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Safety Commission

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sûreté nucléaire

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Salle des audiences publiques
14e étage
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Ottawa (Ontario)

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Ottawa, Ontario

--- Upon commencing on Wednesday, May 7, 2014
at 9:06 a.m. / L'audience débute le mercredi
7 mai 2014 à 9 h 06

Opening remarks

M. LEBLANC : Bonjour, Mesdames et Messieurs. Bienvenue à ces audiences publiques de la Commission canadienne de sûreté nucléaire.

The Canadian Nuclear Safety Commission is about to start a series of three public hearings, one today and two tomorrow.

The Commission meeting is scheduled to start at 3:00 p.m. today and will resume tomorrow at 2:30 p.m.

During today's business, we have simultaneous translation.

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 keep the pace of speech relatively slow so that the interpreters have a chance to keep up.

I would like to note that this proceeding is being video webcast and that the proceeding is also archived on our website for a three-month period after the closure of the hearing.

Les transcriptions sont disponibles sur le site Web de la Commission dès la semaine prochaine.

To make these transcripts as meaningful as possible, we would ask everyone to identify themselves before speaking.

As a courtesy to others in the room, please silence your cell phones and other electronic devices.

Monsieur Binder, président et premier dirigeant de la CCSN, présidera l'audience publique d'aujourd'hui.

Mr. President.

LE PRÉSIDENT : Merci, Marc.

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

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

Je souhaite la bienvenue aux gens ici présents and welcome to all of you who are joining us through the webcast.

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

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

We have heard from our Secretary, Marc Leblanc.

We also have Ms Lisa Thiele, General Counsel to the Commission. She's here with us today on the podium.

With this information, I would now like to call for the adoption of the agenda by the Commission Members, as outlined in CMD 14-H1.C.

Do we have concurrence here?

Thank you. For the record, the agenda is adopted.

The first hearing today is on the request by Ontario Power Generation Inc. to remove the hold point associated with Licence Condition 16.3 of the Pickering Nuclear Generating Station Power Reactor Operating Licence.

Marc.

MR. LEBLANC: This is a one-day public hearing. The Notice of Public Hearing 2014-H-01 was published on February 10, 2014.

Submissions from OPG and CNSC staff were due on March 21, 2014.

The public was invited to participate by written submission. April 22 was the deadline set for filing by intervenors.

The Commission received 58 requests for intervention, including 3 submissions which were not accepted either because they were not specific to the matter at hand or filed after the deadline.

The Commission Members will have an opportunity to ask questions on the intervenors' submissions after OPG and CNSC staff's presentations.

April 30, 2014 was the deadline for filing of supplementary information. I note that presentations have been filed by CNSC staff, OPG and intervenors.

In fact, in terms of the question period, it will be done in the context of the interventions' review and then if there's any

further question period at the end of the proceedings.

I will now deal with two procedural requests.

Pursuant to Rule 20 of the *CNSC Rules of Procedure*, a participant may make a written or oral request to the Commission for a ruling on a particular issue by explaining the issue and the reasons for the ruling that is sought.

The Commission, where procedural matters are raised, shall deal with these as informally and expeditiously as the circumstances and the considerations of fairness permit.

CMD 14-H2.12/14-H2.12A

Written submission from Frank Greening

MR. LEBLANC: Request number 1 is Dr. Frank Greening has requested the adjournment of this hearing. The supporting reasons are documented in CMD 14-H2.12A.

The Commission has determined that it will not at this time adjourn the hearing and wishes to proceed and hear all of the evidence

prior to making further related decisions.

As the Commission is not accepting this request, there's no need to provide OPG an opportunity to present their views regarding an adjournment.

CMD 14-H2.36/14-H2.36A/14-H2.36B

Written submission from New Clear Free Solutions

MR. LEBLANC: Request number 2 from New Clear Free Solutions. New Clear Free Solutions has requested, pursuant to Rule 20 of the *CNSC Rules of Procedure*, that the Commission rule on its request -- and I quote:

"in part that the Commission permit, under Rule 21(1), participants a one-week timeline after the hearing transcripts are made publicly available to present information on subject matter relating to this hearing in writing."

The Commission is taking this request under advisement. The Commission will

determine, as part of its deliberations, whether to seek additional information, allow more time for further submissions or if it has sufficient information to render a decision.

The supporting reasons from Nuclear-Free Solutions are documented in CMD 14-H2.36A.

The Commission will provide OPG an opportunity to present their views on the request, either as part of their presentation this morning or later during today's proceeding.

You will be informed of the Commission determination on the ruling request in due course.

Mr. President.

THE PRESIDENT: Thank you, Marc.

For the record, I would like to remind everyone that this hearing is specific to the request by OPG to remove the hold point that is a licence condition imposed by the Commission when it issued the five year operating licence to OPG in August 2013.

Consequently, this hearing is not for the purpose of reconsidering the five-year licence regarding the OPG Pickering A and B

licence that is set to expire in 2018. In this context I will exercise my powers as Chair of this panel to ensure that this hearing remains within the defined scope. The Commission has permitted the consideration of more than 50 written submissions, some of which are completely within scope and others which are partially within scope. Only those elements within scope may be addressed by the Commission.

So with that, I'd like to start the hearing by calling on the presentation from OPG as outlined in CMD 14-H2.1, 2.1A and 2.1B. I understand that Mr. Phillips will make this presentation. Please proceed.

CMD 14-H2.1/14-H2.1A/14-H2.1B

Oral presentation by Ontario Power Generation Inc.

MR. PHILLIPS: Thank you, Mr. Chairman, members of the Commission. Good morning.

For the record, my name is Bryce Phillips. I'm the senior vice president of Ontario Power's Pickering Nuclear Generating Station. I have with me today on my left Mark

Elliott, OPG chief nuclear engineer, and to my right Kamyar Dehdashtian, Manager of Pickering Public Affairs and Regulatory Affairs.

Other representatives of the OPG team are also here to assist in responding to your questions.

We are here today to request the removal of the Pickering hold point. We have successfully completed all regulatory requirements and confirmed that the Pickering station remains safe to operate to 2020, with a safety margin.

In this presentation OPG will: review material we presented March 27th on the fuel channels and on probabilistic safety assessments; we'll present the specific activities we have performed to meet the Commission's requirements on the hold point, and we'll provide some additional comments on a couple of related topics.

Let me start first by setting some context: The current power reactor operating licence for the Pickering station was granted on August 9th of last year for a five year period until 2018.

As you know, the licence has a

hold point that requires OPG obtain the approval of the Commission for operating our pressure tubes beyond 210,000 Effective Full Power Hours. The hold point required OPG to complete outstanding confirmatory assessments for the pressure tubes, perform Probabilistic Safety Assessment analysis and methodology development, and to provide an update on the way forward on filtered containment venting as part of future enhancements provided by the Fukushima Action Plan.

In this presentation I will be informing the Commission on the actions that we have completed in order to obtain your approval for removal of the hold point.

The hold point on pressure tubes was introduced into the Pickering relicensing because of units 5 and 8 -- through 8, pardon me, would eventually surpass the originally assumed design life of the fuel channels of 210,000 Effective Full Powers within the licence period.

A lot of work had already been done leading into the relicensing period that demonstrated the continuing safety of the pressure tubes well past 210,000 Effective Full Power Hours. But as we approached the relicensing

hearings, there are still a few things to be done. CNSC established eight criteria for the removal of the hold point related to pressure tubes. I will briefly go over the steps that OPG has taken to ensure that the pressure tubes are fit for service and how we ensure that they remain fit for service until the end of the plant's operation.

As well, the Commission directed OPG to: complete the revised Probabilistic Safety Assessment, or PSA, for Pickering units 1 and 4 that meet the requirements of the CNSC regulatory standard S-294; also to update the PSA for both Pickering units 1 and 4 and units 5 through 8, incorporating the enhancements under the Fukushima Action Plan, such as the Emergency Mitigating Equipment, and also to provide a whole site PSA methodology for the Pickering units.

I will outline the work that has been completed in this area and the results of the assessments.

OPG was also directed to provide an update on our analysis and way forward for the future enhancements to protect containment through the Fukushima Action items, and so I will be updating the Commission on our conclusions.

And while this is not part of the hold point, I will also be taking the opportunity to update the Commission on the production of the Emergency Management public information document, required to be produced by the end of June of this year.

Now, before I get into the details of how we have met the Commission's requirements, I would like to say a few words about my personal commitment to Nuclear Safety.

I would not run the Pickering stations and I would not be here in front of you today if I was not completely satisfied that Pickering is safe to operate. The plant is safe and I will continue to ensure it is safe. So how do I do this?

I am going to tell you about some of the many tools I have at my disposal, the processes we have established over many years, and the barriers to an event that we have implemented. You have all heard the term "defence in depth". You may have sometimes wondered what that means in practicality. Here's a concrete way of looking at it:

The entire way the plant is built

puts multiple barriers between the radiation in the core, and the public outside the fence. The fuel is in ceramic pellets, surrounded by a strong fuel sheath, inside a robust heat transport system, inside a concrete containment structure.

I also have reliable process systems to control and monitor the plant -- to control and cool the fuel -- and then I have independent and redundant safety systems beyond those process systems that can should shut down the reactor and cool the fuel.

Now, after Fukushima, even if somehow all that failed, I have further emergency mitigating equipment that can be deployed to cool the fuel and power emergency equipment.

Now, to run all this I have detailed and technical and tested procedures, both for normal operation and for emergencies. I have highly trained and certified staff, who are continually undergoing training and regular testing to demonstrate their capability. My staff practice for emergency events in training, drills, and exercises. And you may not know this about me, but not too long ago I was a certified Control Room Shift Supervisor and I was a certified Shift

Manager.

This is all managed within a structure that continually promotes nuclear safety and public safety as the culture of "how we do things at OPG". And there is continual management oversight of our plant by myself, my directors, and my managers, looking for error-likely situations, looking for risks, looking for things we can do better. We are always striving for excellence.

Now, today we're going to talk specifically about a few more of the pieces of OPG's defence in depth and how I know my plant is safe. These include safety analysis -- both deterministic and probabilistic. You also probably don't know that I also spent a number of years in the Nuclear Safety department, performing safety analysis for all three stations in this province, so I know something about safety analysis and its significance.

And analysis is very important -- but it has to be tested against the real world, and that is where our maintenance and inspection programs come in. My staff are doing tests, gathering data, checking that the plant is

operating the way it is supposed to. And of course some things require maintenance -- just like your car -- sometimes preventive and sometimes to fix things that break.

Finally, I will add that this isn't just all in-house OPG stuff that we have made up. There are international standards on how we do analysis, how to operate a nuclear power plant and how to maintain it, and there are Canadian standards that implement them in the Canadian nuclear environment. OPG's programs comply with those standards and I'll talk about some of them today as I demonstrate how I know my plant is safe to operate.

I'm going to start the technical discussion with a reminder that OPG and Bruce Power were before the Commission on March 27th to outline the research and science behind the conclusions on how we know the pressure tubes remain safe. So I'll just briefly summarize the highlights.

The originally assumed design life for the pressure tubes of 210,000 Effective Full Power Hours was a conservative estimate when the plant was constructed. This number equates to

approximately 30 years of operation at 80 percent capacity factor. It wasn't based upon technical knowledge or experience of the day. We know because we went back and we checked the records. No one had run a CANDU reactor for any significant period of time back then. We know a lot more now than we did then.

I referred to international standards a minute ago -- well, we have those and apply those here. There are the IAEA guidelines on how to manage the life cycle of reactor components. This is captured in detail for CANDU reactors in two Canadian standards, which are informed by the latest research and by operating experience and real data from reactors and from labs. Extensive industry research has been performed on fuel channels over many years, including the joint industry Fuel Channel Management [sic] project.

Through this work I can tell you that all pressure tube aging mechanisms are well-known and are within the design limits. A couple of years ago, leading into relicensing, we had a couple more pieces of work to complete. As a result, one of these aging mechanisms related to

deuterium ingress into the pressure tube and its impact and fracture toughness past 210,000 hours, needed a bit more work and became the original subject of the hold point.

What we are going to do in the next few slides is to review some of that research and demonstrate fitness for service past 210,000 Effective Full Power Hours.

I spoke earlier about multiple barriers. This is shown graphically in this slide and specifically for pressure tubes. This concept applies for all of our barriers.

Without getting into all the details, I'll say that the research in question is basically about managing pressure tube condition, detecting possible pressure tube flaws before they become significant, and detecting any leaks before a break occurs. This is Leak Before Break.

So if you note on this slide:

Ongoing tests and monitoring -- that ensures we understand our pressure tube aging mechanisms and is used to develop industry standard acceptance criteria;

Our fuel channel inspections -- that detects for possible flaws; it uses

industry-approved methods to compare to in-reactor continues to the acceptance criteria;

We also have Leak Detection System -- that allows our certified operators to follow their procedures that they are trained and tested to to shut down and depressurize the reactor.

We spoke to this slide at the March 27th meeting also. Basically this just illustrates how hydrogen or deuterium ingress into the pressure tubes and its impact on fracture toughness is the key material property that was still being studied in the last two years. That research has been done for hydrogen levels far beyond where we are today, and enabling us to get to 2020 with safety margin. We have demonstrated our pressure tubes are safe and fit for service to at least 247,000 Effective Full Power Hours.

The researchers updated the fracture toughness model to account for hydrogen levels in the pressure tubes that increase with time.

The updated model covers the entire temperature range of plant operation.

Hydrogen ingress has little impact

on normal operating conditions. That's where the reactor spends the majority of its time. It does make a difference, though, at lower temperatures, during a reactor shutdown or a reactor start-up.

We have made changes to our operating procedures, training and testing material for these operating conditions.

We had independent reviewers and these reviewers concluded that the updated model is adequate for application in our fuel-channel fitness-for-service assessments.

Nonetheless, we are continuing research, to further extend our knowledge, to further extend the model, to provide more safety margin.

As we described in the March 27th meeting, the first line of defence in preventing a pressure tube failure is the avoidance of conditions that allow cracks to develop and that is the purpose of our inspection program.

But we always want to have more than one line of defence ... so as a defence in depth measure we need to be able to demonstrate that every -- for every reactor state Leak Before Break applies.

Now, what's Leak Before Break?

Well, we start by postulating a large flaw in the pressure tube and that it starts to leak. We know that this sort of flaw really shouldn't exist, but that's why it's defence in depth. In the unlikely event that a flaw does exist and it grows into a leak, we have demonstrated the ability to detect that leak.

Our Annulus Gas System provides a highly sensitive leak detection system using both dew point and dew point rate of rise.

This provides our certified operators a clear indication, and then they follow their procedures to place the reactor in a safe state [cold and depressurized] before the flaw grows to an unstable size -- that is, before the tube breaks.

And that's Leak Before Break, and we have that.

Now, the authors of the CSA standard, they envisioned that there would be situations where deterministic analysis would not be the optimum way of demonstrating Leak Before Break, so they explicitly wrote in that probabilistic methods could be used as well. They

didn't specify how, they just said you could. What we have done is developed that probabilistic method to do this analysis. We needed to complete that work as part of the hold point criteria and we have done that.

But with either method, the objective is still the same, to demonstrate with a degree of reliability -- with a high degree of reliability that if a pressure tube leak occurs, the operator can safely bring the reactor to a safe shutdown state without failure of the pressure tube.

And at this point I should add that the probabilistic LBB evaluation provides enhanced insights into the influence of key parameters related to leak detection capability, and we have reflected those insights into our operating procedures and that's part of our operator's response to a leak.

So, we understand hydrogen uptake.

The fracture toughness methodology model has been updated and operationalized.

We have the probabilistic Leak Before Break, and we have provided that information to the CNSC as required.

And then we've done an assessment of the whole core using these tools.

We've done it for all pressure tubes, for all conditions out into the future, for all units.

The assessments show large safety margins compared to the failure frequencies requirements of the standard.

All of which confirms ... All of which confirms the pressure tubes are safe and fit for service.

