOLGYESI: You said potentially

pressurized. It could happen that any yellow cake could generate this pressure?

MR. ASTLES: Chris Astles, for the record.

No, it would be only the peroxide-type concentrates, the UO4s that could possibly have the pressurization.

MEMBER TOLGYESI: So you include that in the training process that this type of yellow tape could generate and -- yes?

And, when you look at 26 kilograms, it's about 9 or 10 per cent, maybe 8-9 per cent of the total volume. So, there was some kind of pressure build-up.

Could this pressure be built up even higher? And to what extent that it could cause eventually maybe a physical -- physical injury?

MR. ASTLES: Chris Astles, for the record.

This is the first time that an event of this nature occurred at the refinery. But through a review of NRC data, it has occurred at mills in the States in the past and the removal of the lid, when the pressure actually came out of the drum, and I am assuming the Willow Creek investigation will be determining what kind of pressures the drums can sustain, therefore avoiding the possible injury.

MEMBER TOLGYESI: The drums and the lid,

and the system of closure. But what you are saying is based on the US Nuclear Regulatory Commission, information note 99-03, there is potential that there's a creation, a generation of oxygen. So, I suppose you will try to find what kind of resistance the drums, the lids and the cover and the yellowcake is coming from. Yellowcake is a kind of peroxide type, yellowcake.

THE CHAIRMAN: Thank you.

Dr. McDill?

MEMBER McDILL: Mine is a follow-up to that.

That lid is plastically deformed. There must have been a fairly substantial load or pressure involved. So, you're well beyond the yield of that material.

So, maybe I can staff if the root cause doesn't have an analysis of the strength of the lid-drum joint or the strength of the -- I mean, the real assessment of the damage tolerance of that material. Will staff undertake to make sure that that's part of their study?

MR. ELDER: Peter Elder, for the record.

We're certainly looking at, in terms of -- these drums are actually packaged, they're not certified packages, but they must meet the requirements of our

packaging regulations.

So, I'll pass it to Sylvain Faille, Director of our Transport and Packaging who can give you what we'll be looking at from transportation, and were they in compliance with our transportation regulations.

MEMBER McDILL: Before we go to Sylvain Faille, a highly pressurized drum not in transit could be a risk if there is rust or deformation or pre-existing flaws in the drum. So, it's not necessarily an issue of transportation. It could be an issue of ---

MR. ELDER: It's not necessarily an issue of transportation but it's through the transportation process that we actually look at the design of the drum. So, one of the things when you're looking at this one, is you would actually be looking at the design, what it's allowed, what it is supposed to be able to do.

I mean, the basic question -- the basic that I'm going to point out is: you're not supposed to be transporting pressurized drums. These drums are not supposed to be pressurized. But, we will look into what is the maximum possible pressure you would get at and, so, when you look at the hazard analysis, how big a hazard could there be.

I'll ask Sylvain if he wanted to add to that.

MR. FAILLE: For the record, I'm Sylvain Faille, Director of the Transport Licensing and Strategic Support Division at the CNSC.

Something that we will undertake, as part of the CNSC review, is to look at the material properties of the drum and the design specifications. So we'll be able to conduct a review of that part to see how much pressure those drums and the connections can withstand and how much pressure can be in the drum before we can see some deformation of the drum.

And to the other part related to the rust on the drums or the packages, that's something that is relevant to the transport regulations because that's part of the preparation for shipment; so you have to make sure that you do a thorough inspection of the package before you load it, so making sure that there's no damage to the drum or to any of the packages before they're being loaded.

So, that's part of the overall review of the CNSC. We will look at all aspects, again, to make sure that it covers inspection of drums before they're being loaded as well as a verification before they are unloaded.

MEMBER McDILL: Thank you.

Does Cameco want to add anything to that?

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

I would just add the use of experience from the USNRC and the document that you have in front of you really spoke to the hazards, the risk manifesting itself at the packaging end, so, it would by and large at the mill end and the packaging where you saw the peak exothermic oxygen being produced within two to three hours and subsiding thereafter.

So, the expectation on the Blind River side of it was not the same as the packaging end of the fuel production cycle.

THE CHAIRMAN: Can I -- I'm trying to understand, but it seems to me that one of the lessons you learn, that this particular yellowcake material should not be packaged in this particular drum. Am I right or not?

MR. MOONEY: I don't want to foreclose the outcome of the root cause investigation. Again, we've got two going on: one related to Cameco's activities and the other being a match by Uranium One for the Willow Creek facility.

But, I would say that, in relation to the packaging, there is a number of factors that need to be taken into consideration, including how long before you lid the package in question and what the temperature of

the final product is because that seems to be one the bigger determinants on the safety of the goods being put into the package.

THE CHAIRMAN: Okay.

Dr. McDill?

Ms Velshi?

MEMBER VELSHI: Thank you, Mr. President.

The NRC website that discusses this event -- this question for Cameco -- mentions that there were a number of similar events that occurred in 1988.

And, so, my question is, were you aware of these events? And, if not, is your investigation looking at why these lessons learned were not passed on?

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

And Cameco was aware of the NRC events in 1999 and the notice that was issued in relation to those events. We looked at our Rabbit Lake Mill which Mr. Elder mentioned earlier. It's the only production facility that we have in Canada that has the oxygen peroxide precipitation process, which is what leads to the oxygen evolving from the product.

At that time, in 1999, we did a comprehensive review and evaluation and we were satisfied that there were adequate controls in place to mitigate the

potential risks associated with the product.

MEMBER VELSHI: But those adequate controls did not look at visual inspection or need to a respirator, for instance?

MR. MOONEY: The controls in question related to the Rabbit Lake milling operation looked at our packaging and the temperature of the product at the end of the precipitation process coming out of the dryer and being put in the drums. And, the product temperature there, which is a part of our response to CNSC staff in relation to their due diligence 12-2 request, focused on the fact that our product is 59 degrees where the ideal temperature for the evolution of the gas is in the 95 plus degree temperature range.

So, the product at the Rabbit Lake mill really doesn't have the same inherent risk as the end-product of some other milling productions.

MEMBER VELSHI: So, the refinery did not look at those lessons learned to say what impact does that have on your receiving products and what kind of controls need to be put in place then.

MR. MOONEY: Yes, that's correct. I would go back to the USNRC notice that was issued spoke to the peak evolution of oxygen gas occurring within two to three hours, so the -- typically, the hazard that was seen was

at the mill, the potential risk associated with the product, manifested itself during the packaging process.

So, the steps that were -- the look that Cameco used, the use of experience at Cameco, was focused on -- was in relation to our milling operations.

MEMBER VELSHI: I understand that other shipments that you have received from this particular supplier are in quarantine right now?

Can you tell me how many drums you have in quarantine? And, I mean, have you done visual inspections of those? And do they pose any hazards of, perhaps, exploding?

M. ASTLES: Chris Astles, for the record.

We have approximately 360 drums of material from this particular producer. We have done visual inspections on the drums to determine if there is any signs of pressurization. Some have been identified and they've been isolated or set aside.

MEMBER VELSHI: Thank you.

And my last question is on the procedures that were followed in providing help to the operator. Were those company procedures that were followed as far as decontamination and seeking medical aid or could anything else have been done to reduce the uptake to operator, the first operator?

MR. DeGRAW: Joe DeGraw for the record.

That is one of the things we're looking at is: Could we have done anything better in terms of that?

But, on the surface, it appears that everything was done to minimize the potential uptake to the worker.

MEMBER VELSHI: Thank you.

THE CHAIRMAN: Thank you.

Dr. Barriault?

MEMBER BARRIAULT: Merci, monsieur le président.

Is there anybody here from Uranium One, from Wyoming, in the room? Nobody?

I guess my first question really is that when you get chemicals of any form, there's usually a Materials Safety Data Sheet with that. Is there any mention of pressurization of the containers on the MSDS sheets at all?

MR. ASTLES: Chris Astles, for the record.

In reviewing the Uranium One MSDS sheet, there is no indication of pressurization.

MEMBER BARRIAULT: Okay.

And is that going to be included in the future once, I guess -- I understand really there's a centre for the MSDS sheets so it might be worthwhile to

notify them of this potential danger of these chemicals.

MR. ASTLES: For the record, Chris Astles.

Yes, we will be notifying Uranium One and Willow Creek in particular ---

MEMBER BARRIAULT: Right.

MR. ASTLES: --- that their MSDS sheets are not up-to-date with the actual product.

MEMBER BARRIAULT: Thank you.

THE CHAIRMAN: So can I follow up?

So I'm trying to understand, in cross-border, are they of side with the U.S. regulation? Canadian regulation? Or both?

And what is U.S. NRC likely to do if this is a repeat infraction?

I don't want to prejudge you, it may be speculative here, but it's not the first time it happens. So what is the U.S. NRC going to do about that?

Staff maybe know the answer better?

MR. ASTLES: For the record, Chris Astles.

I guess -- I don't believe I'm in a position to comment on how the NRC is going to react with the findings at Willow Creek.

THE CHAIRMAN: But they are of side with the U.S. NRC rules; is that correct?

MR. ASTLES: For the record, Chris Astles.

Yes, I believe so.

THE CHAIRMAN: Staff?

MR. ELDER: Well, we don't, again, have all the facts on this one but what we know so far would suggest that they were, you know, our transport regulations are harmonized with the American ones.

Our interpretation was you're certainly not supposed to ship, on the Canadian side, pressurized materials so we assumed that they are in non-compliance with the uranium -- with the U.S. regulations about shipping pressurized materials. So, yes.

How they deal with it? I can't say too much. I believe also there has been a change in operator at that mill since the last event so that, in the last events in -- 12 years ago or 13 years ago, it was not Uranium One who was the operator.

THE CHAIRMAN: Okay, thank you.

Dr. Barriault?

MEMBER BARRIAULT: Thank you, Mr. Chairman.

I guess the next question really in terms of the care of the injured employee, has Workmen Compensation been advised of this incident?

MR. ASTLES: For the record, Chris Astles.

Yes, WSIB has been notified of the incident.

MEMBER BARRIAULT: Okay.

And here I'm thinking really that there's actually two issues: there's the radiation issue, of course, and then a second one is heavy metal, you know, effect on the kidneys that you may want to pursue long-term.

It's certainly something that has to be followed up and Workmen Compensation will be the ones who follow that so that's a given.

Next question really is that, with regards to the containers that you have now, do you have a means of measuring the pressure inside those drums as they exist now?

MR. ASTLES: Chris Astles, for the record.

No, that is the challenge. In order to get the pressure -- the internal pressure, you have to breach the surface of the drum. As soon as you do that, it will be venting.

So we have a developed a Job Hazard Analysis as to how to safely vent these drums so that there is no further exposure or loss of containment of this material.

MEMBER BARRIAULT: Is there any chance that the remaining drums can have a higher pressure than the one that actually was opened?

MR. ASTLES: Christ Astles, for the record.

There again, I'm -- I can't comment on that. The methods specifically we're looking at is actually the condition of the drum; whether there is deformation of the lid itself.

The operator was questioned as to: Did this lid look bulged when he took the lid off? And his comment: It was at the time but not uncharacteristically so.