Now, we are aware that our community would like us to publish the fuel channel research results. We will publish summary -- pardon me. We will publish summary reports, similar to what we have done with the PSA.

So in summary, on the pressure tubes and 210,000 Effective Full Power Hours:

All the required assessments have been done and submitted on time.

The updated fracture toughness model produces a more conservative envelope in the heat up and cool down range, and our operating procedures were revised to increase margins in

these areas.

CSA compliant fuel channel fitness-for-service inspections are performed every maintenance outage. And fitness for service is accepted by the CNSC for every unit following every planned outage.

The R & D results have been used to update the fitness-for-service methods and have shown that the Pickering fuel channels will remain within the design basis until 2020 plus safety margin. They are safe and fit for service to 247,000 Effective Full Power Hours.

OPG has met the hold point criteria for fuel channels. This supports our submission to the Commission to remove the hold point.

I will now turn the presentation over to Mark Elliott, our Chief Nuclear Engineer, to cover the next area of the hold point on PSA.

MR. ELLIOTT: Good morning, Commissioners. For the record, I am Mark Elliott, Chief nuclear Engineer at Ontario Power Generation.

On March 27th the industry was in front of the Commission to provide an overview of

Probabilistic Safety Assessment, PSA, in particular, how it is used as a tool to assess risk.

The presentation covered: the concepts of risk and safety goals; an overview of PSA methodology; the different uses of PSA; improvements in PSA methodology, and a "whole-site" perspective on risk assessment. I am not going to try to cover all that material again, but I would like to highlight a few points.

Both Level 1 and Level 2 PSAs are required in order to meet the CNSC Standard S-294. First you do a Level 1 PSA for core damage, and then you do a Level 2 to consider the impact of containment impairments that can lead to radioactive release.

By current industry and international practice, the PSA results for Severe Core Damage Frequency and Large Release Frequency are expressed on a "per unit" basis. That is, the focus is on what happens to a single reactor unit, and the metric is occurrences per reactor year: "multi-unit" effects are considered in this process; for example, in a common mode event, such as a station blackout, where all units are

simultaneously affected by the same initiating event ...; the total release from all units is considered in the LRF, Large Release Frequency, calculation.

So the per unit LRF actually captures a mixture of contributions from purely single-unit events as well as multi-unit events (due to common mode scenarios). Lastly, the PSAs include both internal and external events; that is, events that originate inside the plant (such as a loss of coolant accident) as well as those originating outside of the plant (such as high winds).

There are separate PSAs for each of these different types of hazards: a PSA for internal events, a PSA for seismic, fire, flood, high winds and so on.

One of the reasons for having separate PSAs is that for any PSA, any given PSA we are looking for insights on nuclear safety. Different insights may be gained from each of the PSAs, depending on the type of hazard analyzed. Hence, it is important to look at them separately.

This is a simplified depiction of the safety goals framework under development at

the IAEA, to show where PSA fits into the Safety Framework. PSA is one tool that assists in our assessment of safety towards the goal of protection of the public.

The foundation of nuclear safety is built on defence-in-depth principles and the achievement of specific safety goals. This can be expressed in a simplified form, as shown on the slide.

At the top level we have qualitative goals expressed in terms of protection of the public. This would relate to health objectives, such as limiting the probability of fatalities due to radiological releases from nuclear power plant accidents.

In the intermediate level we have semi-qualitative goals that are performance based and action oriented. These include the various program activities that the licensees carry out, such as: equipment testing and maintenance; staff training and fostering a nuclear safety culture, and emergency response.

As we progress down this pyramid, the goals become increasingly more quantitative in nature.

At the low level are the specific quantitative goals and criteria that include those associated with safety analysis and PSA.

It is through all of these supporting elements collectively that nuclear safety is assured and the high-level health objective is met.

PSA is one element of that framework and it is used to numerically assess the probability and consequence of foreseeable events and compares results against quantitative safety goals.

This slide shows how PSA has developed and advanced. PSA started in the '80s and covered internal events only. S-294 was issued and expanded to external events. Now that we are in compliance with S-294, the Commission has asked that we move towards aggregation of hazards and a site-wide PSA. Canada is at the leading edge worldwide in PSA development.

This is another slide that we covered on March 27th. The key message is that PSA models are quite large and complex.

To give you an idea, in a typical PSA model: there are 165 distinct initiating

events that are modeled; such as loss of coolant accidents, steam line breaks, loss of electrical power, loss of service water, et cetera; 40 Nuclear Power Plant systems are represented (shutdown systems, Emergency Power Systems and others; with tens of thousands of individual potential failures modeled at the detailed equipment/component level; supported by a large database of information on performance gathered from equipment testing and other sources.

It is labour intensive to develop these detailed models. For example, it takes two years to create a Level 1 PSA model. But one needs this level of detail in order to properly determine the probability of the various sequences of events that can lead to severe core damage.

Given the robustness and high degree of defence-in-depth in nuclear power plants, a series of multiple failures has to occur to progress to a severe accident with releases to the public.

PSA is more than just the numbers. The main benefits of PSA are the safety insights gained from the process. PSA provides ongoing benefit during operation through insights into

important contributors to risk. And PSA provides insight into the relative benefits of various possible risk mitigation measures.

At this point I am going to turn the presentation back over to Bryce Phillips to speak to the work we have done to meet CNSC expectations to clear the hold point.

MR. PHILLIPS: Bryce Phillips, for the record.

Prior to the licence renewal for Pickering in 2013, OPG had already submitted a PSA for Pickering units 5 through 8 compliant with the regulatory standard S-294.

Coming out of the licensing hearings, the Commission directed us to complete the Pickering APSA before the lead Pickering B unit reached 210,000 Effective Full Power Hours, as a requirement for the Pickering hold point removal.

As required, the Pickering units 1 and 4, Pickering A, PSA has been completed in compliance with the CNSC Regulatory Standard S-294, and all values are better than our safety goal limits. No safety goal limit is exceeded.

As another part of the Pickering

licence hold point, OPG was directed to submit an updated PSA for both Pickering units 1 and 4 and Pickering units 5 to 8 that takes into account the enhancements under our Fukushima Action Plan.

The enhancements incorporated into the PSAs were primarily our Phase 1 Emergency Mitigating Equipment, or EME. In addition, lessons learned through the PSA process have been implemented into plant operation. To calculate the risk reduction, changes were made in the PSAs, such as changing the modeling assumptions to better reflect plant operation as well as use of the EME. This again was industry-leading work.

Some Fukushima Action items are not yet incorporated into our PSAs -- their safety benefits and PSA risk number reductions are not yet credited.

Now, the reason for this is that the methodology does not exist worldwide on how to quantify the benefits of crediting things, such as Severe Accident Management Guidelines (SAMG) into PSAs, but we have started work on that.

In addition, the benefits of Phase 2 EME are not yet incorporated.

With the Fukushima Action Plan

enhancements that we could model and credit, the lessons learned from previous PSA work, and these new modeling assumptions being implemented, risk is reduced by a factor of 2 up to 10 times depending on the scenario.

The Severe Core Damage Frequency estimates for internal events at-power for Pickering units 1 and 4 is approximately a factor of two less than the Severe Core Damage Frequency estimated in S-294 compliant PSA. The estimate for Large Release Frequency is approximately a factor of three less than the Large Release Frequency estimated in the S-294 compliant PSA.

Similarly for Pickering units 5 through 8, the Severe Core Damage Frequency estimates for internal events at-power has been reduced by a factor of five. The estimate for the Large Release Frequency has been reduced by an order of magnitude.

So as we expected, the Fukushima work has been a real safety benefit.

But we're not standing still with that.

OPG has an Action Plan to further reduce the numbers -- which are already below the

limits -- toward our targets, as per our procedures, as per our belief and continuous improvement, and consistent with our vision of achieving excellence.

We're continuing to complete our existing Fukushima Action Plan.

And the Action Plan will include incorporation of the benefits of Phase 2 EME and SAMG, and using operating experience gained through the recent PSA work and from the Darlington PSA update, as well from improved modeling. In addition, we continue to study ways to incorporate SAMG into our PSA calculations and take credit for benefits there. We have provided this Action Plan to CNSC staff.

We plan to complete the updates to the PSA calculation for those aspects that have the highest impact on risk numbers, prior to the next Pickering licence renewal submission in 2017.

There has been a lot of discussion, in the 2013 relicensing hearings and by interveners, on whether Pickering's PSA meets the regulatory requirements, whether the results are above the safety limits, and thus whether the plant is safe.

So let me be perfectly clear:
Pickering is safe. I would not run it otherwise.

For our PSA, all requirements under S-294 have been met. Our PSA meets industry standards. These standards measure risk per hazard, per unit. So too does our PSA, and we meet the limits.

International work that we are participating in is ongoing toward development of aggregated risk methodology and multi-unit safety goals, of which Canada and OPG are leaders.

Nonetheless, we have gone back and confirmed that there are additional reductions in the numbers that we could have achieved if we had done the simple calculation method. We have done some of that refinement. For example, taking account of the time spent a unit is actually at power versus when it is in an outage. And we have removed unnecessary bounding analysis and done the actual analysis. Both of these refinements reduce the number. When we take them into account, the Pickering A Large Release Frequency is 1.05×10 to the minus 5 -- pardon me, 1.03×10 to the minus 5. However, that is still without taking credit for SAMG. When we take credit for SAMG,

the number is less than 1×10 to the minus 5. And we will quantify that and formalize it.

The final PSA requirement for the hold point was to develop a site-wide PSA methodology for the multiunit Pickering site. There is currently no standard approach, either nationally or internationally, on how to aggregate risks from different hazards or on safety goals to use for the whole-site PSA.

OPG is working with the Canadian nuclear industry, the IAEA, and international experts. Multiunit, all-hazard PSA methodologies are currently under development by the international PSA community. And as we previously mentioned, the IAEA is finalizing guidance on the hierarchal safety goal framework.

A CANDU Owner's Group joint project is being setup to further develop and apply the whole-site PSA methodology.

Canada is leading the international community on whole-site PSA methodology development. And as Mark Elliott noted a few minutes ago, it is important to note that common mode events that impact a whole-site are already included in the per-unit PSAs, and

these will be properly accounted for in the whole-site methodology.

Safety goals will need to be derived for a whole-site PSA.

OPG has provided a concept-level whole-site PSA methodology to the CNSC. Our committed timeline for our first multiunit site PSA has been provided; safety goal framework by 2015, risk aggregation studies by 2016, and piloted multiunit whole-site PSA in 2017.

Interim results will be available as work progresses and OPG will provide regular updates on these progression points.

So in summary, OPG has met all the requirements established by the Commission for PSA to remove the hold point. PSA methodology has been evolving over many years and is a useful tool to support risk-informed decision making.

The insights gained on potential improvements to plant operation are a major benefit. PSQ quantitative safety goals are one part of a hierarchal framework that serves to assure nuclear safety and to manage risk.

Post-Fukushima actions have introduced an additional layer of protection,

which has resulted in even higher levels of safety.

Whole-site PSA aims to offer an additional perspective, which is considered prudent and serves as a public interest. Significant additional work is necessary to complete an accurate multiunit whole-site PSA methodology.

Therefore, in terms of PSA requirements, OPG requests the Commission to remove the hold point.

The final aspect of the CNSC requirements to remove the hold point is that the Commission required an update on OPG's analysis and way forward for future enhancements to protect containment through the Fukushima action items. The details had been provided to CNSC staff through our regular Fukushima action plan updates.

In brief, Pickering has filtered containment venting capability through exhaust filters for normal operations and through the filtered air discharge system for accident conditions.

The existing containment provisions are robust, reliable and effective for a wide variety of accidents, both design basis and

beyond design basis. There are multiple and flexible barriers to prevent or limit a severe event progression using methods already in place.

OPG has added additional defence and depth measures to cool the reactors and protect containment during and beyond design basis events. EME, which are portable diesel pumps and generators, are in place. SAMG have been issued. Passive autocatalytic recombiners have been added for hydrogen mitigation. Training drills and exercises have been conducted.

We are also continuing to pursue enhancements. Phase II of the EME project will repower station equipment for long-term core cooling and containment cooling and pressure control.

Enhancements to emergency guidelines to further streamline operations will be implemented for multiunit events and for accidents initiated from low-power shutdown conditions. These measures are the most practical and improvements, as the basic elements are already in place.

By combining the planned enhancements with existing provisions, it

solidifies OPG's, it solidifies my confidence in the ability of Pickering containment to protect the public in the event of a beyond-design basis accident.

And again, in this area, OPG has met the Commission requirements to remove the hold point.

I would also like to take this opportunity to update the Commission on the development of a new emergency management public information document which is required to be completed before the end of June of this year.

While the provision of this document was not tied to the removal of the Pickering hold point, we feel that this is an opportune time to update the Commission and the public on this initiative.

Over the course of many years, many brochures and information packages have been distributed to Durham residents to educate them on nuclear emergency preparedness. This new document was produced in consultation with the province, the municipalities, and the City of Toronto, and provides the public with information they need to know about our integrated emergency response

plans.

Focus group research conducted late last year showed us that, in general, the public has a low-level awareness of what to do in the unlikely event of an emergency.

Our research showed us that there were two reasons. Previous brochures didn't connect with residents; they looked like junk mail and they were more focused on process rather than what residents really needed to know and what to do.

We found that people wanted the information in a package that they would remember and keep. Furthermore, they want it in a simple language that focused on the things that concern them the most; their kids, their loved ones, their pets. They were not interested in information that outlined the roles and responsibilities of each emergency organization.

In January and February of this year we worked with our partners to develop written content in line with what we heard from all these focus groups. We asked our ad agency to come up with some design concepts for our brochure that people would remember and keep.

We then tested the written content and design concepts with additional focus groups and incorporated their feedback into the flashlight design that you see on this slide.

Commissioners, I believe you have copies of the brochure in front of you. Everyone in the focus groups agreed that this design really stood out and they would keep it readily available. I would imagine you would agree with the focus groups.

The distribution of this new brochure is in progress. This week is emergency preparedness week.

Before I wrap up, I would like to say a few words about openness and transparency. A number of interveners question the extent to which to which OPG has been open and transparent about the work done on the safety case relating to Pickering continued operation, pressure tube life, and PSA.

OPG is committed to earning and maintaining the trust of the public. In particular, the residents of the communities in which we operate generating stations. This includes a commitment to sharing information about

the safety and operations of our nuclear stations in an open and transparent manner.

This is done in many ways, including public meetings such as the Community Advisory Council, our information centre and our website.

OPG provides regular public reports on various aspects of our operations including safety, operating performance and environmental impacts and emissions, regulatory reports and non-routine operating activities through many methods.

The CNSC's requirement for public information and disclosure for nuclear facilities is outlined in their guidance document, RD-99.3. OPG is fully compliant with this document which came into effect January 1st of last year.

In some cases our information reports and studies can be of a highly technical nature. So it has been our past practice to endeavour to share information that is understandable by the general public by producing a public summary or synopsis of some technical reports.

The Pickering B PSA summary report

posted on our public website prior to the 2013 relicensing hearing was an example of this. We have followed that up with the new Pickering A PSA summary report and an additional report on the benefits to the PSA from the Fukushima action plan. These are also on our website OPG.com.

Nonetheless, OPG understands the increased public interest in seeing even detailed technical reports supporting the safe operation of our nuclear power stations. For that reason, we are increasing the number of reports and documentation pertaining to the licensing process that will be posted on our public website OPG.com.

However, there are occasionally reports that have information in them that contain details that, if released, could potentially compromise the safety and security of the stations.

And, for example, in-depth safety analysis work that includes detailed descriptions of safety and security systems, those type of reports will maintain our safety and security.

In conclusion, Mr. Chairman and Commissioners, with respect to OPG's request for Commission approval to remove the hold point

associated with the Pickering licence condition 16.3, we confirm that all regulatory requirements do remove the hold point for pressure tubes have been completed. The station is safe to operate.

That Pickering units 1 and 4 PSA has been completed in compliance with S-294, all values are better than safety goal limits. No safety goal limits are exceeded. The station is safe to operate.

The PSA has been updated to account for the enhancements required under the Fukushima action plan. This is further evidence the station is safe to operate.

And methodology for a whole-site PSA has been submitted as well and a timeline for completion of the first multiunit PSA has been provided.

OPG has provided to CNSC staff a report and a path forward on containment protection and filtered venting through our Fukushima action plan update. Pickering has containment filtered venting and is making several enhancements which would reduce event progression and improve the protection provided.

The station is safe to operate,

but we have also an action plan to further reduce risks.

In conclusion, we have demonstrated the Pickering plant to be safe and fit for service and can be safely operated beyond 210,000 effective full-power hours of operation to 247,000 effective full-power hours. All the requirements for the removal of the hold point have been met.

In fact we have, and continue to meet, all regulatory and Canadian standards. We respectfully request the Commission to remove the hold point.

Thank you for your attention, and we are available to answer any questions that the Commission may have.

THE PRESIDENT: Thank you.

And prior to opening the floor for questions, I would like to move to the presentation from CNSC staff as outlined in CMD 14-H2 and 14-H2.B.

I understand Mr. Rzentkowski will make the presentation. Please proceed.

CMD 14-H2/14-H2.A/14-H2.B

Oral presentation by CNSC staff

DR. RZENTKOWSKI: Thank you.

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

My name is Greg Rzentkowski and I am the Director General of the Directorate of Power Reactor Regulation at the CNSC. With me today is Mr. Miguel Santini, Director of the Pickering Regulatory Program Division who will present the CNSC staff's position on the release of the hold point.

CNSC regulatory and technical staff are also present and available to answer any questions the Commission may have.

CMD 14-H2 presents CNSC staff's assessments, conclusions and recommendations pertaining to OPG's request for the removal of the hold point in the Pickering power reactor operating licence.

Our presentation this morning summarizes this information as well as provides additional information to address concerns raised in interveners' submissions.

This presentation is based on our

supplemental CMD 14-H2.B which addresses OPG's adjustments to Pickering A large-release frequency submitted in OPG supplemental CMD 14-H2.1A.

I would like to begin by providing a brief outline of our presentation. As you can see, it includes background information to establish the regulatory context for today's hearing. This information is followed by a discussion of the matters presented today for the Commission's consideration which include the conditions for the release of the hold point and other information of regulatory interest.

The presentation will end with CNSC staff's conclusions and recommendations.

The Pickering power reactor operating licence was renewed in August 2013 for a five-year period. During the Part 1 relicensing hearing in February 2013 CNSC staff recommended a hold point be included in the licence to give appropriate regulatory oversight of the outstanding submissions from OPG relating to the fitness for service of fuel channels beyond 210,000 equivalent full-power hours.

The hold point required that OPG submit, among other things, improved or new tools

for demonstrating continued fuel channel fitness for service. Furthermore, the hold point required that these tools be found acceptable by CNSC staff prior to the first Pickering B unit reaching 210,000 equivalent full-power hours.

Details relating to the expected submissions from OPG are in the licence conditions handbook. Through the record of proceedings the Commission directed OPG to submit additional information prior to seeking removal of the hold point.

This additional direction from the Commission was also captured in the licence condition handbook to allow CNSC staff to track compliance.

This slide lists the matters for consideration before you today.

First, demonstration of fuel channel fitness for service beyond 210,000 effective full-power hours.

Second, completion of the probabilistic safety assessment, namely the revised Pickering A PSA, the updated Pickering A and B PSA to include Fukushima action plan enhancements, and the development of a side PSA

methodology.

Third, enhancements to protect containment.

We will also provide an update on off-site emergency preparedness following Commission requests documented in the record of proceedings. This will include the status of the development of regulatory documents entitled *Nuclear Emergency Preparedness and Response*.

I would like now to pass the presentation over to Mr. Santini.

MR. SANTINI: Thanks, Greg.

The first condition of the release of the hold point is the fuel channel fitness for service.

CNSC staff have a clear and robust regulatory framework in place to ensure continued safe operation of reactors.

As required by licence condition 7.1, the licensees must implement and maintain programs to ensure fitness for service of the pressure tubes. These programs include engineering capabilities to assess the structure integrity of the pressure tubes, an in situ inspection.

The CSA Standards N285.4 and N285.8 set the rules to follow for assessing the conditions of the pressure tubes.

The regulatory document RD-334, on Aging Management for Nuclear Power Plants, sets out the requirements for managing the aging of structures, systems and components at the nuclear power plant.

I would also like to add here that the safety assessment of an unlikely event of a pressure tube rupture to demonstrate that the reactor can be shutdown, depressurized and cooled in a timely manner to avoid fuel failures and releases of radioactivity from the plant is performed in accordance with licence condition 5.1.

CNSC staff carryout regular oversight of the fitness for service of all components important to safety. CNSC staff specifically review and inspect the following outputs from the licensee's programs. The life cycle management plants, inspection results and control room procedures and protocols.

In addition, the many years of operating experience and research, routine

inspections on all operating units and the in-service performance gives CNSC staff the necessary confidence on the fitness for service of the pressure tubes.

The integrity of the pressure tubes is continuously monitored through normal operations by the control room staff. The monitoring includes both the leak-before-break detection of pressure tubes and the break detection in the heat transport system.

Leak-before-break ensures that the reactor can be shutdown in a timely manner if a crack develops in a pressure tube. While fracture protection ensures that hydrides in the pressure tubes have not increased to a level which can render the pressure tubes too brittle to prevent cracks.

In the unlikely event of a leak from a pressure tube, the consequential leak will be detected in time to shutdown the reactor and cool and depressurize the primary transport system before the pressure tube ruptures.

At Pickering between two to three unit pressure tubes are inspected every year and scrape samples are taken to monitor the impact of

the regulation mechanisms in accordance to the periodic in-service inspections.

It is important to note that ongoing research efforts are directed at refining engineering methodologies and models to conservatively assess the fitness for service of the pressure tubes.

Based on the empirical evidence provided by OPEX Research and Development, a fuel channel life management project looked into the regulation mechanisms on the pressure tube, especially into the main contributor, which is the hydrogen pick-up and its effect on the fracture toughness.

As you may recall from the March 27 meeting presentation, we stated the material toughness decreased at low temperatures when the reactor was heating up or cooling down.

The operating envelope has been designed so that the increases of temperatures are made at the lowest possible pressure to reduce the stress on the material. That way, the reactor is always operated at states such that the safety margins to rupture are acceptable.

The graph on this slide

specifically shows the cores for Unit 5 to 8 at Pickering when the hydrogen concentration reaches 80 ppm projected to achieve beyond the 247,000 effective full power hours.

In this way, adequate safety margin will always be maintained, since OPG has conducted experiments where the pressure tube have been successfully tested up to 120 ppm of hydrogen.

On this basis and given the present level of knowledge and operating experience, staff has confidence that the predicted models could protect life of pressure tubes until 247 effective full power hours -- sorry, 247,000 effective full power hours.

This summarizes our conclusions for this condition for the removal of the hold point.

OPG has met all hold point release criteria which relate to continued operation beyond 210,000 effective full power hours. The knowledge gained after many years of operation and enhanced surveillance of monitoring of the in-service pressure tube gives staff confidence to support the current projection for pressure tube

fitness for service until 247,000 effective full power hours.

This projection is based on current model H and hydrogen intake estimates, which is the most limiting parameters for fitness for service.

It is to be noted that the models are confirmed or adjusted if necessary after each planned outage and factoring in all of the test results of the operating pressure tubes. That allows to re-evaluate the models on a continuous basis to prove the fitness for service of the pressure tubes.

This projected fitness for service limit brings the projected operability of the pressure tubes beyond the current power reactor operating licence expiry date of September 2018 for all Pickering B operating units.

As you may recall, the Pickering A was retubed in the eighties and have been in operation much shorter time than the Pickering B units.

The second condition of the removal of the hold point relates to development of the PSA. CNSC staff has a clear and robust

safety analysis framework in place which consists of deterministic and probabilistic approaches, which are complementary in nature.

It has to be understood, however, that the current approach is largely deterministic to clearly demonstrate that the dose acceptance criteria are met.

The CNSC is one of the few international regulators that required full scope single unit Level 1 PSA, which identifies the sequences of events leading to core damage and Level 2 PSA, which identifies the sequences leading to large releases to environment.

In addition, as per S-294, licensees are required to define their safety goals as part of their methodologies.

Currently, the PSAs must be updated on a periodic basis. The dates for the PSA updates are specified in the Licence Condition Handbook.

The purpose of the revision is to apply latest models for reflecting improvements to the reactor design.

The deterministic analysis used in the safety reports also undergoes the same type of

periodic updates.

This slide describes the CNSC review process to ensure compliance with S-294.

The review and acceptance of licensees' PSA methodology is the first step in the review. This element includes accessibility of the licensee's probabilistic safety goals.

The methodology is reviewed against the IAEA guides listed in S-294. This review is carried out early in the process and before the models are fully implemented by the licensee.

Once the methodology has been accepted, the PSA results are reviewed in two phases.

The first phase is a high level review to confirm whether the accepted methodology was implemented. At the end of each stage, staff can conclude if the PSAs comply with S-294.

Further, more detailed review ensues in a second phase where staff samples and verifies the models used for the dominant contributors. The second phase usually results in minor adjustments, if any.

But before we continue presenting

the results of the PSA, we need to reiterate the significance of the PSAs in the context of the safety case for a facility.

The CNSC staff, as any other nuclear regulator in the world, based the safety case on deterministic requirements and analysis using the defence in-depth principle to minimize risks.

Starting from the basis of the plans, it is deemed to be safe based on deterministic principles and analysis, the PSA complements this approach, offering insights in the relative safety importance of event initiators, response of system and of operating procedures.

The PSA may identify potential vulnerabilities and it can be used to prioritize the safety issues to focus primarily on items that result in large safety gains.

For the operating reactor, PSA contributes to assessment of the overall safety performance and highlights points for which the assigned or breaking changes can be necessary.

As per S-294, CNSC staff accept the OPG's methodology for the PSA modelling and

the safety goals to be met. These are in line with the current international practices and are now part of the licensing basis.

The Pickering licensing basis calls for a calculation of the core damage and large release frequencies for each of the hazard groups shown on the slide for a single unit and compare each of them separately with the accepted safety goals.

Several interventions claim that the PSA results show that Pickering does not meet safety goals for large release frequency or core damage frequency. CNSC have added the frequencies for illustration purposes only since the simple summation has no regulatory value given the status of development of the external event models.

Furthermore, there is no currently international consensus on how to aggregate internal event frequencies to the external event frequencies.

The reason for that is that simple summation of internal events and external events provide biased results due to the large uncertainties associated with external events PSA.

Return to the specifics of the

hold point condition number 2, OPG submitted a complete PSA for Pickering A prior to the inclusion of the Fukushima enhancements. Staff confirmed that the PSA complies with the accepted methodology and, hence, is compliant with S-294.

The core damage frequency and large release frequency meet the safety goal limits per reactor year of one in 10,000 years and one in 100,000 years, respectively, for each one of the hazards groups.

Similarly, also for condition number 2, OPG submitted the complete PSA for Pickering A and B with the inclusion of the Fukushima enhancements.

Staff confirmed that the PSA complies with the accepted methodology and, hence, is compliant with S-294.

The core damage frequency and large release frequency meet the safety goal limits per reactor year of one in 10,000 years and one in 100,000 years for each one of the hazard groups.

Due to the lack of appropriate models, OPG has not yet incorporated in the PSA all of the Fukushima enhancements, for example,

the Severe Accident Management Guidelines, SAMG.

Now we will focus for a few minutes on the aggregation of hazard group frequencies.

As stated before, there is no consensus on how and if to aggregate internal events frequencies with the external event frequencies. There is a clear interest for intervenors to compare the aggregate numbers with the safety goal as if this was the only measure of safety of the plant that matters.

The table in this slide show the simple summation of frequency at low power and shutdown states of all hazard groups' contributions, with inclusion of the main Fukushima updates.

As you can see, the large release frequency aggregated for Pickering A is the only number greater than 1 times 10^{-5} . It is expected that more reductions to the frequencies will result with incorporated models once developed.

After the CNSC staff submitted the CMD for this hearing, OPG made some refinements to account for the use of emergency mitigating equipment related to Fukushima for the shutdown

states.

OPG reported these corrections on the supplemental CMD with a final aggregated large release frequency of 1.03.

The emergency mitigating equipment was not credited in the first round, as first approximation due to the low contribution of the hazard groups at shutdown state.

Due to the fact that the progression of accidents leading to large releases following a containment failure is very slow, typically much greater than 12 hours, the operators have plenty of time to mobilize the emergency mitigation equipment, inject cooling water where it's required to address the progression of the accidents, and to protect the containment.

Due to this credit, the estimate of the hazard group's contributions in shutdown state have been reduced significantly. In other words, the credit of emergency mitigating equipment reduces the calculated large release frequency in shutdown state to values less than 1 times 10^{-7} , which for all purposes could be considered approximately zero.

For the time at power, OPG used historical data for Units 1 and 4. Conservatively, OPG assumed that the units had power when they are not in guaranteed shutdown state. It is to note that many times the units are shut down, but not in guaranteed shutdown state.

Based on the data, the units are considered to be at power 78 percent of time.

The chief manager could initiate the mobilization of the EME when the criteria are met, driven by emergency operating procedures, to maintain the service heat sink at shutdown.

At this time, we are not yet in SAMG space yet.

These refinements, however, were sufficient to further reduce the large release frequency as described in the Tameka report submitted on Friday by OPG.

The report was received and reviewed by staff, and after high level review, staff concluded that OPG refinement is acceptable. They are found to be technically sound and properly supported.

Staff is planning to follow with a

more detailed review, as it does for any PSA correction or adjustments submitted by the licensees.

Again, it is expected that more reductions to these frequencies will result when incorporated in the SAMG models once developed.

For multi-unit PSA, it is the intent to reach consensus among the international community practitioners. The calculations required first to develop the consensus to aggregate the contributions for single unit, as mentioned before, the simple summation method, was described in the previous slide and is considered biased, followed by the addition of contributions to four units for all operating states.

As described in March 27 -- at the March 27 meeting, OPG has initiated the work and has submitted a concept methodology and estimated implementation time. This was done through work with Canadian partners and international community experts.

It is expected that the implementation of the new methodology for the Pickering site will be completed by 2017.

CNSC staff is satisfied with OPG's

submissions to date and estimated implementation time line.

You might recall from the March 27 presentation at the Commission meetings, we mentioned that the current single unit PSA models already including packs from events in actions and units, hence, simply multiplying -- simply multiplying the results for a single unit times the number of units is wrong because it leads to double and sometimes multiple counting of the same contributions.

For the whole site and in order to better reflect the reality, the CNSC staff performed the first approximation calculation to eliminate some of the multiple counting.

We concluded that the whole site results are at least 60 percent lower than the simple multiplication by the number of units.

This slide summarizes our conclusions for this condition for the renewal of the hold point.

Staff confirms -- confirmed that the PSA before and after Fukushima enhancements are compliant with S-294 and then the accepted safety goals are met.

The licensee must perform additional work to incorporate all of the Fukushima enhancements such as SAMG, for which a methodology needs to be developed.

Also, staff is satisfied with the progress made on proposed time lines for the unit -- multi-unit PSA by OPG.

And why -- you may wonder why this is acceptable to staff to put the proposed time line for multi-unit sites.

To answer this question, we need to reiterate how the PSA fits in the context of the safety case for the facility. We must start from the basis that the plants is deemed safe based on deterministic principles and analysis.

The safety case is built from deterministic rules and proven engineering practices for the design to ensure defence in-depth, dose acceptance criteria for design basis events are met and reliability of the system's important safety.

The PSA complements this approach. For the operating reactor, as stated before, PSA contributes to highlights points for which design or operating changes may be necessary for

continuous improvement.

The PSA indicators such as the core damage and large release frequencies are used to show whether changes in configuration or procedures contribute in the right direction, i.e. produce safety gain.