So this is a process or a procedure we're implementing is: How does the drum look and if there's a risk of it being pressurized?

Follow-through on this JHA, Job Hazard Analysis, as to how to safely handle it prior to taking the lid off.

MEMBER BARRIAULT: Can these products be returned back to the producer?

MR. ASTLES: Chris Astles, for the record.

I guess we could look into that but, in all practicality, it would be safer to handle it at our site and not put it back into transportation.

MEMBER BARRIAULT: Okay.

Does CNSC care to comment on that? On returning to sender really these defective drums?

MR. ELDER: I'll ask Sylvain Faille to give

our opinion on that.

MR. FAILLE: It's Sylvain Faille, for the records.

In this particular case, we would have to evaluate all the options but it would certainly need some kind of (inaudible) person to make sure that those drums don't have any issues while they are being transported back to the point of origin.

MEMBER BARRIAULT: Thank you.

That's all for now, Mr. Chairman. Thank you.

THE CHAIRMAN: Thank you.

Monsieur Harvey?

MEMBER HARVEY: Merci, monsieur le président.

Was the staff aware of the -- I know it's far away back but of the NRC Notice or at least were you aware that there was some possibility that the -- that such a drum could have pressure?

MR. ELDER: Were we -- yes, we were aware of the Notice from the U.S. NRC in 1999. In fact, our records show that we had provided it to Cameco.

Again, as Cameco states, it's mostly focussed on a hazard at a mill rather than saying that there's a hazard after this material has been packed.

But, yes, we were aware of it and we also confirmed that we had informed Blind River of the Notice as well.

MEMBER HARVEY: Okay.

Sorry, that you did not recognize that pressured drum presented a potential hazard, you were aware of it?

Are you saying that in your presentation?

MR. MOONEY: Sorry, can you repeat the question?

MEMBER HARVEY: The question is: In your presentation, you mention that the root cause was that EIR did not recognize that pressured drums presented a potential hazard.

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

On that issue, we did recognize it as a filling and packaging issue for our mills but -- our mill, Rabbit Lake Mill -- that had the peroxide precipitation process.

So in that conversation it was recognized there and, again, the NRC Notice that we're talking to specifically talks about the hazard manifesting itself within three to four or five hours and so that the controls in place being really required at the mill.

And, again, looking at our packaging process at our production at the Rabbit Lake Mill, we were confident that there was adequate mitigation in place at that facility.

MEMBER HARVEY: Okay. I see.

The last question is: Are you going to present the final report in August 31st like it is mentioned here?

MR. ASTLES: Chris Astles, for the record.

Yes, the plan -- the submission is actually going to be August 24th.

MEMBER HARVEY: Twenty-four (24)?

MR. ASTLES: Yes.

MEMBER HARVEY: It could not have been earlier? Like today?

Okay, thank you.

THE CHAIRMAN: Thank you.

Anybody else? Mr. Tolgyesi?

MEMBER TOLGYESI: How do you transfer these drums? By trucking?

And did you communicate the transportation company that is there a potential hazard that could -- it could, I don't know, explode during the transportation?

MR. CHRIS ASTLES: Chris Astles, for the record.

The transportation is by truck. In North America, of course, it would be what we call "van trucks" and then, from overseas, the material is in ISO containers.

As far as notification to the transporters themselves, I do not believe they would have been informed of the potential of pressurized drum as the expectation was that there would not be any pressurization in these drums as they're being transported.

MEMBER TOLGYESI: So it is your intention eventually to do this because I think this an event which could -- we will hope that it cannot happen but it could happen once again.

MR. ASTLES: Chris Astles for the record. Yes, it's the producers that do arrange the transport so it's something we can communicate with them going forward to prevent any further potential accidents like this.

THE CHAIRMAN: Anybody else?

I just got one question. Given what happened here and particularly this dust management and all the -- are you satisfied with your Radiation Safety Program and the people who are managing it, everybody understand their roles and responsibility and is staff always verify that the program is on sound grounds and the qualified people managing it? So start with Cameco maybe

hear from staff?

MR. DEGRAW: Joe DeGraw for the record.

Yes, we are quite satisfied with the Radiation Protection Program, which falls under myself actually, and we're quite confident in the people we have.

And, well this incident was quite unusual, you know, we feel we did a -- there was a good response all around. But we are looking at obviously opportunities for improvement and we have been in consultation with health physicists from our Corporate Office to review this incident, again see what we could do better. You know, hopefully it never happens again, but if it does, what can we do better? So we are certainly looking at this as a learning opportunity.

THE CHAIRMAN: So the health physicist is not on site, it's at headquarters? Is that where it is?

MR. DEGRAW: Joe DeGraw again for the record.

Yes, Blind River doesn't have a health physicist on site pursuant with Radiation Safety Officer but we do have health physicist support. There's health physicists in the Field Services Division located in Port Hope Conversion Facility as well as health physicists at our Corporate Office.

And we got them involved right away when we

became aware of the potential magnitude of this event from a dose and toxicity perspective and they did the modelling work and were of great assistance in this incident.

THE CHAIRMAN: But just so I'm clear. So but on-site, you do have a Radiation Safety Officers.

MR. DEGRAW: Yes, definitely.

THE CHAIRMAN: Right.

And staff you check normally that everything is okay and above board and competency and qualification, all this stuff?

MR. ELDER: Peter Elder for the record.

Yes, like we do at all facilities, we ensure that all staff and those types of positions have the necessary trainings and qualifications and that they are based on a systematic approach to training that we apply to every facilities.

So specifically for the radiation staff at Blind River, we have the confirmed inspections, including interviews with the staff that they are qualified to meet the requirements as defined by Cameco and that they are maintaining these requirements through continued training.

So we've confirmed that the staff at Blind River has the knowledge, skill and experience to effectively implement the Radiation Protection Program at Blind River.

THE CHAIRMAN: Thank you.

Last chance?

Dr. Barriault?

MEMBER BARRIAULT: Yes thank you.

I noticed that now you have Respiratory Protection Program in place. Do you have training for Respiratory Protection testing and all those good things?

MR. DEGRAW: Joe DeGraw for the record.

Yes, we do that as part of our Radiation Protection Training Program.

MEMBER BARRIAULT: Thank you.

Thank you Mr. Chairman.

THE CHAIRMAN: Okay. Thank you.

Thank you very much. We look forward to reading the report.

I think we need -- ah okay. Are there any other Early Notification Reports that should be brought to our attention?

Mr. Jammal?

MR. JAMMAL: Ramzi Jammal, for the record.

Mr. President, I would like to bring to the attention of the Commission an unusual event that did not make the agenda of the Early Notification Report or Early Information Notification.

An event occurred at the CNSC here -- do

you want me to wait 'til the rooms change?

THE CHAIRMAN: No, go ahead.

MR. JAMMAL: An event occurred at the CNSC where the check sources, what I mean by check sources THEY are small radioactive sources designed to be hand-held for the purpose of detecting the operation of detectors.

These sources were being used for orientation session of our summer students and three of these sources were misplaced in the public area; at no time there was any exposure nor a risk to the public.

These sources are category five sources under the International Categorization that is labelled as negligible risk; that means no harm to the health. Our radiation protection specialists responded expeditiously, removed the sources and at no time there was any exposure to our staff, the public or the students.

Upon review of the event, and I have established an independent review team to look at this matter and as a matter of fact it showed, early indication showed, administrative controls need enhancement, the lab and the sources from the old lab at the CNSC were moved to its new location and we have to enhance the administrative controls.

So the lab activity as pertained to sources is now ceased, I've ordered the shutdown of the lab

activity until such time that the procedures, the enhancement of the administrative controls will be prevent recurrence of such events.

The report is being finalized as we speak and I will be providing an update to, as a matter of fact, to our External Audit Committee and to the Commission.

I'm available to answer any questions that you may have.

THE CHAIRMAN: Thank you.

Anybody wants to pose a question?

Dr. Barriault?

MEMBER BARRIAULT: Just a brief question.

What is the size of these sources? I mean is this something you can slip in your pocket or swallow or whatever?

MR. JAMMAL: The size of the sources -- Ramzi Jammal for the record -- it's roughly the size of a quarter or some of them are just a little smaller.

Can you swallow them? It would be very difficult to swallow, it's gonna hurt to swallow. But the intent here is; the sources themselves are sealed sources and again they're designed to be handheld so there is no external contamination in any way, shape or form.

MEMBER BARRIAULT: Thank you.

Thank you Mr. Chairman.

MEMBER VELSHI: Mr. Jammal, have you heard similar incidents in the past?

MR. JAMMAL: Ramzi Jammal for the record.

Have we had -- I cannot confirm if we had or not. The early indication has shown potential misplacement of these sources and the report itself -- the investigation is undergoing.

There are two issues here. Number one is -- some of the sources, the check sources are below what you call exempt quantity hence they are not required to be licenced. And our investigation now is determining is there a proper control and if there's proper control are these sources been transferred to a licenced facility for disposal or if we had any occurrence? To date, I can inform you that if there were any sources left behind, they were recovered.

MEMBER VELSHI: So there's none missing right now then?

MR. JAMMAL: Ramzi Jammal for the record.

We are reconciling the inventory and I can, I mean I can tell you, for the last five years, the sources have been recovered and which they're reconciling the inventory. So potentially some sources have been disposed of. We're reviewing the record of disposal. We are reviewing the inventory itself and if there was any

incident that previously occurred. Officially, none of the previous incidents have been reported to us, to the CNSC.

MEMBER VELSHI: Thank you.

You also mentioned that your lab operations had ceased while you're doing an investigation, so what are the implications of shutting down the lab?

MR. JAMMAL: Ramzi Jammal for the record.

The implications of shutting down the lab is training, courses for staff, handling of the sources, transferring the sources to trainers or moving the sources around for calibration purposes, has all ceased in order to ensure that there is proper transfer of sources to all our users, when I say our users it's CNSC users, and that's the implications.

So the lab will continue to, if there is a need, to measure any samples or wipe testing. That is not being affected at all because there is no need for the use of sources in the lab. But anything that pertains to the transfer. So in other words, the lab is, when I say ceased operation, is to maintain possession only of these sources.

THE CHAIRMAN: Dr. McDill?

MEMBER McDILL: Thank you.

You said you've assembled an independent

team without necessarily giving away identities. How do you know it's an independent team?

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

When I say independently, I meant at arm's length, not independent from the CNSC. So I've called in site inspectors who have not at all been involved in any inspections of the lab, and then the person who heads the team is -- I can give the name -- it's Mike Lemay, who is a trained root-cause analysis on the root-tap system, and he put the team together to include a member from our Audit and Ethics Group to ensure the independence of the evaluation is being -- is taking place.

So in other words, an individual who is not technical in nature and she is -- the person is brand new to the organization and belongs to the Audit and Ethics Group who accompanied the investigation and the review.

MEMBER McDILL: So the procedures that are being followed, if you like, against us, against ourselves are as strict, if not perhaps more demanding than would be applied to any other licensee, any of our licensees?

MR. JAMMAL: Ramzi Jammal, for the record.

You are correct. We want to be the example. Are we more strict? We are just as strict. As a matter of fact, I can say we're more strict because

we're reviewing the whole file from the licensing to the compliance activity, to the control itself.

So our expectation of ourselves should far exceed any expectation of a licensee and we are conducting a full investigation without any compromise to the functionality or the expectations that are required under our regulation and our requirements under our regulatory guides.

MEMBER McDILL: Would there be merit in having someone from completely outside CNSC on this team, someone from industry, someone from the sealed-source sector?

MR. JAMMAL: Ramzi Jammal, for the record.

Okay. I can share with you one of the early indications. One of the recommendations is to have a third-party review post the enhancement of the procedure in order to come and verify the lab itself. And the lab itself is set and applied for an ISO certification, which will put us under the microscope with respect to administrative controls.

THE CHAIRMAN: Monsieur Harvey?

MEMBER HARVEY: Is the calibration the only use of those sources?

MR. JAMMAL: Ramzi Jammal, for the record.

The -- yes, the intent of these sources is

mainly for calibration or demonstration purposes. So when I speak of calibration, it's you have a radiation detector, and those sources are so low in activity so that you check the functionality of the detector. So when I speak of calibration, it's if the machine responding to the source of that activity?

If I'm getting too technical on you, let me know, but it's more a check source. Is the machine functioning and does it respond to radiation. So it's not really a full-blown calibration according to our requirements. It's just the detector, and if it detect. Is it on or off? Because the source itself has a very low activity, and the expectation is: you know what is the actual exposure, and it's microsieverts per hour -- microsieverts.

MEMBER HARVEY: How often do you have to do that?

MR. JAMMAL: Ramzi Jammal, for the record.

Usually our inspectors who are on the field, they use these sources for, again, verification of our detectors, and those are optional.

And when I say optional, it's -- they come in a set of -- un ensemble de trousse -- it's a set of sources, and each one can be used to check. Literally, you hold it by hand and you put it in front of the

detector. Does it buzz or not? And then you put it back.

MEMBER HARVEY: How many employees are authorized to use those sources?

MR. JAMMAL: I can tell it's -- how many employees? Usually -- Ramzi Jammal for the record -- it's our inspectors, site offices, they have on average probably -- just going by memory here now, they have the adequate number of sources in order for them to check, again, to verify the detector's functionality, and if there is any official calibration of those detectors, they are brought to the lab itself here, and then we have a calibrator designed for the calibration of those machines.

So we have two groups of employees: our inspectors in the field and then the people, our employees here. In the site office who use these sources, as I mentioned, for demonstration purposes. And those are the users. So we have two types of users, in total, roughly around 40 or 50 employees.

MEMBER HARVEY: So the sources can be used here inside the building and outside?

MR. JAMMAL: Correct.

In what I'm going to call an unlicensed facility, yes.

MEMBER HARVEY: And you're going to have a procedure, but in the past, did you have a procedure, a

written procedure for that?

MR. JAMMAL: Ramzi Jammal, for the record.

In the past, existing written procedure, like I mentioned, we have to enhance those procedures for the purpose of transfer of the sources and accounting of these sources.

MEMBER HARVEY: Okay. Thank you.

THE CHAIRMAN: Anybody else?

Well, let's put it this way; you know my view on this. This was a very embarrassing incident where we, as supposedly the regulator, are not abiding by our own rules. So I'm looking for some -- a lot more rigorous adherence to the procedures we establish for everybody else.

So we're looking forward to see what will be put in place into the future.

And the good news for anybody who is interested in the subject is that the organization put on our website a lot of information associated with check sources and where they are, what level they are, who is using them, et cetera, et cetera.

But nevertheless, it was an embarrassment for this particular Commission, and hopefully we can learn from it and fix our own internal procedures.

MR. JAMMAL: Ramzi Jammal, for the record.

I do not disagree with you. That was such a silly embarrassment. Regardless, it's an embarrassment, and we'll commit that's not going to happen again.

THE CHAIRMAN: Okay. Thank you.

MEMBER HARVEY: One final question.

Just, do you have a timetable to have a solution and to restart the operation of the lab?

MR. JAMMAL: Ramzi Jammal, for the record.

The report itself, I have just --- the final draft to sign off right now, and we're expecting to have everything in place no later -- by the end of September, and the restart of the lab will be contingent upon the development of procedures to the satisfaction of our team. That is, number one.

Number two is the management will have to provide the response to this report, which would include a timeline, but we're working very vigorously and aggressively to close all the issues by the end of September.

THE CHAIRMAN: Okay. I just want to clarify; the lab is still operational? It's just the movement of sources that has to come under completely more rigid regulatory review.

Okay. I understand there's another Early Notification Report?

5. Update on an item from a previous Commission proceeding

MR. ELDER: Peter Elder, for the record.

This isn't really an Early Notification Report, but I just wanted to take the opportunity to update the Commission on something that was discussed at the March meeting about the vessels inspection at NRU.

I had given a note to the secretary to distribute it to the Commission about the fact that AECL was successful in completing all the inspections. I just wanted to use this opportunity to inform the Commission that AECL has now since submitted the results of the inspections, as well as the updated Fitness for Service Report for the vessel.

As stated in March, if the results are consistent with the previous reports, CNSC staff will discuss the future inspections required at the Annual Performance Report on Chalk River that is due later this fiscal year.

If there is anything new in these reports from our review, we will be presenting an Early Notification Report or an Early Incident Report to the

Commission when we have solid information to do so.

So to date, those inspections of the lower HAZ, the lower heat-affected zone have not given any unusual indications, but we're also looking at all the other inspections that were done during the last inspection campaign and the overall Fitness for Service Report.

So the report has been received. Our specialists are now reviewing it. Again, if there's anything unusual, we will come to you early. If there's not anything unusual, we will give you updates in the annual report.

Thank you.

THE CHAIRMAN: Anybody wants to comment on this?

Well, I think that it's a milestone that finally the Fitness for Service of the famous NRU and all the repairs that were done to it seem to, if I understand correctly what you're saying -- has been demonstrated to work and hold and be repaired.

MR. ELDER: Well, we have all the information to say it was all a baseline for those back in. There are other -- you know, this vessel will continue to be inspected.

So what we haven't reviewed yet is the

series of inspections, so comparing what was done two years ago to what they did this year and see if there's any change. So, you know, you'll continually look at those to see if there's -- get an early indication of is there any evidence of corrosion coming back or anything. So we're not in position ---

THE CHAIRMAN: So when is the next time you're going to appear in front of us and tell us all of this?

MR. ELDER: So the updates we will give in -- it's just that if it's business as normal, we'll come back to you in our annual report, which I think is early January, Marc, I think? I'm not sure of the exact date.

The other one is if there's anything unusual, we will be back sooner.

THE CHAIRMAN: Even if it's not unusual, we want to hear -- sometimes we want to hear good news.

MR. ELDER: Yes, I can understand.

THE CHAIRMAN: Okay.

MEMBER HARVEY: So you have received the results, but they are not analyzed yet. I mean, you've got to compare the past and the present to see if there is -- there has been any changes?

MR. ELDER: That's correct.

We received the results in early August,

results plus all the analysis of those results. So that would show that -- so one thing we looked at -- we're looking at do we agree with the analysis of the results that show the vessel's building and do we also agree with their future inspection campaign. So those are the two things we are looking at right now. And that's a highly technical review and it usually takes certainly a few weeks to conduct those.

MEMBER HARVEY: A few weeks?

MR. ELDER: It's certainly weeks timeframe. I say weeks and then that's assuming that we don't have any questions that we have to get answered before we come to our final conclusion. We usually allow like three months for this type of review to make sure that -- to come to a firm conclusion.

THE CHAIRMAN: But the latest will be in the annual report?

MR. ELDER: The latest will be in the annual report, absolutely.

THE CHAIRMAN: Okay.

MEMBER BARRIAULT: Just one short question. It's brief. It's just my own interest really. The actual tools that were used for the inspection, were those the tools that were produced for the repair?

MR. ELDER: These were -- in inspections,

these were newer tools that were developed to actually go into areas that they could not see after the initial repairs. So those tools did work as designed.

MEMBER BARRIAULT: Okay. And no tags in the reactor at this time that we had before -- the test tags or samples?

MR. ELDER: There will be -- no, these were actually physical non-destructive measurements of the reactor wall.

There is some other inspections going on in terms of other parts of the reactor other than the vessel. So there's a very comprehensive inspection regime going on as well.

MEMBER BARRIAULT: Thank you. Thank you, Mr. President.

THE CHAIRMAN: Okay, thank you. We need, I think, five minutes to set up for the next presentation, so we'll come back at a quarter to. It's close enough to five minutes, I guess.

--- Upon recessing at 2:40 p.m./

La réunion est suspendue à 14h40

--- Upon resuming at 2:53 p.m./

La réunion est reprise à 14h53

THE CHAIRMAN: Okay. We are now into something really simple. It is an update, I think, on an item from a previous Commission proceeding. It's a Progress Report on the CNSC Staff Review of the new Neutron Overpower Protection (NOP) Methodology, as outlined in CMD 12-M42.

And I understand that Mr. Frappier, you will make the presentation. Please proceed.

5.1 Fourth Progress Report on the CNSC Staff Review of a new Neutron Overpower Protection (NOP) Methodology

12-M42
Oral presentation by
CNSC staff

MR. FRAPPIER: Thank you and good afternoon. For the record, my name is Gerry Frappier and I'm the Director General of Assessment and Analysis here at the CNSC.

With me today is Dr. Greg Rzentkowski, the Director General of Power Reactor Regulations. Greg will be presenting the second part of today's presentation.

And on my left is Dr. Michel Couture, Director of CNSC's Physics and Fuel Division. And we also have several experts, in particular Dumitru Serghiuta and Haldun Tezel who can provide some additional support should the questions become a little bit tougher.

Also, I'd like to point out that we have representatives from both Bruce Power and OPG here with us today.

Today we'll be providing the fourth Progress Report on the CNSC Review of the new Neutron Overpower Protection Methodology.

In the first part of the presentation, I'll give a -- I'll provide a quick recap of the Neutron Overpower Protection or NOP, as we call it for short, along with the effects of the aging of the heat transportation system because the two work -- are important to understand together, how they are interlinked.

I'll then provide a summary of our activities and our conclusions to date.

In the second part of the presentation, Greg will present the current licensing impact on the actual operating nuclear power plants in Canada, and we'll go through the situation at each one.

So NOP. NOP is a key aspect of defence and

depth in design of the CANDU reactor since it guarantees a very fast shutdown of the reactor in the rare case a malfunction of the regulatory -- of the reactor regulating system.

Given its importance, major changes to its function, functioning or the safety analysis supporting it is of keen interest to the Commission. It's for this reason that we have taken some of your time today to provide you with some more information and the reason why we've been doing these progress reports over the past few years.

So a little bit of history, just to give us some context. Between July 2005 and December 2007, OPG and Bruce Power submitted updating licensing NOP analysis based on a new methodology. The new methodology was of keen interest to ourselves and we began to want to have a review of it.

We presented that to the Commission and the Commission requested that we provide regular updates to yourselves, and so the purpose of this meeting and several of the others that we've had was to fulfill that commitment to provide the Commission high-level progress updates regarding our review of the new NOP methodology.