As a third condition for the release of the hold point, the Commission requested information in relation to containment venting and protection. This very topic was one of the actions in the Fukushima action plan.

The Pickering containment system, which includes the vacuum building, already had design features to minimize releases after an accident. Among other features, the system has a Filter A discharge system.

The system is designed to cope with design basis accidents. The Fukushima event taught us to look into beyond design basis.

The Fukushima action plan requested licensee to look at different options in the event of severe accidents to enhance the protection of the integrity of the containment while minimizing the control or air control release of fission products. Given the relative

short time to end of life of the plant, the option has to be -- had to be implementable in the short time -- in the shortest time possible.

Also, the current features and limitation of the design needed to be taken into account.

This slide lists the options chosen by OPG and accepted by the CNSC staff in response to the Fukushima action.

Some of the features have already been implemented, and the remaining must be implemented as per approved plan before the end of 2015.

In addition the conditions of the release of the hold point, in the records of proceeding the Commission directed OPG to develop and distribute emergency management information document to the public in the primary area before June 30th, 2014. You have seen the brochure that has been distributed to every household in the primary zone this week.

Staff would like to highlight the extensive consultation process followed by OPG to maximize the benefit in terms of public preparedness to all people living in the primary

zone.

Staff would also like to provide an update to the Commission on the latest development of the off-site emergency preparedness fund.

The development of CNSC Reg Doc 2.10.1 entitled "Nuclear Emergency Preparedness and Response" was identified in the CNSC Fukushima action plan as well. It is saying to enhance the emergency preparedness and response regulatory framework by incorporating lessons learned from Fukushima as well as international best practices.

Reg Doc 2.10.1 focuses on the responsibilities and actions of the licensee and is well aligned with a new CNSC 106 standard on emergency preparedness.

CNSC staff has completed the public consultation on the Reg Doc and comments have been dispositioned.

Currently, CNSC staff are consulting with stakeholders, namely the off-site authorities, on additional requirements. The document is on the schedule to be presented to the Commission for approval in August 2014.

We'd like to draw the Commission's

attention to some of the new requirements staff would like to add to the current draft in light of the multiple public concerns.

These additional proposed requirements are, firstly, licensees are to work in collaboration with the appropriate authority to ensure that KI pills are on hand, for example, pre-distributed, in all residences, businesses and institutions within the design designated primary zone, which is 10 kilometres in Ontario.

In addition, licensees are to ensure that stocking of additional KI pills for residents beyond the primary zone.

Secondly, in response to the Commission's direction given at the Pickering hearing on public information for off-site nuclear emergency, this has been formalized into Reg Doc 2.10.1. It is now -- which now requires licensee to undertake more active and regular public information on emergency preparedness and response.

And lastly, licensees are to assist off-site authorities in their emergency planning by providing a planning basis that includes release and short-term information.

I would like now to turn the presentation over to Dr. Rzentkowski.

DR. RZENTKOWSKI: Based on information assessed, CNSC staff are confident that OPG has met all the prerequisites imposed by the Commission for the release of the hold point.

In addition, staff would like to point out that OPG's contributing to the improvement of the public awareness and preparedness for nuclear emergencies. OPG will complete this week, and in preparation for the unified response exercise, the distribution of information brochure requested by the Commission by the end of June.

Further improvements of preparedness will be achieved through a more active participation by OPG in the distribution of the potassium iodine tablets to members of the public in the area.

In closing, CNSC staff recommend that the Commission remove the hold point in the Pickering Operating Licence to allow operation of the Pickering units beyond 210,000 effective full power.

In addition, staff recommend that

the Commission direct OPG to collaborate with provincial authorities to ensure that a sufficient quantity of potassium iodine tablets is pre-distributed to all residents, institutions and businesses in each sector of the designated 10 kilometers primary zone around Pickering NPP. This direction and the implementation timeline will be described in the license condition handbook following directions from the Commission in the record of proceeding and reason for decision for this hearing.

Staff will continue to monitor the mandatory pressure tube inspections to ensure their appropriate fitness for service, and the research associated to continuous improvement of the knowledge of degradation mechanism.

Staff will also monitor progress in the development of the whole site PSA. As well, it will develop the matrix for safety goals in the context of the whole site. Staff will report the progress through the annual staff integrated safety assessment NPP report.

This concludes our presentation. CNSC staff now are available to answer any questions the Commission may have. Thank you very

much.

THE PRESIDENT: Thank you.

Colleagues, before opening the floor for questioning, what I propose to do is to get directly into the intervenors' written presentation, because I think we'll cover a lot of the issues. And I understand also we have online representatives from the Office of the Fire Marshall and Emergency Management. Let me test the technology. Is Mr. Solomon or Mr. Nodwell online?

MR. NODWELL: Dave Nodwell. I'm online.

THE PRESIDENT: Okay. Thank you.

So what I would like to do is I would like to start with the first written submission from the City of Pickering, as outlined in CMD 14-H2.49, and I'd like to hear whether there are any questions associated with this witness submission. Ms Velshi?

CMD 14-H2.49

Written submission from the City of Pickering

MEMBER VELSHI: Thank you, Mr.

Chairman.

Questions for OPG. I know after this notice of motion was passed by Pickering you did publish the summary results of the PSA on your website. A couple of questions with regards to that. One was, had you -- was anyone from OPG present at this Pickering Town Council meeting?

MR. PHILLIPS: Madam Commissioner, Bryce Phillips for the record.

Yes, we had representation at the town meeting.

MEMBER VELSHI: And did the OPG representative at that time mention that these results were going to be posted on your website eminently?

MR. POWERS: Kevin Powers for the record.

No, we did not mention that these would be posted eminently.

MEMBER VELSHI: Was there a reason why you didn't? I mean, had you made a public disclosure that your results were going to be posted?

MR. POWERS: We did do a delegation. We presented for about 10 minutes in

front of council to explain how we believed that we were fundamentally in compliance with the three main subjects of the motion. The first of those was that we post all documents related to our submission.

In that case we noted that we had posted the submission online promptly and that we had posted synopses of various important technical documents.

MEMBER VELSHI: Yeah. I'm specifically getting to the summary results of the PSA that were posted after. What I'm getting at is, did you post this as a result of this motion and as a result of the interventions we've received, or was that always your intent? Because if it was, why would you not have publicly come out and said, folks, this is coming?

MR. POWERS: Kevin Powers for the record.

It had always been our intent to publish this and it was published in accordance with our schedule.

MEMBER VELSHI: A schedule which you did not share with the Pickering Town Council, correct?

MR. POWERS: That is correct.

MEMBER VELSHI: Thank you.

My second question around this is -- and it's a question for staff, one of the other items on this motion is a need to hold annual public meetings. Can you comment on that, please?

DR. RZENTKOWSKI: Greg Rzentkowski for the record.

As I indicated in my presentation, it is our intention to provide an update to the public and to the Commission on an annual basis in our NPP status report.

MEMBER VELSHI: Right. So here, what they're specifically asking, is whether public will have an opportunity to ask questions.

DR. RZENTKOWSKI: Public will have an opportunity to provide comments in writing, yes. But I don't think there will be an opportunity to present them in -- as a question during the Commission hearing.

MEMBER VELSHI: Thank you.

THE PRESIDENT: Someone -- anybody else? Any other questions? Dr. Barriault?

MEMBER BARRIAULT: Yes. To CNSC,

the motion also carried that you would ask OPG to provide a decommissioning plan for 2015. Can this be done? CNSC and then, I guess OPG is going to be involved.

DR. RZENTKOWSKI: I would like to ask Mr. Peter Elder to answer this question.

MR. ELDER: Good morning. Peter Elder, I'm the Director General for the Nuclear Cycle Facilities Directorate.

Yeah, we would expect that common practice would be as the facility gets closer to end of life, like Pickering, that there would be public discussions around the decommissioning plan. We would support that.

THE PRESIDENT: Okay. Again, let me -- this is out of scope.

MR. ELDER: Yeah.

THE PRESIDENT: This is not -- just as a reminder, I thought this -- the Commission plan is on a public record and available to everybody. But again, I don't want to discuss this right here and now. We've got plenty of other stuff to discuss.

I'm still on the annual meeting, public meeting. I thought that almost --

particularly in communities when you have a nuclear power plant, this should be a no-brainer for you guys to have a public meeting where discussion can occur back and forth. What am I missing here in your response?

MR. PHILLIPS: Bryce Phillips for the record.

We do conduct regular open public meetings on approximately a monthly timeline. Then we have agendas that are built by the members of the community that attend. Then we address all questions that are --

THE PRESIDENT: So you do have annual meetings, annual public meetings?

MR. PHILLIPS: More often than annual. We have monthly meetings with --

THE PRESIDENT: Okay. Sorry. I didn't catch that reply.

Anybody else? Mr. Harvey?

MEMBER HARVEY: Just to come back to the posted document, you mentioned that the -- it has been posted following your schedule. When those document -- when you know that there will be a Commission meeting and that the documents are completed, should you post those documents

immediately or what is your schedule? What is the basis of your schedule?

MR. ELLIOTT: Mark Elliott for the record.

It takes about one to two months after we complete the technical work to do the summary report and put it on the website. And so we completed the technical work in the -- at the end of February and then it took that time to get it on to the website. So it's not that we delayed it. We went at it. We wrote the summary report and posted it.

MEMBER HARVEY: But do you agree that this caused a problem for the public? I mean, if the documents are posted just one week before a meeting, it doesn't give much time to the public to -- well, to read and to have a good comprehension of those documents. What should be changed to permit a longer period?

MR. ELLIOTT: I think this is -- Mark Elliott for the record.

This was a very unique process that we've gone through, with the license last year and then the hold point, and the PSA being required by the hold point to be done 60 days

before. And we met those -- that milestone for the hold point and then we immediately went and worked on the summary report.

So I think this is a unique situation that we're in today and we intend to continue to write these summary reports and post them, but they're not usually around hearings. They're not usually related to a date of a hearing. This was a unique situation.

MEMBER HARVEY: So maybe the meeting, the Commission meeting should be linked -- the ability of the licensee to submit the document. So maybe a --

MR. ELLIOTT: Mark Elliott for the record.

The main intent was to submit it in time for the CNSC staff to have their technical review of it, to have a Commission hearing today, and we met that.

THE PRESIDENT: Well, let me -- let me piggyback on the staff. Was there -- I'm just trying ascertain the facts. Were they a requirement for this document to be published in time for the Commission hearing? Was there a requirement or not?

DR. RZENTKOWSKI: No. There was no clear requirement. Maybe there was an oral commitment made in one of the Commission hearings. I am not sure. I will ask Mr. Miguel Santini.

MR. SANTINI: Miguel Santini for the record.

I'm not 100 percent sure, we can confirm on the transcripts, but I believe the OPG made a commitment to publish them prior to the hearing. But there was not -- to this hold point hearing.

THE PRESIDENT: So prior was not defined how long that might be?

MR. SANTINI: Yeah. It was not defined.

Sorry. I would like to make a correction. At the time of the hearing for the day two, the Commission had not issued the records of proceeding. So we didn't know whether there would be a hearing for the hold point or not. The commitment made by OPG at the time was to publish the summary of the PSA after the report has been produced.

When the records of proceeding were published by the Commission, we knew the

timeline for by which the PSA had to be finished. And that then directed us to have the submissions by OPG by early March to allow us time to review the submissions and be prepared for this hearing.

In that case, OPG after they -- actually OPG had to do lots of work within this short of field time, and only at that time OPG could start writing the summary report. And they did that, then they published, I suppose, based on the commitments that they made always to publish the summary report after the assessment is complete. But no timing was attached to that.

THE PRESIDENT: Mr. Harvey?

MEMBER HARVEY: Maybe it's up to us, the Commission, to take into account the time to prepare the summary -- to complete a summary before to fix a date of a meeting in order to permit the public to get it.

MS SWAMI: Laurie Swami for the record.

I just thought I might add that, when we were here in March, we had our discussion of the new documents that would be issued by the Commission with respect to probabilistic safety assessments. And at that time I stated that we

would issue it in April. We recognized, I believe, during the discussion that that would be tight with respect to this hearing, but that was the timeline that we could -- we could meet.

THE PRESIDENT: Okay. Any other questions?

Well, the next submission is from Pickering West Shore Community Association as outlined in CMD H -- 14-H2.44, and again, one of their concerns was the documentation -- all the documentation being very, very late. Any questions? Yeah, it's almost the same kind of a resolution. At the time it was issued I understand there was a concern about the documentation, the missing documentation. OPG, you want to comment on it? You want to add anything to this?

MR. PHILLIPS: Bryce Phillips for the record.

Just to clarify the question regarding the missing document from the --

THE PRESIDENT: Well --

MR. PHILLIPS: -- submission.

THE PRESIDENT: It's again, if you look at the motion by the Counsellor Jennifer

O'Connell, it's appended here. If you look at the last paragraph:

"The study's information request to the OCG have yet to be released."

Very many intervenors have the same kind of sentences in their intervention.

MR. ELLIOTT: Mark Elliott for the record. We understand the increased community interest in the technical reports, and the -- for example, on the fuel channels, we've never issued those kinds of technical reports on the web before. We understand that is needed to be done, and we're going to do that. We're going to do it in the same way we've done the PSA. We're going to write a summary report and so we're making a commitment to do that.

THE PRESIDENT: I just think my personal observation is we have some pretty sophisticated intervenors, and when you make reference to a document, you can almost bet that somebody's going to ask for it.

MR. ELLIOTT: Understood.

THE PRESIDENT: Anybody else?

Okay. I think I'd like -- this is

a good time to take a break for about 10 minutes and then we will reconvene at 11:05. Thank you.

--- Upon recessing at 10:53 a.m. /

Suspension à 10 h 53

--- Upon resuming at 11:09 a.m. /

Reprise à 11 h 09

THE PRESIDENT: We are ready to continue. The next submission is from Northwatch as outlined in CMD 14-H2.45.

CMD 14-H2.45

Written submission from Northwatch

THE PRESIDENT: Questions? Dr. McDill...?

MEMBER McDILL: Thank you. It's on the edge of being in scope, but there is a request in this intervention concerning the possible fuel bowing in the report, so maybe we could have an update on that, just where it is.

MR. RZENTKOWSKI: Greg Rzentkowski, for the record. Yes, this was an operational event we reported last year. The situation has been corrected and the unit returned back to 100 percent power operation.

I will ask Mr. Miguel Santini to describe more in detail what we have done in order to assure ourselves that the operation of the unit is safe.

MR. SANTINI: Miguel Santini, for the record. As you may recall when we presented the event of the black deposits, OPG had originally reported that there were some -- through inspections they have measured some bowing of the element.

That became a concern to us because that would have meant that the heat transfer of the fuel pins would not have been at the level that was suspected, or the cooling of them.

For that reason is when we imposed a three percent penalty of full power for the unit.

Further inspections by the same team, a more detailed inspection confirmed that effectively there were not fuel deformation, or pin deformation in the fuel bundles that have been inspected in the first place and further inspections of the bundle, which included the brushing of the heat deposits, has shown no

discolouration of the sheath, really show that there were really no heat transfer issues with it due to the black deposits.

THE PRESIDENT: But what I am trying to understand is, the black deposit was part of the Hold Point hearing, so is it a phenomena they are associating with aging?

Staff...?

MR. SANTINI: Miguel Santini, for the record. The black deposits are caused as we know now by chemical imbalances in the primary system, and OPG could perhaps give more details, but that could happen to new plants as well, it's not necessarily an aging-related mechanism.

THE PRESIDENT: OPG...?

MR. ELLIOTT: Mark Elliott, for the record. No, it's not really related to aging. What it was, was the chemical -- basically the pH in the heat transport system allowed the deposits that naturally occur through corrosion of the heat transport system over time to actually settle on the fuel and stay on the fuel.

We caught that, we monitored that. We changed the chemistry in the heat transport system to stop that process and we had stopped it,

and over time those black deposits will eventually come off the fuel as we have this proper chemistry.

THE PRESIDENT: Thank you. Ms Velshi...?

MEMBER VELSHI: Question for OPG. On page 3 of the intervention on Confidence in OPG Safety Claims for an Aging Operation, and I know you have given us a presentation on the pressure tubes and the research that has been done, but here there was a reference made that perhaps your submissions to the OEB may not be consistent with what has been presented to the Commission.

And maybe it is a question of timing because this was February, 2012, but can you comment on the question here where they say, you need to do a whole bunch more research to demonstrate fitness for service and there was some urgency to that in 2012.

On the record, what is the position today?

MR. ELLIOTT: Mark Elliott, for the record. There's two things happening here. Towards the Hold Point we did the research to 247, we completed that research, submitted it, had

third party reviews, found it was solid and it's on that basis that we are here today, and that's related to 247,000 hours.

We continue to do research towards the possibility of the pressure tubes lasting longer than 247, but today we are confident in the 247 and that is what we are here to talk about.

So in the OEB space we have told them of ongoing projects because the OEB is concerned with funding of those projects, and so they rightly need to understand what the funding is for, so we have explained that.

MEMBER VELSHI: So it leads to the broader issue on exactly what is the end of life one is planning for for the Pickering unit.

We heard earlier in the Staff presentation that there were certain actions that OPG was -- was understood that couldn't follow through because this station is not going to be around for that long around filtered venting and containment.

But if there are expectations for it to last longer than 247, at what point is that public declaration made and at what point, as we look at the licensing basis, is there a firm

number that that is based on?

MR. PHILLIPS: Bryce Phillips, for the record. Our business plan takes Pickering out to the end of 2020 and the licensing period takes us out to 2018.

Any changes that we would contemplate in the future would have to be back in the public domain, back to you for a relicense hearing if we are going to go beyond 247 to some other larger number, or if we wanted to get to a time beyond 2020, but right now the business case is 2020 and we have made our case for 247,000 hours.

If that were to change in what we wanted to plan, we would be back in front of the Commission in the public forum.

MEMBER VELSHI: Well, maybe let me turn this question around to Staff then. If you were to fast forward to 2018 and OPG came and said, "Now we have done this research and the pressure tubes we are confident can last 300,000 or even longer effective full power hours", would you go, "Well, heck, if I had known that in 2014, 2015, my decisions would have been different, I would have asked OPG to do something different the

past five years." Is that likely?

MR. RZENTKOWSKI: We are looking at this differently because it really doesn't matter how far away we are from this projected end of the assumed design life.

From the regulatory standpoint, it is absolutely essential that OPG, and as a matter of fact any other utility, operate in accordance with the regulatory requirements and those regulatory requirements are stated very clearly in the *CSA Standards* and our regulatory document *RD-334* on aging. That is what we apply.

Currently we can say with a high degree of confidence that, in fact, OPG is in compliance with every single requirement in those documents.

As a matter of fact, in our presentation we made reference to hydrogen concentration in pressure tubes. So this is the limit which we currently monitor and we established the safety limit at 80 ppm for hydrogen concentration in the pressure tubes, but we know that it is safe to operate until the concentration of 120.

So this is the critical component,

or critical element of the operation of the pressure tube going forward.

Have we done something differently? No. We will identify the critical parameter, we will monitor this online and we will make sure that OPG operates in compliance with our regulatory requirements.

MEMBER VELSHI: But I am getting at areas other than pressure tubes, and I specifically mentioned containment and filtered venting because what I heard from Staff was, given the short life of the plant, we don't expect OPG to do something.

And so, when one does risk/benefit or cost/benefit analysis if the plant is going to be five years versus 12 years, your decisions may be different today. So it is not a question of compliance, it is a question of would there be certain safety measures, mitigation measures, changes that one can justify if the plant is going to be around longer than if it isn't?

MR. RZENTKOWSKI: Thank you for this clarification. That is a very important point because the time at risk can also be considered in the regulatory decision-making. So,

of course, the time at risk would change if OPG decided to operate those units significantly longer.

Would have our decision been different? Yes. I think yes, especially when we look at the Fukushima Action Plan and we will be discussing later today the implementation of the emergency filter system for beyond design basis accident at the Pickering station.

For the time being we decided that the approach taken by OPG is completely sufficient because those existing filter systems, which were designed for the design basis, can be rebuilt in order to operate better under severe accident condition and it is absolutely sufficient.

But if those units were to operate for another 10 to 15 years, probably we would request an independent and separate filter venting system to assure the last layer of defence is in place in the case of severe accident. This is just an example.

MR. ELLIOTT: Maybe just to add one thing, Commissioner Velshi. Our studies are looking at going a small number of years, at the most, past the 247, so we are not going to

refurbish Pickering, it's not going to run another 30 years like the Darlington plant is. So we are talking of a small number of years, at the most.

MEMBER VELSHI: But I heard 300,000, that is a whole lot longer; isn't it?

MR. ELLIOTT: You didn't hear that from me.

MEMBER VELSHI: It's there somewhere; is it not?

MR. PHILLIPS: Not from OPG.

MEMBER VELSHI: Okay, thank you.

THE PRESIDENT: So I would like to understand. There is a lot of research being done and I assume lessons learned about what to do, what not to do.

What I am trying to get from both sides, from the OPG as an operator and from CNSC as regulator, it's an aging process -- what are you doing in your regulatory process differently over time? The closer you get, the longer you get do you change your, I don't know, frequency of monitoring, inspection, what do you do differently and what do you guys do differently in operational experience based on some of the research you have done?

So let me start with OPG.

MR. ELLIOTT: Mark Elliott, for the record. What we have said at various public forums is, there's only one way to run a nuclear plant and that's to run it well. You can't stop doing certain things and letting its performance suffer towards the tail end of life, you can't do that; you can only operate at the excellence level that Mr. Phillips talked about earlier.

And so, we're doing that, we're continuing to invest in the plant, we're continuing to implement all the safety improvements that we talked about today, we're continuing to buy and install equipment.

For example, the sustainable operations plan will be -- it's in the Licence Condition Handbook to be submitted and updated in December of 2015.

So that plan shows that we are going to continue our preventative maintenance, deal with aging, continue our equipment replacements where we have to do that, and then for the major components like fuel channels, we're going to do this research and monitoring.

So we're going to keep the plant

in top condition right until the last day of operation.

MR. PHILLIPS: Bryce Phillips, for the record. I add to what Mr. Elliott was speaking to. If you were to walk into my power plant today you would see a lot of new metal being put into that plant, pipings being replaced, new pumps, new valves.

It's not an aged plant. It's not like driving a 1970 Chevrolet that has not had maintenance done; it's like driving a 1963 Corvette that has been kept up to the mint condition. That's how we operate and maintain the nuclear power plant.

So when you use the word "aged", it's not in the same context that most people think of aging. We do replace a lot of components, there's a lot of new metal in the power plant.

THE PRESIDENT: Staff...?

MR. RZENTKOWSKI: Yes, in the regulatory space we introduced many new requirements pertaining directly to aging of critical components and process -- process components at the nuclear power plants. So the

best example is the aging management document, which has been recently introduced in operating licences for all facilities. Another requirement is life cycle management programs, which licensees have to establish for all major components at the plants. And also, every single time the unit goes into outage we request clear demonstration of the safe operation when the unit gets out from the outage.

And also, in the spirit of continuous improvement, we request the licensees to go beyond the requirements in the industry standard. As a matter of fact, OPG inspects significantly more pressure tubes than this is required by the -- by the conditions of the standards. And this is -- this is to demonstrate very clearly to themselves and also to demonstrate to the regulator that it's safe to operate those units even if they age.

I may ask Dr. John Jin to provide more information on our aging management program.

MR. JIN: My name is John Jin. I am the director of the Operational Engineering Assessment Division. I am in charge of conducting technical review of the structural integrity of

the pressure boundary component.

As mentioned by Dr. Rzentkowski, as a technical staff of the -- of the CNSC, we're going to conduct most stringent technical review to -- to conform that if there is no evidence to invalidate any assumptions made in the fitness for service or if there is any need to improve or enhance the methodology or the understanding of the degradation mechanism. We're going to continue to our -- our job to con-- to conform with that -- conform of the continued validation of the fitness for service, to -- to confor-- again, to conform that it -- all -- all the inspection findings meet the -- meet the criteria provided by CNS-- CSA standard to demonstrate fitness for service.

THE PRESIDENT: Thank you.

Monsieur Harvey.

MEMBER HARVEY: Just to have a simple comprehension of all that, what is the -- is there any difference between, let's say, Point Lepreau, Darlington and Pickering? Is there some tasks, some requirements, some reports to be provided to the staff and produced by OPG? What is the difference to -- to run Pickering over its

expected lifetime and Point Lepreau and Darlington?

MR. RZENTKOWSKI: Thank you for this question. It's actually a very interesting question. We are focusing on -- for example, in the context of the pressure tubes -- we are focusing on hydrogen intake and pressure tube toughness for OPG. But in fact, degradation mechanisms affecting pressure tubes due to aging can be very much site specific. They are not the same from site to site. So, sometimes our regulatory practices have to differ slightly and we have to request certain reports from one licensee which we wouldn't request from the other. I am sure Dr. John Jin can provide better examples.

MR. JIN: John Jin for the record. Please let me take an example of feeders. I mean, it -- I know it is outside of the -- to this hearing, but to explain about the differences station to station. We had some experience of cracking at the feeder bend at Point Lepreau, but it is because of the high -- high registered stress caused by the fabrication process, which was the hot formed, and they didn't relieve the

stress after bending process. That caused the -- the cracking problem, but that is not the case at the Pickering or other stations. Other stations has the hot-formed elbow or the -- they did stress relief after bending stress. So they have a reasonable -- reasonably low level of registered stress, so we don't consider the cracking issue is -- is the case for Pickering. So I think that is one of the examples to explain the differences among the station to station.

When it comes to the pressure tube, there is differences in the -- in the operating condition with the higher temperature or lower temperature, or the higher hydrogen concentration. So we are looking at the differences very carefully and we -- as more -- more inspections for the station with higher susceptibility.

MEMBER HARVEY: OPG, do you want to comment on that? Because you're --

MR. PHILLIPS: Bryce Phillips for the record. There are differences between power plants for -- you know, Darlington has a refurbishment program. Pickering has a continued ops, continued operations, and sustainable

operations plan. We're -- we are looking at all the different aspects of operating the power plant to the high standards out to the last day that we operate, and that's what those two programs do. And it is -- it is slightly different than you'd find in a different power plant, they have a different circumstance, but we have a program in place that identifies all the different things we need to do to continue to operate the plant at high standards right out to the end of 2020.

THE PRESIDENT: Dr. Barriault.

MEMBER BARRIAULT: Correct me if I'm wrong, and I'll -- and I'll ask CNSC about this really, I'm getting the impression that we're endorsing a research project to extend the life of these two beyond 2020. Are we backing a research project here, is that what's going on? I'm sorry if I have to say that.

MR. RZENTKOWSKI: Greg Rzetkowski for the record. As a matter of fact, the research project is supporting continued operation of -- of Pickering unit, but not only. The research project is -- is supposed to -- to assess all degradation mechanisms identified at operating units in Canada. This project has been initiated

about five or six years ago, and it hasn't been driven by the request from the Commission, I assure you. We had a joint discussion with industry, we looked at the strategic issues we have to -- we had to address in the near future, and this one was definitely on the top of our agenda. It is driven simply by the regulatory concern and by the operating concerns on the part of the industry.

THE PRESIDENT: I --

MEMBER BARRIAULT: Go ahead.

THE PRESIDENT: Mr. Jammal, I think he wants to add something to this.

MR. JAMMAL: Thank you, Mr. President. Ramzi Jammal for the record. Just what you're hearing here is the -- the proven enhancement with respect to the safety case. The Commission issues a licence based on, starting from the deterministic factor, which is the safety case, and depending on the uniqueness of the site and the planned operation we will ensure safety at day zero or at day 1,000 at the end of the day. So the safety is not compromised at any stage because the safety cases are reviewed and we have multiple elements to review the safety case.

In this case of Pickering, we've got a major licence hearing that's going to come up in 2018, where all of these elements, systematically holistically will be looked at, not just the aging -- aging, radiation protection, improvements that is required, depending on the operation plan of the facility.

So we will not allow them to operate without validation of the safety case. As you mentioned, Dr. Barriault, is it the research only? No, it's one of the elements to demonstrate the continuous enhancement and safety is maintained at all times. Is research to support the safety case assumptions or beyond. We want to always maintain a safety, conservative margins, so that regardless what the operator is doing we're ensuring safety.

MEMBER BARRIAULT: Okay, thank you. Thanks.

THE PRESIDENT: Okay. I'd like to move on. Mr. Tolgyesi.

MEMBER TOLGYESI: Sorry, just one. You were saying that operations, operating the reactor beyond the end of life, it's 210,000 hours. You were talking about the impact, that

there will be more stringent maintenance, there will be more verifications, et cetera. Is it -- is it means that there will be -- the reactor availability will be reduced or could be reduced?

MR. ELLIOTT: Mark Elliott for the record. The reactor availability depends on two things really: Planned outages, the frequency of planned outages and how long they are and how well the plant runs between planned outages. We are working every day to make that period between the planned outages a very reliable period, and that doesn't change. That effort and that capability -- that availability factor doesn't change due to this.

Now, the planned outages are another factor. We have to factor in the inspections and the maintenance to ensure that the pressure tubes remain safe. We have to factor that in and we have done. So our business plan has all these inspections in -- and maintenance activities built in. So that -- that's one factor. And -- and those -- those outages, you know, are significant in length and they do impact on the availability, but the availability, the reliability between planned outages is not

affected, and in that period we're expecting high -- high availability.

MEMBER TOLGYESI: What I was meaning, that these outages will be increased because I -- when I was talking about availability, it's how long the -- over a period of time, how long the reactor is operating. So, if those periods will be increased -- another one is that should the operating full power be revised or lowered or otherwise affected?

MR. ELLIOTT: Mark Elliott for the record. The -- just in answer to your first question, the outages are longer than at other plants, that's correct, to do that inspection maintenance. They're already -- they're already in that -- those number of days. So they are longer to do this work and they will continue through the licence period.

Should the power level be reduced? No. The power level is safe to operate. Our research has shown that -- actually, there really is very little difference in the way the pressure tubes operate as they age at full power. The issue that we're dealing with with the heat up and cool down that you've heard about is that the

pressure tubes as they age the fracture toughness changes in that lower temperature range, but at full power it does not. So that there's no reason to lower power through the -- because of the pressure tube aging.

THE PRESIDENT: Okay. Thank you. I'd like to move on to the next submission, which is from Greenpeace Canada as outlined in CMD 14-H2.47.

Who wants to starts?

Dr. Barriault.

MEMBER BARRIAULT: Thank you, Mr. Chairman.

I guess I'm looking at page 3, the third bullet, and it talks about a "regulatory loophole tolerated by the CNSC". Does CNSC want to comment on that? As -- what it says really is:

"A regulatory loophole tolerated by the CNSC allows the Pickering nuclear station to impose significantly higher levels of risk [to] the community surrounding the station than around the Point Lepreau ... New Brunswick

[station]."

As to "regulatory loophole".

MR. RZENTKOWSKI: Yes, thank you very much for this question and allowing us to defend ourselves to some extent because, to be perfectly honest, I don't understand the concern raised in this intervention. And as a matter of fact, there's many other concerns about the integrity of the CNSC staff and regulatory capture raised in these interventions. So if you don't mind, I would like to express some general comments on this intervention.

MEMBER BARRIAULT: Go ahead.

MR. RZENTKOWSKI: Because I think we are forgetting the most important point; CANDU reactors over 40 years of operation have attained an impressive safety record. And in light of Fukushima accident, the design of CANDU reactors was enhanced through implementation of additional measures to improve severe accident prevention and mitigation. As a result, the risk associated with the Pickering station operation has been, in my opinion, reduced to as low as practicable. Yes, this is an old station, but, nevertheless, through all the improvements, I think we managed to bring

its level of safety close to those -- to that established for the new power plants.