It's worth also pointing out at this point that we're really only discussing about the facilities at

OPG and Bruce, so both Darlington, Pickering and Bruce facilities. It does not apply to Point Lepreau or to Gentilly-2. Both Point Lepreau and G-2 use another methodology to achieve the necessary safety that we're talking about.

So a quick recap on normal operations again, just to make sure we're all following what NOP does on that. If I could remind people of the normal operations of a CANDU reactor, it's controlled -- basically, a CANDU reactor is based on a controlled, steady state, neutron-induced fission chain reaction.

And that's a whole big mouthful, I know, but basically what it is is we want to have a constant fission chain reaction and we want to ensure that we always have control of that chain reaction.

So the CANDU units possess several types of vertically-operated neutron absorbing devices which are used to control the fission chain reaction. They are part of what is known as the reactor regulating system or the RRS.

The RRS maintains a steady operating reactor power level, and that's key to the operations. A number of fast response in core neutron detectors, known as the Neutron Overpower Protection system, continuously monitor the power level throughout the core. So as the

reactor regulating system is maintaining the neutron flux in nice control within the reactor, we have a system that is watching that very, very closely.

Any malfunction of the RRS leading to an abnormally high power level in the reactor core will be detected by the NOP system, which will immediately initiate a reactor shutdown when the overpower reaches a pre-established limit which we call the NOP trip set point.

Within a couple of seconds, the reactor will be placed in safe shutdown state and that will end that excursion, if you like, whatever the reason might have been for the power level to go up higher than expected.

So the NOP is a system that is watching all the time, completely separate from the reactor regulating system. And if it detects that the power level is starting to go up beyond the pre-defined trip set point, it will immediately automatically shut down the reactor.

So this is part of the defence in depth and the NOP trip set points are a key part of that. As part of the defence in depth, the CANDU reactors have multiple barriers to releasing radioactive material. There are physical barriers, including the ceramic fuel itself, the fuel sheath or cladding, and the primary heat transport

system pressure boundary. All of these prevent radioactive release to the environment.

The NOP trip set point values are selected to ensure that the shutdown systems' effectiveness are protecting the integrity of these physical barriers.

So the whole concept here is that NOP will shut down the reactor before any of those physical barriers are stressed beyond what is allowed.

So the analysis methodology which determines these trip set points is referred to as the NOP methodology.

And so the determination of these NOP trip set points is important for ensuring this aspect of the design and depth or defence and depth -- excuse me.

So the impact of heat transport. So now, just to change subjects a little bit, let's talk about the heat transport system and how it's aging in CANDU reactors and how that interacts with the trip set point.

So the heat transport system, or HTS, operating in CANDU reactors -- that's the coolant flows, the temperatures, the pressures all associated with that -- are affected by the aging of the heat transport system components.

In the absence of compensatory actions, this would require the reactor to be tripped at a lower

power level. Therefore, the NOP trip set point would have to be set lower. The adverse impact of aging increases with time and eventually will lead to a reduction of the operating power level and, therefore, to a reduction of the electrical output of the reactor, so-called de-rating.

So eventually, if we don't do anything, these trip set point will have to get lower and lower and the reactor will have to actually de-rate and produce less electrical power than it's capable of.

The adequacy of a reactor protection system and safe operating under aging conditions is strongly dependent on the NOP trip set point and their trend with time. So the aging of the -- the basic message here is the aging of the heat transport system components require the NOP trip set point to be adjusted.

So that leads us to why we wanted a new methodology or why industry wanted a new methodology. It is OPG and Bruce's position that the previous NOP method that's been used since the reactors were originally designed was overly conservative and would have led to earlier than required plant de-rating.

So in the 2005-06 period, OPG and Bruce Power proposed a new NOP methodology which incorporates the impact of aging of the heat transport system components. The new methodology is complex and introduces

several new features which represent a significant departure from the previous NOP methodology.

Given its complexity and impact on the licensee's aging management strategy, the new methodology required close scrutiny and staff undertook an in-depth, independent review.

So although this is a new methodology, the CNSC staff and the industry, I would say, are determined to ensure there's no decrease in safety.

So in September of 2007, the CNSC staff completed a screening review of the new NOP methodology and identified a number of issues that required further in-depth assessment.

In order to resolve those issues, an independent technical panel was jointly created by the CNSC, OPG, Bruce Power as a COG-joint project to review the methodology.

The ITP review report, issued in early July 2009, concluded that the overall methodology has a sound technical basis. However, it stressed that final acceptance of the methodology by the CNSC for use in the regulatory process requires additional justification and supplementary analysis and possibly revisions.

The interim status of the CNSC staff review, as well as the results of the assessment done by

the Independent Technical Panel, is documented in an August 2009 CNSC staff interim report.

Based on these three reports, the CNSC staff stated its interim position on the use of the trip set points calculated with the new NOP methodology.

So I just want to again emphasize that this is receiving a very thorough, independent review by CNSC staff.

So that led us to the interim position of November 2009. And given the values of the installed NOP trip set points and the fact that OPG and Bruce Power had committed to address all the issues identified in the CNSC and the Independent Technical Panel reports that they were going to apply a correction to the calculated NOP set points to address one of the key issues raised by the ITP, that they were applying compensatory measures as required to ensure that sufficient safety margins were maintained going forward into 2010 and beyond, and that they would submit quarterly reports on progress and on the continuing adequacy of the trip set points.

Based on those, the CNSC accepted that these actions were adequate as an interim measure and authorized the use of the NOP trip set point calculated with the new methodology.

So the interim position was in place and it

assured safety.

So where are we today? Some of the key highlights. So OPG and Bruce Power have completed all major activities committed in their work plans and submitted several reports documented in the results.

The formal request for closure of licensing actions and CNSC's concurrence with the application of the new NOP methodologies have been submitted by OPG last December and by Bruce Power last January.

OPG and Bruce Power are confident that the current NOP trip set point are adequate for safe operations of their stations based on their review of results of analytical and methodology-related activities.

So in short, OPG and Bruce Power have delivered on the commitments that they had made to the Commission with respect to this review.

With respect to the CNSC staff review, the staff review is carried out by a multidisciplinary team and the main objective of the CNSC staff review is to finalize a regulatory technical position with recommendation for safety and licensing application of the new NOP methodology.

The CNSC staff has made significant progress with the review of information submitted by OPG and Bruce Power for resolution of the issues that were

identified in 2009, both by ourselves and the Independent Technical Panel's report.

The consolidated CNSC staff progress review was completed in July of this year and will be forwarded to OPG and Bruce Power this month.

There are still a couple of issues that require some attention and in path forward have been identified. The two key areas are the modelling of the plant-channelled thermal hydraulics -- the plant and the fuel-channelled thermal hydraulics and a new statistical framework for computing the NOP trip set points.

The CNSC staff review deliverables on the formulation of the regulatory technical position with recommendations for safety and licensing application of the new NOP methodology is planned for the first quarter of 2013, so coming up in the spring.

As of right now, the overall conclusions are that, first of all, OPG and Bruce Power are both confident, based on their reviews of results of the completed activities, that the current NOP trip set points are adequate for safe operation of their station.

The basis for the November 2009 CNSC authorization for interim use of the new methodology remains sufficient to ensure safe reactor operation, and given the current settings are deemed safe, no action is

requested by the Commission today. We believe that the 2009 CNSC interim authorization is still acceptable and should be in place going forward.

And with that as a bit of a summary of where we are with the NOP review, I will now pass it on to Greg Rzentkowski to talk about where we are with the impact on the actual operating plants.

MR. RZENTKOWSKI: Thank you very much, Gerry.

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

Mr. Gerry Frappier has explained some technical details behind a new NOP methodology and provided the status of regulatory reviews.

I, on the other hand, will explain what it means in practical terms. Specifically, in my presentation I will show the impact of this methodology on operation of power reactors. I will present the trip set points derived from the application of the new NOP methodology for the Darlington, Pickering and Bruce power operating units, together with the corresponding reactor operating power.

This methodology is currently not applied to CANDU-6 reactors, as Gerry mentioned already.

Furthermore, Mr. Frappier has stated that

this is an interim position only, established based on the current status of implementation of the new NOP methodology, which is subject to final review and acceptance by CNSC staff.

This slide shows a conceptual representation of trip set points and the corresponding reactor power that is essential to provide context for the information related to operating units that I will present later.

The nominae reactor power level shown here in red is kept below a maximum over power level of 120 per cent full power, above which fuel dry out is estimated to occur. The NOP installed trip set points represented by the black dashed lines on the graph must ensure that the safety system were actuated before the reactor power exceeds the maximum over power level in case of a loss of reactivity.

Now, the distance between the nominae reactor power and the installed trip set points, which is a design margin or operating margin, should be preserved at all times during reactor operation.

The trip set points, calculated base on the new NOP methodology, are shown as a blue solid line on the graph.

Please note that the trip set points

decrease gradually in time due to the adverse impact of heat transport systems aging. As a result, at some point in time, about 2016, when the calculated and the installed trip set points overlap, the reactor power would have to be reduced from its nominal value of 100 per cent full power to preserve the required design safety margin. The reactor power must be reduced at the same rate as the calculated trip set points, as shown on the graph.

I would like to stress again that this is a conceptual scenario only. The next few slides will demonstrate the current and projected NOP trip set points for operating units.

It is also important to point out, before I go to the next slide, that the NOP installed trip set points value will show some variations between stations depending on the location of the detectors that monitor the neutron populations in the reactor car.

I would like to start with the description of the NOP trip set points at the Darlington station where none of the units is currently derated to maintain the designed margin. However, the lead unit, which is Unit-2, will have to be derated by mid-2013, as illustrated on this graph. Remaining units, not shown here, will need to be derated a few years later starting in 2016.

To avoid derating, OPG is the process of

implementing the new fuel bundle design, which is expected to provide additional design margins equivalent to approximately 5 per cent of full power. This change will significantly improve the current safety case, mitigating the adverse impact of aging.

At Pickering A, there is no need to adjust the NOP trip set points or power for the remainder of operation of Unit 1 and 4. The end of commercial operation of these units is currently scheduled for August 2020, as indicated on this graph.

I would like to remind the Commission that Units 1 and 3 are in a safe storage state.

This graph shows that at Pickering B, there is the need to adjust NOP trip set points by 2017 for the remainder of the operation of all units. As with Pickering Unit 1 and 4, the end of commercial operation is currently scheduled for August 2020.

I will now provide a description of the NOP trip set points at Bruce Power reactors. As shown on this graph, Bruce A units are currently limited to 92 per cent full power as they were originally designed to produce steam for the heavy water plant. Units 3 and 4 would be derated by about 1 per cent in the fall of this year to maintain the NOP design margin. Subsequently, the units will be derated at the rate of about 1 per cent per year.

Units 1 and 2 have undergone a full refurbishment and are scheduled to return to service this fall. They will operate at the nominal power of 92 per cent full power.

As indicated on this slide, Bruce B units are currently derated to 93 per cent full power. This is required to maintain the safety margin for a postulated large loss of cooling accidents.

None of the units are currently further derated to maintain the NOP design margin. This would be required starting in 2020 for each unit.