And even this, according to Greenpeace, is, in fact, not sufficient because:

"CNSC staff actions indicate institutional culture at the CNSC which is yet to accept and implement lessons learned from Fukushima..." (As read)

I am quoting from the document.

In the opinion of Greenpeace, it is better to focus on hypothetical risk scenarios instead of risk insights that allow timely identification and implementation of reasonable improvements to enhance reactor defence in depth, as summarized in the Fukushima Action Plan.

This is not sufficient because:

"CNSC staff has shown a schizophrenic approach to the role of risk assessments in oversight of Canadian reactor operators."

I am quoting again from the intervention.

Once the risk contributors have

been understood through the risk assessment, CNSC staff undertook a concerted effort leading to implementation of risk control measures instead of focusing on enhancements to the risk assessment.

It is true that the science can still predict the residual risk, but, for all intents and purposes, it is practically eliminated. Greenpeace, however, would prefer to replace this pragmatic approach by a precautionary one to better understand the hypothetical risk of nuclear power.

It is also not acceptable because it fosters a sense of complacency and manifests symptoms of regulatory capture through lack of public disclosure of hypothetical risk scenarios and accident precursors. CNSC staff does not downplay the relevance of this information but cannot communicate the risk using absolute terms if there is no certainty in underlying facts.

CNSC statements have to be science-based and science is meant to reveal the truth, not to create it. Especially that Greenpeace have never offered a clear science-based explanation why this is important and how the results will be used. Instead,

Greenpeace offered excessive statements about the danger of nuclear power and desire to shut down all power plants.

I would like also to stress one point: safety doesn't happen by accident.

Thank you.

THE PRESIDENT: Okay.

MEMBER BARRIAULT: Go ahead.

THE PRESIDENT: We all read this, so we all understand the statement, but, again, I'd like to focus on the scope here. And the question posed to you was "regulatory loophole".

Okay, so what's the answer here?

MR. RZENTKOWSKI: My answer was, at the beginning, I don't understand where this loophole is coming from. I really don't understand the concern raised in this intervention.

THE PRESIDENT: OPG, any idea what is being referred to?

MR. PHILLIPS: No, we have no idea of any regulatory loophole.

THE PRESIDENT: Okay.

Dr. Barriault.

MEMBER BARRIAULT: No, that --

that was the question really, yes or no, that's all. Thank you.

THE PRESIDENT: Dr. McDill.

MEMBER McDILL: Thank you.

I think one of the challenges with -- with this intervention is the -- the change from 1.26 to 1.03 between March twenty-- 24th, I think, and several days ago. So in view of the fact that it takes such a long time to do a PSA, when the 1.26 came up for Pickering A how was it possible to -- to affect such a rapid change to get down to 1.03?

MR. ELLIOTT: Mark Elliott for the record. The first plan we had was to get into compliance. So S-294 does not require summation and we had a commitment to complete S-294 60 days before the hearing. We did that and we were in compliance with that. We saw that summation was something that was of interest and the CNSC prompted this in their CMD and did a summation. We saw that 1.26 number. Before that number was published, all of our results were between target and limit or below limits and so there was no reason to do any more work. When we saw that the summation had been done and was of concern, we --

we got back together, and the people who had done the PSA had a lot of ideas, as you can imagine. As they -- as they went through two years of work, had a lot of ideas of how it could be done differently and -- and improved, but we were driving to a date, we were driving to get this issued on time and meet the limits, and -- and both of those things were met.

So, we got together with those people who had those ideas and we said what -- what have you learned by doing that could be very simply put into a new prepared, verified, approved document. So a simple change that could be done. And I think you'd -- you'd agree that simply looking at the capacity factor, the amount of time the reactor has operated is a fairly simple technical change that could be looked at in a short period of time. So we rolled up our sleeves and did that and were able to produce a prepared, verified, approved change and submitted that last week.

MEMBER McDILL: I'm going to ask staff to comment on that, please.

MR. RZENTKOWSKI: Greg Rzentkowski for the record. Let me do it in, I hope, simple

way. In the number "1.26" there is a summation of events at power and summation at shutdown as well. Initially, the emergency mitigating equipment was credited only for the events at power. In order to reduce the number from "1.26" to "1.03", the emergency mitigation equipment was also credited for the events during the outage.

MEMBER McDILL: Can you tell me in your table, page 22 of 14-H2, "TABLE C.1: PICKERING A REVISED PSA RESULTS", precisely where that change occurs?

MR. RZENTKOWSKI: I understand that our specialists are ready to respond to this question. I will flip it over to Monsieur Yolaoui.

MR. YOLAUI: Yes, Smain Yolaoui. I'm from the PSA & Reliability Division. The -- the numbers which -- which have changed is mainly the -- if we look at the fire PSA for the LRF, this is -- we -- we gave -- OPG gave the number of 0.84. This is -- this is for the at power. And we say that it's bounded by the at power. So when we multiply this by the 80 percent, which is supposedly the time in which the reactor is at -- is operating at full power, if we multiply 0.84 by

80 percent, we will obtain 0.26 for the -- for the at power. And all the shutdown states where -- as in the presentation, CNSC presentation, we demonstrated that we have enough time to credit the EME, like the accident is evolving in at least -- it takes nine -- nine hours at the worst case. So we calculated the -- the EMEs, and -- and, therefore, we think that the shu-- the shutdown -- at the shutdown state it's less than 10 to the minus 7.

So to -- to answer your -- directly your question, if you multiply 0.84 for the fire by 80 percent, which is the time at which the power -- the -- the reactor is at power, you will obtain zero point twenty -- zero point twenty sixty-six. And if we add up the numbers together, we will come up to 1.03 instead of 1.26.

MEMBER McDILL: From the perspective of interveners, would that not have been a good slide to put up to show to people, who are watching, where those numbers changed?

MR. RZENTKOWSKI: That's a very good point, but we have to find a balance between the message we want to deliver and the time of our presentation. And we didn't want to stretch it

out too much because we have to allow the time for this discussion as well.

MEMBER McDILL: I agree, but we also have quite a large number of interveners who have said they haven't had time to review these things, they would like more time, and it would have been very clarifying just to have a one -- one additional table that could have been ... Okay, so there isn't a table.

And at the end we are down to 1.03, which is still above the limit. And I know you were talking about SMAG. What's your estimate for the next step?

MR. ELLIOTT: Mark Elliott for the record. When we saw the 1.03, we looked at what hadn't -- what was left to be credited, and the Severe Accident Management Guidelines were the obvious things that is in place right now and was not being taken advantage of. There isn't -- there isn't a method for quantifying it exactly right now and I'll describe why that is. When we look at response to events, we have a model for human reliability that has been approved and accepted by the CNSC because, like equipment that can fail, people can make mistakes as well. So,

the reliability of the human element is factored into all PSAs. And when you have detailed procedures, like we have for the EME and like we have for abnormal incidences that we've had before Fukushima, we have a way of quantifying that. But Severe Accident Management Guidelines, the G part, the -- what they are, they're guidelines. And so, we don't have a current method for putting a number on the human reliability of doing that, that work. They're -- the guidelines talk about a lot of the things that could be done, how you could do them, but they're not detailed step-by-step procedures that you can easily translate into a number.

So when we looked at this, though, we said, again just like my previous answer, is there something obvious, is there something obvious in the SAMG that would clearly take us below the 1 when you do the CNSC's summation. And we found a way that -- we found a scenario that I can describe but I'll -- if the Commission wants more detail, but we found a scenario that it was very clear that SAMG would be effective and would reduce the risk. Don't know exactly how much because there's not a method for that; we know it

would be significant. And so, in Mr. Phillips' statement we said the number is less than 1 and we believe that.

THE PRESIDENT: Mr. Frappier.

MR. FRAPPIER: Gerry Frappier for the record.

I just want to also add from staff's perspective that there is no requirement for them to have this summation that comes -- that comes out less than the 1.0. That's important because we don't believe that straight summation is the appropriate approach.

Also, we're very sure that if you do take a straight summation, you're biasing it in an overly conservative way so that the number -- once we do figure out exactly what's the best way of doing it, we're very sure it's going to be less than a straight summation. So when we start getting into, you know, is it 1.03 or is it 1.0 on something that's not a requirement to begin with and we know will be less than that once we figure out exactly how to do it right, we're very confident it's not of concern.

THE PRESIDENT: Can I piggyback on that one. So you guys keep talking about biasing

but nobody explained to me what "biasing" means. In my -- in my simple lang-- let me try something, okay, my understanding. Can you -- when you sum-- let me use -- fire and flood, are you saying they're happening at the same time? It sounds counterintuitive that fire and floods will happen at the same time. Is that what "summation" means?

MR. FRAPPIER: Gerry Frappier for the record. I think that's an indication of one of the things that we have to go through with respect to taking something like summation. Some of these are mutually exclusive. You know, they -- they cannot happen at the same time is -- is one aspect, but there's also more to that. There's the level of uncertainties that are used in particular for external events, and also the level of conservatism that is used when you do some of these different -- different types of analysis. So, for instance, in the fire PSA you will assume that everything in a room has been destroyed by a fire in it. That's -- that's probably not true. And so, we're looking at ways at -- that we can pull the Commission's desire to have an aggregated sort of risk number together in a way that's -- that's technically correct and

defendable.

THE PRESIDENT: Dr. McDill.

MEMBER McDILL: Just because it came to mind, burning fuel on water. Yeah.

THE PRESIDENT: Mr. Jammal is raising his hand here.

MEMBER McDILL: Okay.

MR. JAMMAL: Ramzi Jammal for the record. I am not going to diminish the technical discussion on the numbers in summation, so I'll leave the experts to have that debate; okay? I don't want to take away any of that. But as Mr. Frappier said, we -- we have now transformed the simple summation to a -- an approved methodology, so there are uncertainties associated with it and we've got to take it into consideration.

However, from safety perspective the numbers are the numbers but the key element for post-Fukushima is, if the reactor is in a shutdown due to any external/internal hazard, there are emergency mitigation equipment in place to maintain the safe shutdown of that operation at any cost to prevent releases. So the key points here from safety perspective, yes, we can take -- take numbers, excuse my words, until we turn blue

in the face, but the issue here is what's going to happen if there is an accident and what does it mean from emergency mitigation measures, improvements in place that the reactor will safely maintain its safe shutdown. Even they don't have adequate equipment on site, offsite equipment will be brought in in order to maintain that safe cooling shutdown of the reactor. That's my statement, sir.

MEMBER McDILL: Thanks for the clarification.

Whether the summation is required or not, it was presented and this is what the public sees and it's the only thing the -- without going into the technical documentation, it's what the public reads. And it looks with the simple summation that it doesn't pass the guidelines. Whether the guidelines were required or not, it's not what the public is going to see. That's my concern. And your -- this is in the context of the Greenpeace intervention.

THE PRESIDENT: Since Mr. Frappier raised his hand and identified himself, I discovered what the loophole was. It's on page 9 of the Greenpeace presentation. It's actually

quoting Mr. Frappier. It is referring to "a regulatory loophole the CNSC has tolerated for several decades." And, "This loophole allows the [nuclear station --] Pickering nuclear station to impose significantly higher levels of risk on the community ..."

Mr. Frappier, do you want to comment on that?

MR. FRAPPIER: Thank you for the opportunity. Gerry Frappier for the record. I certainly didn't say there is any loophole in regulations. What I did say was that we have to be -- exactly the conversation we're having right now. We have to be very careful about talking as if summation is going to give us a -- the proper identification of risk and whether safety goals as -- they are currently done now, which is to drive engineering changes on a per unit basis, whether they, in fact, are the correct ones for something when we start doing this aggregation. So he's quoting me as having some of my internal e-mail to staff and whatnot, where we were as -- as -- the Commission will find out perhaps more in the fall, when we come with a more fulsome discussion on safety goals and whatnot, we have

directed staff to take a look at how better to understand this -- the whole concept of aggregation. And so, in this particular e-mail that he's talking to is identifying that summation is probably not going to be -- just straight summation is probably not going to be the right way of doing it. But that is not a loophole and has nothing to do with the risk of Pickering versus the risk of Point Lepreau. The safety goals are designed for a per unit basis to ensure that the designs of the units are as safe as possible and continuous improvement of the units. And the overall safety, as was mentioned earlier, is not just based on PSA but also based on deterministic safety assessments and a whole bunch of other engineering practices.

THE PRESIDENT: Okay. Thank you.

Dr. McDill, are you done?

Ms Velshi.

MR. ELLIOTT: Please could I mention -- could I just mention one answer to Dr. McDill that -- about what the public sees. The only time that OPG talked about summation was in our latest CMD from last week. And what the public would see is the number is less than 1.

That's what we -- we're putting on the record.

THE PRESIDENT: Ms Velshi.

MEMBER VELSHI: Right. It may not be on OPG's record but it's staff's report that's on record that has it more than 1.

I do want to get back to this discussion around safety goals and I know you're going to be coming back later in the year with that. And I understand that comparing the aggregation to the safety goals is not comparing the right things, but I think we keep on saying that these safety goals are a surrogate of the higher level goals. And, I mean, I'm just surprised that it's so much later that someone has finally come around to say we need to do this because we need to understand what's the overall public risk. So I look forward to the discussion around safety goals.

I do have a comment on the refinement of the numbers. We keep on hearing that PSA is complementary, it's a tool to identify how -- what the biggest contributors of risk are and how we can make improvements, but what we have seen in these last few iterations is more just pencil sharpening as opposed to where are there

real safety improvements. I don't want to take away from the Fukushima Action Plan and so on, but since then.

So if I look at the fire risk, which is the highest contributor and it looks like the Fukushima Action Plan has made no difference to the before and after, at least my reading of the tables, but I haven't seen anything in the Action Plan on how that risk can get reduced. So, yes, you have looked at the outage and -- and at power and done the 80 percent adjustment. But if this is a tool, should this not be looked at -- so at .84 it was higher than your -- than your target of point whatever, .1, so why are we not seeing action plans around that, of actually reducing risk in real ways?

MR. PHILLIPS: Bryce Phillips for the record.

Madam Commissioner, the -- there are a lot of actions that we've taken, in how we normally operate Pickering, around the insights we received from this PSA. You know, the examples were our operating procedure changes. When it comes to fires we have a comprehensive improvement plan on how we are improving equipment, and our

procedures, and our training around fires. So if you were to come to Pickering, for instance, you would see that as part of the improvement plan at Pickering now we're continuously trying to improve performance.

So that's an example where the result of the PSA actually informed us in what we should be doing around continuous improvement. So we've actually focussed on improving our fire performance, if you will. How we maintain equipment and how we respond to fires. Anything else -- I'll ask Mark if he wants to add anything to that.

MR. ELLIOTT: Yes. Mark Elliott for the record.

I'm just looking at our action plan that we submitted this week. Given that the -- the results are between target and limit, there must be an action plan to lower them, and we've submitted that this week and I'm just looking at that.

There's two references to fire. One is a little bit to your point about the numbers. But I'll just explain it in that when we did the fire PSA there was conservative

assumptions about where the cables actually run. We didn't do a tracing of cable by cable, and so you assume that there's a fire, that all the cables are damaged. So we are going to do that tracing and we expect -- we expect that to lower the number significantly.

But there actually is in this document that we submitted this week, a physical change. In that during the walk downs, certain cable trays were identified as having a fire protection barrier at the bottom of the tray, but not the sides. And as part of station improvements that barrier could be installed in the sides and contribute to reducing the risk from fire.

So there's a numerical one, yes. But there's also a physical one in our action plan.

MEMBER VELSHI: I'm really happy to hear that because I was just looking at the slide number 21 where, you know, you've got your action plan and it didn't highlight that. So if you are changing procedures, if you're changing equipment, then does that mean that a couple of years from now, or whenever you do your next cycle

of PSA, the contribution from fire would be less than the .84, or whatever the revised number is then?

MR. ELLIOTT: Mark Elliott for the record.

Yes, that's correct.

MEMBER VELSHI: Thank you.