In conclusion, the impact of the NOP trip set points on the operating reactors is that the reactor nominal power has to be reduced as the reactor age to maintain the required design margin.

The trip set points and the designed margin to trip are specified in the reactor licensing bases. As new information, analysis, or operating experience comes to light, that will challenge or change the current assumptions, the licensees are required to make appropriate adjustments to maintain the design margin.

The design margin is maintained at all times by adjusting the nominal power levels as the reactor age. This is the case at the Gentilly-2 station which is currently derated to about 95 per cent full power.

Thank you very much for your attention.

This concludes my presentation.

THE CHAIRMAN: Thank you. Okay. Who wants… Okay. Let me… I will now follow my instructions here, so bear with me for a second.

So, I guess… We have a representative here from OPG and Bruce Power and do you want to make a statement? Or you just wait to answer questions? Go ahead.

MR. DERMARKAR: Thank you for the opportunity, Dr. Binder. For the record, my name is Fred Dermarkar. I'm the Vice-President of Engineering Strategy at Ontario Power Generation.

I'd like to reiterate the comments made by Mr. Frappier that OPG stands behind the statement that the current NOP trip set points are adequate for safe operation. I'd like to just bring to your attention, this methodology has been under development since 2002, a large amount of effort has been put into this methodology.

It represents a significant improvement over the methodology that was employed in the initial licensing of the plants. It better quantifies actual safety margins, so gives us better insights into the plants. It uses recognized methods from across the industry. It has been thoroughly scrutinized through internal industry reviews, through industry-sponsored

third party reviews, through CNSC and industry-sponsored third party reviews, and now through additional regulatory review.

For these reasons, we're confident that the trip set points is robust and will assure safe shutdown of the reactor in the event of the loss of regulation event.

We do recognize, OPG does recognize the CNSC's requirements for independent confirmation of the methodology and we are fully committed to support the CNSC in this effort.

The one thing I'd like to note is, as pointed out by Dr. Rzentkowski, the impact of HC (phonetic) aging is imminent for both OPG as well as Bruce Power. In the case of OPG, Darlington is looking at starting to derate its units in less than a year, if nothing else changes relative to where we are today.

For this reason, we are looking for timely completion of the CNSC's review of the methodology. It will give us between another 18 months to several years of additional margin to accommodate aging if that methodology is approved. This is in addition to the physical modifications that OPG is committed to implement to improve safety margins and offset the effect of aging through the implementation of the modified 37-M fuel bundle.

Thank you very much.

THE CHAIRMAN: Thank you. Bruce Power?

UNIDENTIFIED SPEAKER: Nothing further, really. I think it's been pretty well covered.

We, of course, do intend to take other actions to improve our safety margin, so de-rating is not our first plan, but we'll see how all that works out.

THE CHAIRMAN: Okay. Thank you.

Who wants to start?

Actually, I have a list here. Monsieur Harvey, you're first on the list.

MEMBER HARVEY: I won.

Anyway, it's not the first that we have a discussion on this subject, and the longer it takes to get the final response, final answer, the harder it is for us to be confident. And the security is the same or is better.

You see a departure from the past and it's very complex. It's very complex for us too to understand everything. And the first question I would ask is the -- what are the compensatory measures that are in place to compensate the -- well -- the uncertainty of the new technology?

Well, I don't know -- maybe the staff could answer that? But -- because it is difficult for us to --

it's not the first time we say that. It's the fourth time you're here. So it's difficult for us to say, "Okay, we lowered the nose-blinds and it's safer, it's -- there is no change in that."

So you've got to explain it and maybe you did other times, but maybe it's good to refresh the concept of those compensatory measures that are in place.

MR. FRAPPIER: Okay, Gerry Frappier, for the record, and then I'll ask Michel Couture that.

I think first of all, it's not surprising that it's difficult to absorb all this. It is a complex system. The mathematics are pretty intense, and the new use of statistical approaches is quite a departure. And we've also insisted on lots of new data associated with heat transfer parameters and that.

So there is a lot of things behind this and that's one of the reasons it's taking a while to get to a conclusion on it. It's not because we've found a whole bunch of problems that have not been able to be resolved, it's about going through and making sure we all understand, both industry at the beginning.

But I would say right now ourselves as regulators, we -- there's a very important system and important methodology and we have to make sure that we have the capacity and the knowledge to understand how this

system's going to work.

So part of the delay is us learning enough and part of it is also having enough expertise to undertake independent review. So we have done quite a bit of work, as we've just mentioned, getting outside, world-class experts in particular areas of it.

The reason we want to take our time and make sure this is right is because then this will be the new methodology for the ongoing life of the Bruce and OPG facilities. So we want to make sure that we a) understand it, that we're very, very confident about it, and so that they can then use it as they need to for their future plant.

Up until 2009, we were very -- at -- and in 2009, we were very confident that the general direction that it was going in and the main blocks of what the methodology uses were sound and were good, and we had independent recognition to that effect.

And we are now looking at some of the key details which are important because as Fred Dermarkar was saying, they could make a difference of five, six, seven years before you have to de-rate and that's a huge difference.

But in 2009, we weren't a 100 per cent sure on all the different pieces so we said, okay, you can use

the big pieces of it and that we would then require a certain number of compensatory measures, and that's getting to your point now.

So for the details on those, I'll ask Michel Couture, please?

MR. COUTURE: Michel Couture, Director of Physics and Fuel Division, for the record.

What we mention by compensatory measures, we've mentioned them in the context, first, of the 2009 interim position. At the time, there were recommendations by the expert panel that roughly a two per cent correction to the trip setpoint should be implemented to address certain issues. So licensees did that.

And then the other compensatory measures are always ongoing, is that there's adjustments to trip setpoints due to aging, so they continue monitoring this. And if, at one point, there's a need de-rating, they will go ahead and de-rate. So there's a constant monitoring of that.

And on top of that, is that our staff is following very closely the development in the work. We're on constant interaction with the licensees, so should there be any results coming out that would require adjustment to the trip setpoint, we would immediately impose them.

MEMBER HARVEY: That second point, would that -- would have been done with the old technology? I mean, with the aging you will have ---

MR. COUTURE: Yes.

MEMBER HARVEY: --- the frequent would have been ---

MR. COUTURE: Yes, with the old methodology, they had to adjust over -- every year, there's about a one per cent of de-ratings. The new -- what the new methodology indicated is that there were -- you can actually have the same degree of protection but with higher trip setpoints. So that means that your de-rating comes later.

So because of that, and given the 2009 position that was an interim position, the industry, the Bruce Power and OPG did not have to start de-rating immediately like the G-2 had to do.

The G-2, they started de-rating with the methodology they chose to use. They started de-rating, I think, in the late '90s and early 2000.

MEMBER HARVEY: That's what we saw in the graph there?

MR. COUTURE: Yes, so they started earlier ---

MEMBER HARVEY: They just extended the life

of the ---

MR. COUTURE: --- so they have not put forward the new methodology so they decided to stick to what they had.

And OPG and Bruce Power have spent quite a bit of effort in developing a new methodology.

MEMBER HARVEY: A part of my concern is the fact that I read in your documents that you don't know enough yet to say that -- if those trip points (sic) will have to be raised or maintained or lower, so for us not -- it's difficult to maintain what is there when you read that.

MR. FRAPPIER: Gerry Frappier, for the record.

So, of course, we are continuing our review. Everything that we've seen right now would indicate that the trip setpoints are going to be adequate and, in fact, might be even improved upon.

However, we have not completed our review and so we are making it very open with the Commission that the areas that we're looking into, we cannot discount the possibility that we would insist on more corrections from industry in the future.

At this point in time, we do not believe that's going to be the case, as I said and as OPG had said

as well. We think that, in fact, it will be an improvement in -- as we finish our final reviews.

MEMBRE HARVEY: Pour finir en français, selon vous, la sécurité actuelle est au même niveau ou même améliorée avec la sécurité qu'on avait avant l'instauration de la nouvelle technologie?

M. FRAPPIER: Gerry Frappier, pour -- comment on dit ça en français -- for the record anyways.

Disons que à ce point-ci, c'est clair que la méthodologie qu'ils utilisent maintenant nous donne un meilleur aperçu de c'est quoi la marge de manœuvre, si tu veux, avec ce système-ci et de ce côté-là, c'est beaucoup plus avancé qu'on était avant.

Alors on est confiant que le système est aussi sécuritaire que ça l'était avant avec la vieille méthodologie tant que nos revues qu'on est en train de finir ont une bonne conclusion.

MEMBRE HARVEY: Merci.

THE CHAIRMAN: Thank you.

Ms. Velshi?

MEMBER VELSHI: Thank you.

My point is very similar to Mr. Harvey'S.

As far as the approach taken by the CNSC and whether that's a prudent thing or not, that you actually agreed to it on an interim basis allowing a new

methodology when analysis is still underway.

So recognizing that you know that this is just going to give you better information, but is -- you know -- is this good practice to have, to allow perhaps a reduction in safety margin while there's still ongoing analysis happening?

And isn't the prudent thing to wait for this to be completed and then say yes, you know, you don't need to de-rate and you can revise your set points?

MR. FRAPPIER: Gerry Frappier, for the record.

So certainly from an engineering technical perspective, I would rather have all the time I need to review things before I can say that the whole thing is perfect and now you can use it.

However, we also have to be mindful of the implications of that. So I think we've been very conscious that we are going to make sure that the risk that is inherent is not increasing by our recommendations as far as the approach.

And that's why the interim approach did not allow full utilization of the methodology. It allowed use of the methodology that we agreed on and we still agree on now as being adequate. We also require them to have some compensatory measures, in particular whatever the answer

is, subtract two per cent.

But I think also it's important to know that the NOP is also backed up by a whole bunch of defense and depth. So there's conservatism built in to even the whole philosophy that we're using here.

The NOP is going to trip quick enough to ensure that the reactor never gets to a point where any of the fuel is dried out. That's -- as well call it, a dry out. So the cooling effect of the heat transport system is reduced tremendously at dry out. So we are not going to allow that to happen. And that's what the NOP trip set point is designed to do.

However, even if it does happen, that is not a doom's day scenario, if you like, as we like talked about here, in the sense that already there's quite a bit of margin between a fuel bundle achieving what's called dry out and it having defectiveness with it.

The reason we like dry out, a) it gives us a certain amount of conservatism, that's important, but it also makes it very easy that if the NOP does trip and it works properly, we can allow the facility to restart. We know for sure there's been no damage to any fuel whatsoever.

However, if the NOP did not work as advertised or as required and the fuel did start to go

beyond dry out, there's still quite a margin between that and fuel failure.

And then fuel failure is still a margin between that and pressure tube failure. And when we have pressure tube failure, that's when we would say that we have some, you know, some serious concerns about what's happened to the radioactive material.

So even with NOP perhaps being off by a percentage or two, the risk involved is not that great. Compared to the benefit to Ontario of having, you know, reactors that are fully operating at full rating. So we do have to have a bit of a balance there.

We're comfortable that the 2009 interim position was a reasonable place to be given the situation that -- given the review -- the status of the review we've done.

But again, from a -- I can certainly understand the point of view of hey, you're reviewing something, why don't you wait until the end of the review? But this review has lots of different pieces to it. And several of those pieces, we're quite comfortable with the review we've done.

MEMBER VELSHI: So in 2009, when you agreed with the interim measure, when did you expect to finish the review -- in 2009?

MR. FRAPPIER: So at that point in time, our expectation was that we would be finishing it in early 2012, so spring of this year. Because we did get into some additional complexities for the last couple of areas that we're looking at, we're going to need until spring of 2013.

MEMBER VELSHI: So from the Commission's perspective, there clearly -- the benefit is not safety by using this interim methodology. Yes, you've got better data and -- but the safety margin really is less than headed had you used the old methodology; isn't that correct?

MR. FRAPPIER: No, I don't think that's the right way to view it. Certainly, there would be more distance between the operating reactor and the necessary trip set point because you would have de-rated the reactor. But that doesn't necessarily mean it was true or that it was better. So the new methodology is a more accurate representation of what that margin actually was.

And so if we, in the past, said we wanted to have X percentage of margin, but we were not very good at predicting what that -- where we were, and now we're better at predicting where we were and we're keeping that same operating margin or design margin as Greg had mentioned. Then I would suggest that we're at the same

place we were before.

MEMBER VELSHI: Right. Analytically and statistically, you're maintaining the margin. But the safety margin would be higher had you not used the interim methodology?

MR. FRAPPIER: I would say the margin would be higher, but I'm not sure I would characterize that as a safety margin. So we have a -- you know, you can have more margin, it doesn't always necessarily mean you're safer.

You want to have a certain amount of margin that we call a safety margin that we're comfortable that is the amount you need. Anything above that, we would call, you know, additional conservatism. And that can be good, but not necessarily good.

MEMBER VELSHI: And you said this did not apply to the Candu 6 designs. Is this because they have chosen to de-rate the unit or is there something unique about those designs that the aging process doesn't have as much of an impact?

MR. FRAPPIER: Gerry Frappier, for the record.

The Candu 6 designs or actually the utilities that operate the Candu 6 design are still -- are continuing to use the methodology that was first put

forward by the designer, AACL.

But I think more importantly, for instance for Point Lepreau, now that they have completely done the refurbishment, aging is not an issue. And similarly with G-2, they are moving forward saying they're going to be doing refurbishment. And if they do refurbishment, then a lot of this problem area, if you like, goes away because you don't have an aged transportation -- heat transport system. You have it renewed.

MS. VELSHI: Thank you.

THE CHAIRMAN: Thank you.

Dr. Barriault?

DR. BARRIAULT: Thank you Mr. President.

I'm just trying to get my mind around this really. And what you're basically doing is experimenting with the reactors to see if the margin of safety is as good as it was before given these new parameters that you're working with. Am I correct in assuming this?

MR. FRAPPIER: Gerry Frappier, for the record.

No, I would not characterize it as that. There's no experiments going on with the reactor itself. The experiments that were done were done not in the reactor, but in laboratories, both Chalk River and other laboratories. And the analytical experiments, if you

like, are done on separate computers, not on the operating computers.

The reactors themselves are always operated by the rules and with appropriate margins. And the analysis going forward into the real operational status of the plan has a whole bunch of quality assurance checks and all that. So all the experimental, all the review parts that we're talking about are done not at the site, not on the plant.

DR. BARRIAULT: I just wanted to clarify that.

The next question really is. Does changing the NOP methodology improve the safety margin of the reactor?

MR. COUTURE: Michel Couture, for the record.

I think it's important to mention that the new methodology still has the same criteria to be achieved like prevention, what they call dry out.

DR. BARRIAULT: Okay.

MR. COUTURE: So whether it's the old methodology, the new methodology, prevention of dry out is still the objective. So in that sense, the margin is the same ---

DR. BARRIAULT: The same.

MR. COUTURE: --- because you have a margin between dry out and let's say failure which we're trying to avoid. So from that perspective, it is the same. What the new methodology tells you is that you can trip actually at a higher trip set point and still maintain -- prevent dry out.

DR. BARRIAULT: Okay.

MR. COUTURE: So the importance is to discuss the margin is to discuss what is the acceptance criteria that you're trying to reach to protect your barriers. So the new methodology still has that objective of preventing dry out.

DR. BARRIAULT: Okay. But I guess what I'm trying to understand is that increasing the step -- the trip point at a higher level is based on experimentation or sound analysis of the data?

MR. COUTURE: The power at which you would trip -- you should trip the reactor to prevent dry out, that is established with experiments with certain, you know, at certain labs.

They will do -- they will take sort of a set-up of bundles ---

MEMBER BARRIAULT: Okay.

MR. COUTURE: --- mimics to bundles to start increasing power and, at one point, they will reach

dry-out.

MEMBER BARRIAULT: Okay.

MR. COUTURE: And they will say: Well, that's the dry-out power that we should avoid.

MEMBER BARRIAULT: Okay.

So what I'm hearing then is that you're experimenting in the lab on this methodology and then coming back if it does work safely ---

MR. COUTURE: Well, the methodology is not being tested in the lab, what is being tested in the lab is what is the dry-out power that you ---

MEMBER BARRIAULT: Okay.

MR. COUTURE: Because by increasing the power in your test ---

MEMBER BARRIAULT: M'hm.

MR. COUTURE: --- your experimental set-up, you'll reach a point where you can actually measure. On the fuel, you'll notice there's a change in temperature.

That means that the transfer -- heat transfer ---

MEMBER BARRIAULT: Heat transport system.

MR. COUTURE: --- is going down.

MEMBER BARRIAULT: M'hm.

MR. COUTURE: It's not efficient as much or you identify that as being for certain conditions that

you've tested in your test ---

MEMBER BARRIAULT: Okay.

MR. COUTURE: --- in your experimental set-up. You will be able to say that: I've reached now the dry-out power for those conditions.

MEMBER BARRIAULT: So you ---

MR. COUTURE: And you repeat for different conditions.

MEMBER BARRIAULT: Okay.

MR. COUTURE: And that's what you use in your analysis.

So the power at which the fuel would dry out is being tested experimentally.

MEMMBER BARRIAULT: Okay.

MR. COUTURE: What is being used, the new methodology is being used to calculate the trip set point itself which is a one-step further down the line.

First, you establish what the dry-out powers are ---

MEMBER BARRIAULT: Right.

MR. COUTURE: --- and then you input that information into a computer code that has the methodology and out comes the trip set point at which -- and that includes all the uncertainties in your calculation.

MEMBER BARRIAULT: Right.

MR. COUTURE: So the methodology itself is not tested in labs.

MEMBER BARRIAULT: Okay.

MR. COUTURE: And that's what we were doing, we were benchmarking, for instance, we're trying -- because the trip set point itself is not something you could -- you can measure or there's no true value as such ---

MEMBER BARRIAULT: Okay.

MR. COUTURE: --- so that we use benchmarking tests for the methodology of calculation.

MEMBER BARRIAULT: It brings me to my next question: What is a (inaudible) comparator?

MR. COUTURE: Okay, so the purpose there was the methodology.

The statistical framework that has been used by OPG and Bruce Power is a certain statistical framework. They refer to it as "EVS", Extreme Value Statistics.

And our consultant has declared it as mathematically sound, correct; statistically correct.

We've been using a different statistical framework because one could say: Okay, you're new -- the framework that you're using, which is EVS, is giving you some gain in the trip set point by 8 percent; let's say.

What if you use actually a different statistical framework? What type of gain would you get there or would you get the same results?

So we use the -- we got a consultant that helps us to define tests using a different statistical framework to be able to compare the results on both because, in principle, hopefully, you would get the same ---

MEMBER BARRIAULT: It should be the same.

MR. COUTURE: --- results by the two statistical frameworks.

MEMBER BARRIAULT: All right.

Final question: What is the worse-case scenario that can happen if this ain't going to work?

MR. COUTURE: Well, let -- you mean, should we be off by trip set point ---

MEMBER BARRIAULT: Yes?

MR. COUTURE: --- and let say that you do have a loss of reactivity -- a loss of regulation and your power starts increasing?

If your trip set point is off by a certain -- eventually, the reactor will shut down nevertheless. You have other trip parameters: high pressure and so on.

These trip parameters are less efficient because they are tripped. They kick in later. But your

reactor would be shut down.

Now, how off you are by your trip set point? Let's say you're 5 percent off, you thought that you're, you know, at a certain value but, in fact, you should have tripped 5 percent lower.

First, the criteria itself has some margin, some safety margin there. So the impact on what would happen to the fuel, it remains -- normally, if you have a few percentage off, you may not even fail the fuel and certainly not the pressure too.

But there is some margin to -- first, there's back-up trips, like I mentioned, trips that will kick in anyway. Although they are less efficient, they come later to stop the reaction or stop the increase in power and, secondly, you have some margin built in your criteria that you use which would, like I said, may -- depending on how a margin you have to failure -- how conservative this dry-out is, you may end up having no impact at all to your fuel and to your pressure too or it may fail some fuel sheets.

So the degree of damage would be to -- be difficult depending on how far you're off ---

MEMBER BARRIAULT: M'hm.

MR. COUTURE: --- you're off from the true set point that you should have had.

MEMBER BARRIAULT: So what, in essence, we're doing is changing one level -- if I can say -- of safety.

Am I correct in assuming this?

MR. COUTURE: Well, the position of the industry has been that there's a lot of conservatism in the calculation itself of the trip set point.

MEMBER BARRIAULT: And is that a bad thing?

MR. COUTURE: It's not necessarily -- it's not a bad thing to have more conservatism. However, if you can identify the source of conservatism in there clearly, then it's a question: Okay, do we remove that conservatism?

And then, you look for other places where do you have enough conservatism. It could be in the trip set point -- not at the trip, the criteria itself.

If you prevent dry-out but you know that dry-out does not have a cliff-edge effect and if you pass dry-out, you know, it's not a big -- suddenly a big accident.

MEMBER BARRIAULT: M'hm.

MR. COUTURE: It's simply you still have a margin to failure then you're conservatism is there in the criteria that you use.

We could, at the limit -- at the moment,

there's a request for 90 percent -- 95 percent probability of preventing dry-out and 95 percent confidence level. That's the statistical criteria. One could ask for 96, 96, 97, 97.

So you can build in your conservatism and the criteria that you use.

MEMBER BARRIAULT: Okay.

MR. COUTURE: Although you're removing conservatism elsewhere.

MEMBER BARRIAULT: Thank you.

Thank you, Mr. Chairman, for now.

THE CHAIRMAN: Thank you.

Dr. McDill?

MEMBER McDILL: Thank you.

I can accept that older engineering approaches can -- should be or could be reconsidered and that perhaps overly conservative scenarios can be revisited.

It concerns me that there are still closure criteria going on. For example, the Group A test results were -- some of them were counterintuitive and we can look at that in the Group B benchmarking tests.

What was the nature of the counterintuitiveness of these results?

MR. COUTURE: Michel Couture, for the

record.

First, let me give you the philosophy of the Group A test. The Group A test were problems for which we know the answer. So we were able to, by doing these tests, study the performance of the statistical framework that is proposed by Bruce Power and OPG.