So some other issues that the intervenor has raised, if you can comment on that, one was that there has been no third party review, or no third party review yet of this updated PSA. Is that normal? Is that something you're considering? I know when you were talking about your fuel channel program, and research, and analysis, you did have third party review of that. Is this something you're entertaining?

MR. ELLIOTT: For the record, Mark Elliott.

I'm going to ask that Carlos Lorencez, Dr. Lorencez, come up and answer that. And if he -- we have other experts in the room that we can bring up as well to help answer this question. But the methodology -- the way we've done this is used engineering companies that do this around the industry in North America to do

this PSA.

And we're -- our own experts are not actually executing the PSA. We're like the smart buyers who understand it and can critique it. But it's done by engineering experts in the industry that have done PSAs around the world. And so by definition they are somewhat independent from OPG and we're using those methodologies.

The other thing I'll say before turning it over to Dr. Lorencez is the way you do this, you submit a methodology to the CNSC. And we've submitted a number of correspondence on how you do the PSA and got comments, and gone back and forth and had the -- had all the methodologies accepted by the CNSC before you, kind of, crank the handle and do the calculation. So that's another -- that's another measure of independence. But I'll ask Dr. Lorencez to comment.

DR. LORENCEZ: Dr. Lorencez for the record.

Mark, he pointed it correctly. The number of PSA analysts and contractors who have qualified PSA analysts in Canada is not large. So they use consistently and frequently, resources from the United States. We have had

contractors who need support from ERIN Engineering, for example, in the States, which is a large engineering company dedicated only to produce PSAs.

Also, for example, we have produced methodologies and had them reviewed by EPRI, or members from EPRI, and there are third party reviews that contribute to ensure that we are proposing sound methodologies to be reviewed and accepted by the CNSC.

So there is a number of third parties in addition to our vendors, contractor, and our own staff.

MEMBER VELSHI: Thank you.

So when you talk about methodology -- and it's come up with this intervention but many others -- is there a reality check then done with what the actual evidence has been around the kind of outcomes that you're actually measuring? So whether it's meltdowns, or severe accidents, because this is all -- I'm not saying it's hypothetical. It's based on a real experience. But is it then compared with, you know, what the reactors' experience had been.

MR. ELLIOTT: Mark Elliott for the

record, and I'll ask Dr. Lorencez to add to it.

But I'll just say that that is part of the regular updates. So the PSA is not a one-time thing. PSA has to be updated at a regular interval, and we take advantage of the actual performance when we do the next PSA. And I'll ask Dr. Lorencez to comment further.

DR. LORENCEZ: Carlos Lorencez for the record.

Once we finish our PSAs, we use them as indicators. The number -- we compare the number against our safety walls to demonstrate that the risk posed by the operation of our nuclear power station is small. Or small as compared to the risks the public is also exposed to. But important to us is the vulnerabilities identified by the PSA.

The objective of the PSA is to identify those so we can do something about it. We also look at the changes of that indicator. We go through operations. We go through the outages. We take systems out of service. We have changes in configuration and we analyse the risk posed by those changes.

So the changing indicator, the

identification of the vulnerabilities is the main objective for this. So we constantly compare what we have to the real plant. Does that answer your question?

MEMBER VELSHI: Yeah. I don't think I asked my question properly.

Say if it's -- we're looking at core damage frequency and large release frequencies and we go, look, once a decade we've had a serious accident in the industry. How do we then do the reality check between what these PSAs are coming up with and what we are actually seeing in the real world?

MR. ELLIOTT: Mark Elliott for the record.

We have thought a lot about that question in the industry, and what -- because intervenors have brought it up as well. I'll just make a couple of comments on that.

The -- we've had a small number of core damage events in the industry, Three Mile Island, Chernobyl, Fukushima. If I -- what's really important is what is the impact of those on the going forward risk? What have we learned from those going forward?

For Three Mile Island, which is over 30 years ago, it's really a different nuclear industry that we have since Three Mile Island in terms of training, in terms of operating excellence. Really that -- we've moved so far beyond that accident that that's not really relevant.

The Chernobyl was a mis-operation, an actual conscious mis-operation of the reactor that would never be done in Canada. And so that accident really doesn't add any value in terms of what is the risk of a Canadian reactor going forward.

But the Fukushima is relevant. We learned that events, especially external events, can be beyond what we had previously considered, and that's a real -- that's a real learning. And that's why we put so much emphasis on the Fukushima action plan and building that into our PSAs.

So yes, we've had a number of events in the industry. I think the Fukushima is really the relevant one and we've addressed it.

THE PRESIDENT: I'll jump on this again. From a layman perspective, I hear it now

all the time. People say "Okay, the nuclear business, NPPs, have been around for 50 years, three events, 50 over three, that's a probability." And the industry keeps saying, "No, no. It's not."

But I've never seen a good rebuttal that explains why this is not the right way of calculating probability, or is it? So it would have been nice if somebody can actually come up with some explanation why. And I understand the evolution of the industry and I understand all those things.

But it's not explained with -- some pretty interesting people will come up and say that's the probability. Every, I don't know, 15 years or so you're going to have an accident like that. What do you say to that?

MR. ELLIOTT: Mark Elliott for the record.

You know, I've given you my thinking on it, as much as it is. We could do more thinking on this subject if that was of interest.

THE PRESIDENT: Well, from a layman perspective, it is an interest. Because a

lot of people now are starting to believe in that and, you know? Staff you want to...?

DR. RZENTKOWSKI: Greg Rzentkowski for the record.

As the Commission probably recalls, we had this discussion many times in the past. So using exactly the same argument to the CANDU fleet, we can say the risk is zero, because there was never a significant accident in the CANDU fleet. And we have close to 40 reactors, all with that design, existing.

And as a matter of fact, there was a very prolonged black out in India which lasted more than 48 hours and the reactor survived; survived because the makeup water was provided to the steam generator for 17 hours and there was no progression of accident scenarios to severe accident.

So the design, the CANDU design, has proved in the past that in fact it is very robust. And in addition, we have also operators who understand that the primary responsibility for safety rests with them. We also have the regulatory framework, which is very open and transparent, and relies on very stringent

regulatory requirements which require continuous improvement. That's why CANDU reactors have attained this excellent safety record.

THE PRESIDENT: That may be a very good argument. I've just never seen it, kind of, in written format or in presentation of any sort. Ms. Velshi?

MEMBER VELSHI: And I think having that would be very helpful. It's a great communication tool.

My last question, at least for this round, is the intervenor asks why the benefits of the Fukushima action plan for Pickering B are so much higher than they are for Pickering A when they are fundamentally of the same design. Can you comment on that, please?

MR. ELLIOTT: Mark Elliott for the record.

It's really the different design around the moderator system, the calandria. The -- at Pickering A there is a dump tank. It's one of our safety features that on certain events the moderator -- it's sitting in the calandria -- will actually dump into a tank below.

That doesn't exist on Pickering B,

and so our emergency mitigating equipment, when it's putting water in the moderator at Pickering B the water -- the calandria fills up immediately. When we put water in the -- when we put water in the moderator system of Pickering A, it has to fill up the dump tank first. So it takes longer and so there's less of an effect.

MEMBER VELSHI: Thank you.

THE PRESIDENT: Anybody else? Mr. Tolgyesi?

MEMBER TOLGYESI: Just to answer to Mr. Elliott over OPG comments. On page 20 of Greenpeace, they are saying that -- two, four, fifth bullet:

"OPG has informed the Ontario Energy Board that it plans to push the life of the Pickering B reactors beyond what it informed the Commission in 2013 licensing applications." (As read)

That means, I think that's from where it's coming that it expects to go over.

THE PRESIDENT: In fact, on page 14 there's two -- before we talked about 300,000

and you guys said that's not your lingo. But here it says 230 -- 261,000. Is that your number?

MR. ELLIOTT: Mark Elliot for the record.

The way we do this research, you know, it isn't that we kind of crank out the -- start the research machine and a number comes out the end and gives you the -- kind of the answer. I kind of thought that might be the case when I started this job, but that's not the way it works.

What happens is you do the research around all these areas and you see what the margins are and you say, "Well, it's looking like we can make a strong safety case for this number." And a couple of years ago we said it looks like 247 is supportable.

All the reports were coming in good around the 247, and so we -- we had to provide the public and the Commission, what were we shooting for, what we were aiming for, and then build all the fitness for service reports all around that number. And so we've done that, and we've shown that the 247 is safe.

But by doing that research, again, you learn a lot and it looked like perhaps a

higher number was achievable. And so we have initiated a project in OPG to look at whether 261 is possible. We haven't done the research yet on that, but we think that from what we know, that research could well be successful. It's not done. It could well be successful.

So we have initiated that project and that's why the OEB gets to see it, because they're funding it. But what we're here to talk about today is the 247. It may be just a bit of an analogy to driving a car. When you go for driver training they say, don't drive beyond your headlights. Meaning that you can see far enough in advance of anything that might happen that you can take action.

So that's what OPG is doing. We're not -- 247 means we're not driving beyond our headlights, and that's the way we would always operate our plants. We know that it's safe out to 247 so we can drive from 210 to 247.

THE PRESIDENT: Mr. Tolgyesi?

MEMBER TOLGYESI: Yes. Just going for one point, back to the PSAs. You were saying that PSA is not a complete measure of planned safety of risk. Comparing PSA's values between

two different periods is -- I don't say irrelevant, but very close to. So how -- my question is how you explain to the public that your safety assessment results are improving, or progressing, or responding to several criteria or the forecasts?

MR. ELLIOTT: Mark Elliott for the record.

I'm not -- is there a reference you can bring me back to because I'm just not sure what you're asking.

MEMBER TOLGYESI: Yes. On your document 14-H2.1A, page 13. And you were are that comparing -- you know, you should develop a new PSA for a different period of time. My question is how you could demonstrate to the public in general that, you know, we are improving?

MR. ELLIOTT: Yeah. I'm not sure we talked about a period of time that I -- oh, unless it was that timeline on the slide. Is that what we're talking about? The -- there was one slide with the development.

MEMBER TOLGYESI: No. This is in the text and you were saying that -- you were comparing two different generations of computers

because it's two different periods, okay? So you are saying this one is much more complicated and sophisticated. This one is much worse.

So my question is that if this is in the timeframe -- so if you cannot compare them, how do you demonstrate your improvement, your performance?

MR. ELLIOTT: Now I understand. Thanks for taking me back to that.

Because what's happened is that the standards and methods for doing the PSA have improved and developed. For example, we're putting emphasis on -- now on external events, where previously it was only internal events.

So the numbers will change, and I think you're asking, you know, how do you know if you've kind of changed the yardstick, changed the method, how do you know you're actually improving? And I think there is an improvement in the fact that we are looking at those areas. We are assessing them against safety goals and limits that we never did before. So we're actually focussing more on those external events and taking advantage of those.

I'll give you one example, for the

high wind PSA, that wasn't required previously to S294. We found that we do get warning of high wind in certain circumstances and we can lower the risk by taking some pre-emptive action. So we have built that into our procedures for Pickering right now, that when we get a severe weather alert we can operate certain valves to kind of pre-stage our response and that will lower the risk.

So I think because we've developed to PSA from internal events now to external, we have added -- we had added safety. Now, obviously the Fukushima action plan has added considerable safety, and we've talked about that. So that's another way I can say yes, we're safer than we were before.

MR. PHILLIPS: Bryce Phillips for the record.

Just to add to that, it's -- what I want you to take away from PSA, what we do with that, is it's the actions we take in the power plant to make it more safe, to add margin, right? That's the value of a PSA, and you know, being an old nuclear safety analyst guy, I can understand that translation because it's -- just having a number on paper doesn't make the public any safer.

It's the actions we take when we're informed by those PSA numbers.

The example Mark used is one. We've changed our operating procedures in the range that we're -- that we know hydrogen uptake is at its greatest, shutdown and start up. So it's how we use PSA is what really counts when it comes to public safety and nuclear safety. And it's the actions you take in the power plant are what count and that's what we do with the PSA.

MEMBER TOLGYESI: And my last one is at Green peace, page 15, where they're saying that -- one, two, three, fourth paragraph, that:

"Ontario's detailed offsite nuclear emergency plans were only designed to cope with 'design-basis' accidents or accidents with the estimated occurrence of...[so much] Such accidents are characterized by small radiation releases."

So how you -- how you integrate your emergency plans with Ontario when there is not necessarily a small deigns based accident, but

something which is larger.

MR. COLES: Jim Coles for the record.

The design base scenarios are not the only scenarios that are captured under the provincial nuclear emergency plan. And so I would ask that Dave Nodwell from the Office of Fire Marshall and Emergency Management, he's online and able to add additional comment.

MR. NODWELL: Dave Nodwell, office of the Fire Marshall and Emergency Management for the record.

I'll first check that you can hear me?

THE PRESIDENT: Yes, we can. Go ahead, please.

MR. NODWELL: Thank you. The provincial nuclear emergency response plan actually goes well beyond a design based events. It -- the basic offsite effect that is contemplated in the PNERP is actually based on a dose of up to 250 millisieverts at the station boundary. So that significantly exceeds a design base event.

We are conducting work on the

planning basis and we -- of the PNERP and we expect to have that done fairly soon. But the preliminary information that we have would indicate that that 250 millisieverts is not too far off the mark. So in that sense, this goes well beyond a design based event. Again, contemplating 250 millisieverts at the site boundary.

THE PRESIDENT: Okay. Thank you. Any other questions? Me. Harvey?

MEMBER HARVEY: Just a clarification. You used the outages time to reduce the PSA. Has that been done for other stations, Darlington, Point Lepreau, or is it something that could be done for other stations? If you want to compare you've got to have a -- to standardize the studies. So could you comment?

MR. ELLIOTT: Mark Elliott for the record.

I will ask Dr. Lorencez to answer that question. And we also got experts in the room that have done all the PSAs for the OPG plants.

DR. LORENCEZ: Carlos Lorencez for the record.

I only have access to OPG data, but I have a contractor here with us, Mr. Paul Lawrence, who will answer your question.

MR. LAWRENCE: For the record, I am Paul Lawrence, I am a Technical Director from Kinectrics, I have been a Technical Director at Kinectrics since the 28th of February. Before that, I was the Manager of the PRA Department at OPG.

I was responsible for preparing the S-294 PRAs for Darlington, Pickering A and Pickering B. I was responsible for updating the Pickering PRAs to include the items from the Fukushima action plan.

I authored the two summary reports, the Pickering A summary report and the FAP report that was put on OPG's website.

And I am responsible for the 1.03 number.

The current OPG PRAs, with the exception of Pickering A, do not take any credit for the fact that the units do not operate at 100 per cent full power all of the time.

The reason for that is that in the past we had never aggregated the numbers to

calculate a station-based number or an aggregated number. And because the estimated risks were below the limit, or in some cases below the target, we did not take credit for this time averaging.

This could be done for other stations. It will have less impact for Pickering B and Darlington because they are more reliable stations and, therefore, the reduction factors for Darlington and Pickering B will be smaller.

Should it be done? Absolutely, because what we are doing is we are double counting. If you assume in the at-power PRA that the reactor is at full power for 100 per cent of the time and then in the outage PRA you assume that the unit is in outage for 20 per cent of the time, you are actually getting a risk number based upon 120 per cent of the calendar year, which is an overestimate.

So we felt it was correct to take that. And that it was correct to reduce the risk by the amount of time that the unit is not in the guaranteed shutdown state. And using that is consistent with methodology for outage PRAs prepared by the International Atomic Energy

Authority.

MEMBER HARVEY: You support that?

DR. RZENTKOWSKI: Yes, absolutely, we support this statement.

And regarding other utilities, I would like to say that this is a part of the methodology which is normally proposed to the CNSC staff, reviewed and accepted, if of course it is adequate. And going forward, we will present similar results of PSA in support of the Bruce re-licensing, so stay tuned.

THE PRESIDENT: Okay, thank you.

Member McDill.

MEMBER McDILL: One last question while we are on this intervention, assuming it is the last one.