Because we know the answer, we can actually see how it performs and the certain performance criteria that we look for.

And these tests had to be designed from scratch first because it's never been done before, these types of benchmarking tests.

So one of the results was that as you increase, let's say, the error -- speaking generally -- that the trip set point could be actually increasing, going higher.

Now, the effect was small at the time. Currently, the results, there was a small effect and it's not clear that this effect would have -- because the problems we're looking at are very simple problems.

If you go to the more complex framework, it's not clear that this effect will still be there or will matter.

And that's the opinion of our consultant on that. That's why we're looking -- we'll be exploring in

the Group B tests which are more representative of the NOP problem whether or not this counterintuitive behaviour which was small for the Group A test but still whether or not it's still there for the more complex problems.

So it's counterintuitive in the sense that when you increase your error, you should expect, you know, lower trip set points to compensate for that but it -- although we're not calculating trip set points but that ended up being something like that.

You increase your error and you get -- and, in fact, a higher trip set point and normally you shouldn't be having that.

But the result was, like I said, the deviation was small. So we cannot conclude at this point in time whether or not that would matter for the more complex problem which had features that the Group A test did not have.

We cannot capture all the essential features of the NOP problem in the Group A test but they provided a lot of guidance as to what possibly, you know, what is expected, like we had about five criteria I believe for the Group A test, what type of behaviour. And they did well in all these ones except that particular one that you mentioned. So this would be further explored in the Group B test.

MEMBER MCDILL: Do any of the opponents want to talk about it?

MR. SAUNDERS: I guess -- Frank Saunders.

It gets pretty complex as you know this way so I would try to put it in a little simpler terms.

The piece that we can measure very well is, you know we have a number of fuel bundles in the reactor that are producing heat, they sit in hot water essentially and they heat it up. The part that you can measure very well in the lab is you put that bundle, you create the heat and you detect at what point on the conditions of pressure and temperature that you operate on that you start to see dry outs, now dry outs is a bit of a funny term, it's really kind of steam blanketing other things, you're not getting good intimate contact between the water and the fuel and that's the part where you could start to see field damage.

So this is all about preventing that and like I say on the bundle by bundle basis you can actually calculate that very accurately. So that's not really -- that's not really a statistical thing.

In the core though, you have about 5,000 bundles roughly in one of our cores and not all of those bundles were at the same power. The bundles that are in the inner part of the core and mostly those that are the

outlet end of the core tend to see higher power than the others.

Your detectors that operate to protect the NOP detectors are cores. There's a fine number of them in the core. So the question you're really trying to answer is how well do those detectors protect each and every bundle? You know they protect the gross quite well; right?

So the analysis about understanding that relationship better. How the detectors relate specifically to the bundle powers across the whole core? So you're not talking about significant kind of core damage here, you're really talking about does the group of detectors really react in time to protect all bundles? And so the analytical part is quite important here to try and understand how those shapes interact and there's a variety of them of course.

Some of that work was actually quite easy to do and that's the stuff you do in the front end and that's why we got a bit emerged into that. Some of it gets more complex and that's taking longer.

You know as they've said, we started back in 2002 because we knew this problem was coming. And in fact it hasn't had much impact yet even under the old methodology for example Bruce B wouldn't have changed its

operation to date so and Bruce A would have been merged at less than one per cent.

So we are looking to finish this before we get to a point where it starts to have significant impact. So we're talking right now about very very small incremental things and we're finishing the work in time to avoid anything major.

So I think this is really a case where we didn't know that we needed to work on this. We started early working on it; it's a fairly complex subject so it takes a while to get through it. We're almost there and the results have been pretty good and pretty positive to date.

So I kind and try to put into a package there but that's the way we look at it from our point of view. We are of course experimenting and looking at other ways of doing that, a lot of work with OPG and believe in us working on new fuel designs and that will actually create more margins. So we're not just sort of relying on the analytics to get us there, we are looking fast nutronic trips and other things which all of which factor into this.

MEMBER MCDILL: So really, at this point the upshot is nothing has changed, essentially, perhaps one per cent? But things are coming and you are confident

at this point that all of these things that say August and by next year, before the first one I guess it was 2013, I saw. Before that 2013 will be you and staff and we will be in a position to say this is it? A go or a no go?

MR. SAUNDERS: We're confident for sure.

MR. RZENTKOWSKI: Thank you very much. Greg Rzentkowski for the record.

In conclusion, I would like to point out the real safety benefits we achieved from the application of this methodology. From reactor operation standpoint, we established a very complex compliance strategy and this compliance strategy eliminates the extreme flux shapes from the operation of the plants. So this is a true safety benefit which we can quantify. That's the first point.

The second point is that the accident scenario, we are discussing, here in an anticipated operating transient. Anticipated; it means that we expect this to happen during the lifetime of the facility. So the probability established is one in hundred years and that's the reason why there is multiple layers of protection starting from reactor regulating system, step and set-back, and finally the shutdown system before anything can happen. But the worst consequences would be fuel overheating.

MEMBER MCDILL: Thank you Mr. Chair.

MR. DEMARKAR: Sorry, I don't think anybody answered your first question -- for me to take a short at a simple answer.

You're asking about the counter intuitive nature and I think counter intuitive it's -- they're strong words. But I think what's happening here is we've got two complex mathematical solutions to a complex mathematical problem. They've yielded slightly different answers. That's not really surprising. If they yielded identical results, it would have been surprising.

So the word counter-intuitive is really a way of saying there's something different in the two results, it's relatively small, as Mr. Frappier or Mr. Couture said, it's relatively small but we need to investigate it further. So that's not surprising.

I think some good clarification was offered as well but let me offer one more point because I'm not sure that we all have the same mental model of what's actually happening in the reactor today. The graphs show that there's an apparent margin of about 20 per cent between where we normally operate and where the reactor trips. In fact that's not the case; we calibrate all the detectors in the reactor to a number well above 100 per cent. At OPG, the number is at a minimum 110. So

typically, those reactors are sitting between 110 and 115 per cent, relative to trip set point of about 120 per cent.

The margin to trip is so small that something as benign as a normal fuelling operation, which we do four times a day in every reactor every day, something as benign as that sometimes results in an NOP trip or requires operator action to reduce reactor power to prevent an NOP trip. So I think we need to keep that in perspective that we're operating today with very small margins. So a small reactivity probation will result in a reactor trip. And we know that where we operate today is a long distance away from dry out. So when you put all the math aside and you look at where we -- the margin we operate with versus the margin to dry out, we are very, very confident.

Now the math, the reason for doing all this math is because it's helping us to understand for very distorted flax shapes which, as Dr. Rzentkowski clearly pointed out, we are no longer allowed to operate with. At one time when we designed these reactors we thought we might operate there, we forbidden that but for these very distorted flax shapes, we need to confirm that we still have sound trip coverage.

So that's why we're doing all this

additional work and it builds margin. You may ask why do you look at these distorted flax shapes? They were part of the original design, looking at these distorted flax shapes actually builds conservative margins so we know that if we're covered for these distorted shapes, we will be covered for normal operations as well.

I hope that helps.

MEMBER MCDILL: Thank you.

THE CHAIRMAN: Okay, thank you.

Mr. Tolgyesi?

MEMBRE TOLGYESI: Merci Monsieur le président.

There's a similar -- maybe there's a little bit and more details of what you are talking about. My question was how installed TSP are fixed? What you do is you hold the reactor with a selected fuel power then you set a TSP with a selected calculated or experienced conservative safety margin? That's how you do that?

MR. FRAPPIER: The trip set point is what we get out of the analysis. What we do with the trip set point in the field is we put inside a device and this device both measures the actual power and then when it gets to that set point, it trips, it sends a trip signal. So I'm not sure, does that answer the question? So in the field we actually put those set points, we fix them and we

don’t change them.

MEMBER TOLGYESI: Well my question was you know how you say the reactor is, I don’t know 700, or 900 or whatever and you say now that 20 percent of the 700 is 840, that mean I will set the trip, the TSP to 840.

Okay, how do we do that now? And we do this 20 percent by experience, by calculation or I don't know, just by pulling your hair.

MR. FRAPPIER: Gerry Frappier for the record.

I'm not sure that you quite got the concept there. So the reactor is producing a certain amount of power. There's a certain amount of neutrons that are flowing through the reactor core.

MEMBER TOLGYESI: Yes.

MR. FRAPPIER: And the instrumentation is measuring what that amount of neutron flux, as we call it, that is going through there.

The instrumentation has a setting on it that says, if you get to this level of neutron, send the signal for the shutdown system to shut the reactor down.

So the NOP methodology is all about stuff that's happening outside the reactor to do the calculation that tells you what is that parameter you're going to put in those detectors. So what is that trip set point that

you're going to -- as OPG was saying, that you're going to physically put into that system, so that if it sees that level of power, and there's several of these throughout the core, if it sees that level of power, it will automatically shut down the reactor.

So I don't know if that helps or not?

MEMBER TOLGYESI: (Off microphone).

MR. FRAPPIER: So how that trip set point --

MEMBER TOLGYESI: Yes.

MR. FRAPPIER: --- is established is this NOP methodology that we're talking about, and it takes many things into consideration. So lots of -- but judgment -- it's not like somebody is pulling this thing out of air. That definitely is not the way it's doing it.

So it takes some of the physical parameters like we are saying, the heat -- how much heat flux, the bundles; what's the efficiency of the cooling system to take away the heat from the fuel bundle. It takes into account the aging of the reactor, as to how the heat transport system is going to perform. It -- and I'm going to lose track here, so maybe I'll ask Michel Couture to give a complete list here.

MR. COUTURE: Okay, so the -- what you want to prevent is -- should a loss of regulation, loss of

control of power occur at a given time, you want to make sure that first, you've considered all the possible configurations of power that may be there at the time of the accident. So you have some physics input that will look at various power distributions, and these will depend on your reactivity device and the core; where they are at the time of the accident. It could be a bit higher, a bit lower. That will give you some sort of initial configuration of your distribution of flux in the core.

So for that, they take physics calculations and they try to think about all the possible cases. There's many cases.

On the other side, since you want to prevent, should an accident like that occur, to reach a state that they call dry-out, which is actually where your -- basically, your heat transfer from your fuel to your coolant deteriorates significantly, you need to calculate for each channel what is the dry-out power, what is the power? So there you need -- they use thermal hydraulics codes and they calculate the range for each channel, what type of dry-out power.

So knowing the dry-out power for each channel and the possible configurations in physics flux distribution, this is inputted into a code that takes all that input and there's formulas for the trip set point,

given a certain flux distribution, given a certain channel power, dry out power. It comes out with the trip set point that you should.

Now, that is what they call a calculated. What would be installed in the reactor could be as long as -- like, in Darlington, it's about 122. So you allow 22 percent over power and that allows them to operate at 100 percent full power.

So although the methodology may tell them that you can trip at 127 percent over power, they will still be tripping at 122 because that's all they need to operate at 100 percent.

So the installed may be actually lower than the calculated trip set point.

MEMBER TOLGYESI: Coming to the next question. You know, when I'm looking at this conceptual representation, what you see there is adjustment of installed TSP, which is a linear.

It's first -- on the staff presentation, it's at page 16.

UNIDENTIFIED SPEAKER: Yes, but what's the title?

MEMBER TOLGYESI: Conceptual Representation.

So there's adjustments of installed TSP,

which is linear. We have installed TSP, which is a dotted line, and we have a full power.

Now, I see that the installed TSP -- there is a difference between installed and calculated, which means that theoretically, I could -- I could -- could we say that initially after -- the reactor could operate at higher full power at initial phase, which means that there's a loss of production? Could we say that?

MR. FRAPPIER: Gerry Frappier for the record.

There's other things that will come in at that point. I understand what you're saying but now you're talking about what's the maximum electrical output, for instance, that a reactor can have. And so, that's -- what you can say though is that you could have operated higher and your fuel would still be properly cooled.

MEMBER TOLGYESI: Yes.

MR. FRAPPIER: But there's a whole bunch of other things with respect to how much steam you can handle and how much your turbines can turn and how much a generator can generate and what not.

The important part here is that the dotted line, as you're saying, the conceptual is where the operator needs to have the settings so that NOP does not interfere with the amount of electricity that the unit is

capable of generating.

And so, they like to have a lot of margin between that and where the actual TS -- the NOP says you cannot operate beyond that.

So at the beginning of that chart, as you're seeing, you've got some margin there, so the installed trip set point versus the calculated trip set point, there's some distance between there. So you know you're very, very safe.

But again, if you look at this thing, when you get to about 2015 or so or 2016, I guess, in this chart, ---

MEMBER TOLGYESI: Yes.

MR. FRAPPIER: --- then now, you've got a problem because you'd like to be -- you'd like to keep that installed trip set point the same, but now the calculations of the NOP trip set point is saying no, you must start lowering it. And that's where they start having to consider derating.

MEMBER TOLGYESI: And you are saying on the page -- page -- what is this page? In your presentation, it's page 3, that "certain corrective measures such as mechanical, chemical, operating measures could significantly slow down."

How these corrective measures are

integrated to the calculations, to EVS? What I'm saying is how say a sloppy maintenance in operations could show impact on this TSP?

Page 3, at 1.3, "The impact of heat transportation system", paragraph 2. You are saying that "certain corrective measures such as mechanical or chemical, cleaning, and other operating measures could significantly slow down." Okay?

MR. RZENTKOWSKI: Yes, they will decrease the slope of the curve. So that means it may even bring it to the horizontal orientation when there is no impact of aging on the trip set points anymore.

So any cleaning of the heat transport system really improves the situation from that standpoint.

MEMBER TOLGYESI: But what I'm saying that, in a quality of maintenance or operations, how you could integrate that in a calculation?

Say you are operating valve and I'm sloppy. I'm sorry, just for --

MR. RZENTKOWSKI: I understand the question, so ---

MEMBER TOLGYESI: Yeah.

MR. RZENTKOWSKI: The impact of aging is assessed from the operating parameters, which are the inlet header temperature and the outlet header pressure.

So those two parameters are being monitored very closely, and this provides the insight into the impact of aging or the heat transport system because it can be compared against the initial design value.

So you want to maintain it inside certain boundary conditions in order to operate the reactor safely. Once you exceed the boundary conditions, then you have either to de-rate or start your clearing operation.

MR. SAUNDERS: I think if I could add there, the important thing here is this is only one parameter that protects the reactor. So for example, if I chose not to clean my tubes in the heat exchanger tubes, my reactor inlet temperature would start to go up, which would in fact, you know, affect the temperature in the fuel bundles, but there are protections on reactor that have temperature and reactor outlet temperature as well.

So you can't sort of do sloppy maintenance and get away with it. There are other things that will prohibit you from doing that as well. So in order to keep the reactor within its defined assigned state, there are a bunch of parameters which are monitored and/or tripped which will tell you if you're outside of that design state.

And then your analysis is then all based on that design state, that box, if you want to call it that.

So if you're outside the box, something else will tell you you're not there and you'll have to go do the maintenance or de-rate to get back inside the box.

MEMBER TOLGYESI: I will finish eventually.

My question is that this new method, what you do, it applies to CANDU reactors, CANDU reactors which are overseas or outside Canada.

What they do, are they participating in this experience or are they contributing, or are they aware? They are informed?

MR. FRAPPIER: Gerry Frappier, for the record.

So right now, the CANDU reactors outside of the country are doing the same as Point Lepreau and G-2, so using the similar methodologies.

We have had quite a bit of interest from the Koreans as to having a better understanding of this new approach. So time will tell whether they'll get interested in it, but at this point in time, it's OPG and Bruce.

MEMBER TOLGYESI: And this is specific only to CANDU? It doesn't apply to other types of reactors?

MR. FRAPPIER: That's correct.

THE CHAIRMAN: I'm puzzled here. Why all the other power plants internationally -- this is a

theoretical methodology. What's the downside of applying it? What do they have to do differently to be on board almost immediately? I don't follow what's the prevention here or anybody going on board if you approve the methodology?

Go ahead.

MR. DERMARKAR: Fred Dermarkar, for the record.

Actually, the development of this methodology is proprietary and the Koreans have approached us, looking to buy into the work that we've done, and we are in discussions with them regarding codes in general. Some of the work is -- that supports this is proprietary to OPG. Some of it includes that was done under COG, the CANDU Owners Group, I should say, and the Koreans have access to neither at this point and they're looking into buying into this as well as buying into the CANDU Owners Group R&D program to get access to some of this information and some of this IP and to also get access to the improvements that we're doing with 37-M fuel.

So there is a large amount of interest, particularly from the Koreans.

THE CHAIRMAN: So it's a commercial interest? It's not really -- there's no physical barrier for adopting this methodology once they buy in?

MR. DERMARKAR: Fred Dermarkar, for the record.

There is no physical barrier for them adopting that methodology. That is correct.

THE CHAIRMAN: Thank you.

Go ahead, Mr. Tolgyesi.

MEMBER TOLGYESI: On page 8, you are talking about counterintuitive results that need to be explained. Did you talk about it?

And my last one, how confident are you to complete the B tests 2010 by October 2012?

MR. COUTURE: Okay. The way we're proceeding right now, like, for instance, we're going to Toronto Thursday and Friday to meet with OPG and Bruce Power and their consultants to compare notes about this testing.

So it is a -- it is, I would say, our objective to finish this testing by October, but it all depends on some of the results coming out, and we have to -- like I said, we're innovating into these benchmarking tests, so there's an element -- and it's very open. Whatever we do, we provide it to the licensees and they provide us with what they've been doing, and we will compare notes. And we should be able to conclude -- come to the same conclusion because it's a very open

discussion.

So we're aiming for October. Hopefully we'll make it by October, but that all depends on some of the difficulties we've been having in formulating these problems.

Like, this week we'll be talking about the formulation of the Group B tests and there may be some discussions. We already have agreed on one type of test. The other one remains to be discussed. We have our consultant coming from the U.K. to meet their consultant from AMEC NSS.

So anyway, I can say that at the moment we fixed it at October, and hopefully we should be able to make it -- to complete the tests by October, but our final say will be by the first quarter of 2013, our final position on this.

MEMBER TOLGYESI: Okay. That's the safety margin?

MR. COUTURE: That's the margin, yes.

THE CHAIRMAN: Monsieur Harvey?

MEMBER HARVEY: Short question and even shorter answer; it's yes or no.

Are the trip points specific to each reactor?

MR. DERMARKAR: Fred Dermarkar, for the

record.

They're specific to each station, not each reactor. So yeah.

MEMBER HARVEY: That's good, that precision. Thank you.

MR. COUTURE: Yes, I agree that it varies from reactor to reactor, and each shutdown system has a system of detectors, an independent system of detectors.

MEMBER HARVEY: Oh, that's right, but the trip point ---

MR. COUTURE: Oh yes. Well, usually they'll take ---

MEMBER HARVEY: --- is the same for the stations?

MR. DERMARKAR: Let me just clarify one thing. The trip set points are the same across the station.

However, the actual aging of each reactor is a little bit different between each of the reactors, and so we apply adjustments to how we calibrate the detectors. So the trip set point is the same, but the detector calibration is a bit different to reflect aging, which changes the margin a little bit from unit to unit.

MEMBER HARVEY: So the curves are different?

MR. DERMARKAR: The curves, in terms of the rate of aging, the slopes of the line that you're seeing, they are for -- if you go to Darlington, Unit 2 has one slope; Units 1, 3 and 4 all have a different slope.

MEMBER HARVEY: Thank you.

THE CHAIRMAN: Okay. As I said, one -- I guess maybe two questions.

First of all, the final configuration, 2013, what's the approval process? You're going to come in front of us and we're going to go through this one more time?

MR. FRAPPIER: Gerry Frappier, for the record.

So right now -- and there was a question a bit earlier. I think it's important to understand the internal sort of reviews versus the actual licensing decision.

So the internal reviews that we are running right now, we will come to a conclusion and we will be providing our advice to Greg Rzentkowski and DPRR.

We will also be planning to come forward to yourselves again with a final progress report, if you like, so that we should be planning on doing in the spring of 2013.

It will then be up to Greg with respect to

how he sends that out to the licensees, and perhaps I'll turn it over to Greg for that piece.

MR. RZENTKOWSKI: Any approval to the safety analysis methodology is done at the staff level. So we'll provide this for the information of the Commission only.

But if this leads to any design changes like, for example, fuel design changes, then this decision will have to be made by the Commission or a person authorized by the Commission.

THE CHAIRMAN: We've been hearing about this now for four rounds. I think we would like to see the final round before it goes out there, particularly when you're going to go into things like the 37-M design and all the rest of the new channel studies.

You come to us for administrative arrangements like changing the title of Vice-President. I figure that this is more important to come to us to take a look.

And the conclusion to what I heard just today is I just want you -- I want to make sure that we're all on the same page, that nothing that you're doing here compromises safety. And in fact, I think you're building -- if I understood correctly, your 2 percent adjustment is your calculated risk in case you are wrong. You

calculated your risk that by two per cent degrading, if you like, you have enough margin for your own uncertainty of your own methodology.

Did I get it right?

MR. COUTURE: Actually, no. That was a recommendation by the expert panel, to take a two per cent penalty because of a -- what they believe is was an inaccuracy in their methodology, or a problem ---

THE CHAIRMAN: Well, that's fascinating, but the two per cent, why wasn't it three per cent, four per cent? Somebody actually did some calculations?

MR. COUTURE: Well, they actually -- what they did is they identified what should be corrected and when it was corrected, it translated into two per cent.

The expert panel did not say two per cent. They said you should correct this issue, address this issue, and it translated roughly to a two per cent correction.

THE CHAIRMAN: Okay. Thank you.

I think we've exhausted this topic for today.

Okay, a break until 4:30 p.m. and then we are in-camera I understand. And we will reconvene tomorrow at 9:00 o'clock with -- it's 9:00 o'clock, right ---

MR. LEBLANC: Yes.

THE CHAIRMAN: --- with other interesting presentations.

Thank you.

--- Upon adjourning at 4:21 p.m./

La réunion est ajournée à 16h21