Greenpeace raises the question, and I think it has partially been answered, but I think it is good to have a complete statement on the record.

On page 18 they state, "This is a significant violation of the safety limits," and it raises the following questions followed by three bullets. So I would like both staff and OPG to respond to those on the record, if they could

please. I think part of it has been answered, but...

And similarly on page 19 of this statement, "OPG and CNSC staff should clarify, on the record, when they were aware and what, if any obligations they have to report such information to the public and the Commission."

So those two areas just so it is clear on the record. Thank you.

DR. RZENTKOWSKI: Let me get started. Greg Rzentkowski, for the record.

As we discussed here today, the risk in-site from PSA are used on a per-event basis and really are used to risk-inform our decisions with regard, for example, to anticipated safety improvements or with regard to certain improvements to operation of new facilities.

Aggregated number is not a safety limit, never was. I do recognize the fact that in our regulatory document, stating the requirements for new power plants, we say that all event frequencies should be aggregated. But this document has been written about 10 years ago and then aggregation referred to the internal events only because there was no methodology for external

events.

And internal events, as a matter of fact, are aggregated by OPG and have been also aggregated by CNSC staff. And there was no concern in meeting the safety limits established.

So I don't see the violation, in short.

MEMBER McDILL: So your response to, "This is a significant violation of safety limits," is..?

DR. RZENTKOWSKI: There is no violation of safety limits.

MEMBER McDILL: And OPG please?

MR. ELLIOTT: Mark Elliott, for the record.

So the Pickering A PSA was produced, you know, at the end of February, so that would be the earliest possible time. Since it was not required by S-294 to sum those, the first time we saw that really was in the CNSC CMD that came out and summed those. So that gives you the timeframe for the first one.

I think CNSC can answer the second bullet.

We do keep our board of directors

informed. For example, they were aware that we were doing these PSAs and that the risks would be developed and might take action, like action plans that we have talked about, that that was quite a possibility, that we would have to take action to lower the risk. And so they have known that right along, and we will keep them informed going forward.

Thank you.

MR. PHILLIPS: Bryce Phillips, for the record.

We are not in violation of any safety limits. That context is important.

MEMBER McDILL: So you do not agree with point 10, the conclusion?

MR. PHILLIPS: Bryce Phillips, for the record.

Correct, I do not agree with that conclusion in the Greenpeace submission.

MEMBER McDILL: Thank you.

THE PRESIDENT: Okay, I would like to move.

MEMBER VELSHI: I do have a comment and a question, please.

Mr. Phillips, you mentioned, and I

was very happy to hear, how PSAs are used in the industry to come with actions plans to improve the safety of the plant.

And you made reference to something that was submitted to staff last week on details of your action plan, specifically when you were talking about fire protection.

Can you tell me what CMD that is? I was just looking for it and I couldn't find that, because I would like to have another look at it at a later time.

MR. PHILLIPS: Bryce Phillips, for the record.

Commissioner Velshi, when I was talking to the fire and our improvement plans on that, that is around our business plan improvements that we routinely undertake to improve performance and improve our safety at Pickering and all of OPG.

It is not part of a CMD submission around that, it is around how we do continuous improvement at a power plant.

MEMBER VELSHI: Thank you.

I think it would be very helpful, because coming across in these CMDs is that the

only way that the numbers are improving is with sharpening the pencil and, you know, whether it is outages or now it will be SAMGs and so on, improvements that have already happened, like Fukushima action plan.

But if you are doing incremental additional stuff with this insight, then I think it would be great to document that and for us to review that on a regular basis to see really what specific safety improvements are coming out of these PSAs.

Staff, do you want to comment on that?

DR. RZENTKOWSKI: Greg Rzentkowski, for the record.

I only wanted to comment on the way how the Fukushima action plan is reflected in the results. Only those improvements which are already implemented are credited in the PSA. That is the reason why we see also gradual improvements of the numbers. And this will continue for approximately another two years.

MEMBER VELSHI: Right. But the point I am getting at here is that they have just completed and updated PSA, and I would expect

there to be additional opportunities that have been identified coming out of that.

DR. RZENTKOWSKI: Absolutely, We understand. Thank you.

THE PRESIDENT: Just to reiterate I think what Ms Velshi is saying here. Mr. Phillips said that the PSA is just numbers, it is what you actually do matters. It is documenting what you actually do as a result of a PSA would be very very useful.

You know, in a very clinical way, here we are done PSA, we found we can do some improvements, here is what we have done, or the reverse, we have done some mitigation of Fukushima, here is the impact on the PSA.

Those are the kinds of things that will be really useful for us to understand the process.

DR. RZENTKOWSKI: Greg Rzentkowski, for the record.

As a matter of fact, in preparing for today's discussion I prepared a table for myself which outlines all the Fukushima-related improvements, Fukushima only, in relation to the layers of defence in depth.

And this includes design upgrades, guides and procedures, and safety assessments.

So if the Commission Members are interested, I will be more than glad to share this afterwards.

THE PRESIDENT: It is not only the Commission Members, it is on the record for the public, for anybody who is interested in this, it would be useful.

MR. PHILLIPS: Bryce Phillips, for the record.

We have identified the steps we are taking in that action plan, and it was in a letter to the CNSC staff. We will continue to update them as we progress through these revisions and changes that we make.

MEMBER VELSHI: And we should make that public.

There was something else that the intervener identified that we haven't touched on, and this is on page 16 where, if you look at request for ruling, this is on off-site emergency plans.

And I wasn't quite sure what the intervener was getting at here. But this

particular request is, "Greenpeace makes the following request, that the Commission direct OPG to model a generic large release, as it has for Darlington at the Pickering nuclear station and publish the public's radiation exposure compared to provincial action levels."

Can I get perhaps OPG to comment first and then staff on that request please?

MS SWAMI: Laurie Swami, for the record.

The request to do the additional work at Darlington was coming out of the environmental assessment hearing for continued operation of that facility post-refurbishment. That work was undertaken essentially as a stress test to the emergency plan.

That work has not yet been completed, obviously that will be a discussion point coming forward to the Commission later this year. As far as that goes, it was a generic release that was assessed.

We did a look at, at least from our perspective, a look at what that impact would have on the emergency plan, and that will be factored in going forward.

I think the value of that has been completed now and don't see a need to continue to do that work for Pickering.

THE PRESIDENT: Mr. Jammal?

MR. JAMMAL: Ramzi Jammal, for the record.

I don't have anything to add to what OPG has presented, but I would like to close the loop on Ms Velshi's request with respect to the updates on the direction, either a physical update that will enhance PSA values or the implementation of emergency mitigation equipment.

The annual report of the CNSC staff has a Fukushima section. And I will commit to you for the public transparency, as Chief Regulatory Operations Officer that we will take into consideration the request that you have provided, the Commission, in order to present in that annual report as part of the Fukushima action plan, the enhancement that will contribute to the enhanced safety of the plant.

So I just want to close the loop, that we will make it transparent and that we will, as part of the annual report review, that the public has an opportunity to see such elements and

provide comments according to the rule of procedures.

So I want to close that loop that we will be presenting to the Commission, on an annual basis, the progress with respect to Fukushima action plan and the integration of the process towards PSA or enhancement of safety.

MEMBER VELSHI: Thank you very much.

Any other staff comments on this particular request? So OPG is saying they don't see any additional value for doing it for Pickering.

Staff agree?

DR. RZENTKOWSKI: I would like Dr. Patsy Thompson to respond to this question.

DR. THOMPSON: Patsy Thompson, for the record.

I am the Director General of the Directorate of Environmental Assessment and Radiation Protection and Assessment.

And in response to the request, what I would like to propose is that we are due to come in front of the Commission on June 19 I believe to present the results of the work that

has been done for Darlington. So perhaps seeing the value, the results of that work may provide better context to determine whether this request would be useful for Pickering.

MEMBER VELSHI: Would it be appropriate to make it a specific request to you, that when you come in June you provide a recommendation on what should happen for Pickering?

DR. THOMPSON: Patsy Thompson, for the record.

We can certainly do that.

MEMBER VELSHI: Thank you.

THE PRESIDENT: Okay, thank you.

I would like to move on to the next submission from Mr. Tim Seitz as outlined in CMD 14-H2.4

CMD 14-H2.4

Written submission from Tim Seitz

THE PRESIDENT: Comments?

Okay. I would like to move to the next submission from Durham Nuclear Awareness as outlined CMD 14-H2.25 and 2.25A.

CMD 14-H2.25/14-H2.25A

Written submission from Durham Nuclear Awareness

THE PRESIDENT: Ms Velshi?

MEMBER VELSHI: It is not a question. I guess now we know where that 300,000 hours may have come from, or at least there is some allegation that it has come from someone else from OPG that the pressure tubes could probably run to 300,000 hours.

Sorry, this is on H2.25A, the third paragraph down. Recent statement of Pickering Newspaper or it sounds like this may have actually been in the newspaper.

So OPG want to comment on that?

THE PRESIDENT: They are quoting Mr. Robin Manley, "...stated that the pressure tubes could probably run to 300,000.."

MR. PHILLIPS: We call on Robin Manley.

--- Laughter / Rires

MR. MANLEY: Robin Manley, for the record.

The context of the discussion was

around the fact that OPG was performing and it was planning to perform additional research work so that, hypothetically, the pressure tubes might be found to be able to run a lot longer than 247,000. It had nothing to do about whether or not OPG would actually run a reactor that far.

THE PRESIDENT: Okay. Any other observations, questions?

Let me ask one then. There is no page number, but on 2.25 there "DNA Demands Denial of Licence". Number 5, "lack of adequate emergency planning".

I would like again, one more time, I have now taken a look at your brochure. I don't know what kind of reaction you got from those who actually have seen it. It is creative, there is something useful, like a light in it.

So what was the reaction and are you planning to update this, how often, improve it..? What is the plan?

MR. PHILLIPS: Before I turn it over to Kevin Powers to give you more details, the information that I have received back as a Senior Vice-President has been quite positive over that development.

A lot of people in the community that were involved with the focus groups, you know, they had input and they liked the product.

Anything to add to that, Kevin?

MR. POWERS: Kevin Powers, for the record.

The purpose of the product was to gain attention and to drive awareness around nuclear emergency preparedness that had not happened with previous brochures that had been sent out.

This brochure started going out in the mail on Monday. We have had requests from numerous people in the community for more of them because they liked them and wanted them for their children. We have had requests from media outlets to talk further about it.

And so I would say, as a preliminary assessment, that reaction has been positive.

THE PRESIDENT: Ms Velshi?

MEMBER VELSHI: Well, given that you have brought this up now, I had a question. You have heard from staff saying, pre-distribution of KI pills is a recommendation that they are

making that that happen, that each household has that.

And my very quick look through the book this morning was you are saying go to your local pharmacist to get those KI pills. So are those consistent if one were to accept the staff's recommendation?

MR. PHILLIPS: Bryce Phillips, for the record.

We understand the significance and importance that both the CNSC and the public would place on KI pills and their distribution. And if the decision that they will be distributed, we will support that.

MEMBER VELSHI: Which would mean the booklet needs to be revised.

MR. PHILLIPS: Correct.

THE PRESIDENT: Staff, you want to reiterate again where the regulatory document is going one more time?

DR. RZENTKOWSKI: I would like Mr. Luc Sigouin, the Director of Emergency Management Division to respond.

MR. SIGOUIN: Luc Sigouin, Director of Emergency Management Programs at the

CNSC.

The issue of KI distribution is addressed in two documents within the broader CNSC regulatory framework. First in the CSA Standard N1600, which will be promulgated or made public, released early in the summer. There will be a specific clause in there that recommends that KI is available, on hand, in residences before.

In addition, within the CNSC's specific regulatory framework, REGDOC-2.10.1 as has been mentioned earlier in the presentation, is in the final stages of public consultation and the comments have been dispositioned.

The issue of KI, which was brought up later in the document development stage, there has been outreach done to stakeholders in regards to that, and we are addressing some of their comments about the specific language.

That document, the REGDOC will be finalized and is planned to come to the Commission in August and submitted to you for your consideration for approval.

THE PRESIDENT: Mr. Nodwell, are you plugged into this process? Are you aware and in agreement with what is going on?

MR. NODWELL: Dave Nodwell, Office of the Fire Marshal & Emergency Management, for the record.

We have had discussions with the CNSC regarding the changes to REGDOC-2.10.1. There was a letter that was sent to the CNSC dated April 30th, 2014 with our comments and recommendations related to the proposed wording.

So our position has been communicated to the CNSC and you have our recommendations.

THE PRESIDENT: So if I understand correctly, who does what will become known as the law of the land by, if the Commission approved the regulatory document, in August; is that what you are saying?

MR. SIGOUIN: Luc Sigouin, for the record. Yes, that's correct.

THE PRESIDENT: Anybody else? Monsieur Harvey?

MEMBER HARVEY: Page 4 of the submission, the second paragraph:

"The City of Toronto
Emergency Plan includes no
instructions on what to do in

a nuclear emergency." (As read)

Is that a fact, and is it normal, taking into account the proximity of the plant?

Staff...?

MR. RZENTKOWSKI: Greg Rzentkowski, for the record. Again, I would like Mr. Luc Sigouin to respond to this question.

MR. SIGOUIN: Thank you. Luc Sigouin, for the record. That statement is not quite right.

Toronto City does have aspects of nuclear emergency planning prepared, they are designated as reception centres for certain areas. They are now making KI pills available to those residents who want to pick them up beforehand.

And I could maybe ask Mr. Dave Nodwell, from OFMEM, to comment to provide some additional context to Toronto's emergency planning.

MR. NODWELL: Dave Nodwell, for the record. Luc is correct, Toronto does have a nuclear emergency plan. It has been recently updated and reviewed. It does conform with the Provincial Nuclear Emergency Response Plan based

on our review of that.

The plan outlines the City of Toronto's role, both with respect to providing reception centres, their involvement in the overall organizational response and managing the response within the Toronto area of the Pickering primary zone.

I'll point out that this is a very small area of Toronto that's focusing within the 10-kilometre primary zone, so basically eastern Scarborough is the section that that is dealing with.

MEMBER HARVEY: Thank you.

THE PRESIDENT: Okay, thank you.

Dr. McDill...?

MEMBER McDILL: Thank you. This is the first intervention in which the comments of Hydro-Québec and Point Lepreau are brought up with respect to the design life of 210,000 hours, so I guess it is the appropriate time to ask the question on behalf of several interveners who have posed it.

The Chairman of Hydro-Québec made some statements concerning 210,000 hours and also New Brunswick, Lepreau, in a meeting in 2013

talking about 210,000 hours, and a number of interveners I think have raised a fair question: Why is it that OPG can go further?

MR. ELLIOTT: Mark Elliott, for the record. I guess I'll first start off by saying that the research that was done was done with a small number of parties contributing to the funding and neither of those two companies contributed to the funding and they were not involved in the research, so the results are not available to them.

So we have done the research, I think we've talked about it before. There was 18 research reports that were done in preparation -- during the fuel channel life management project. These 18 reports were -- the scope of those research reports was agreed with the CNSC that those were the right reports and that the closure criteria; in other words, the success criteria on each of those 18 was agreed with the CNSC.

And then we went and did the research and at 247 it came out positive on all the 18 reports.

So we have that information, we've done the work and that is why we know.

MEMBER McDILL: Thank you, Mr. Chair. I will leave it there, but I will come back to it in a later intervention.

THE PRESIDENT: I saw Mr. Jammal, you wanted to add something on this?

MR. JAMMAL: Ramzi Jammal, for the record. The interveners make reference to the President and P.dg d'Hydro-Québec regarding his comments of 210,000 hours. I will leave the technical discussions to our staff and what OPG has presented with respect to the research requirement.

Hydro-Québec made a decision, it's a business decision and the CEO of that licensee at the time, and still is, decided to use 210,000 hours as a hypothetical limit because in their Hold Point they were required to conduct testing to do two things: continue operation as is, or conduct refurbishment.

So the business, political decision to make: What business operational decision? It was a hypothetical 210,000 hours that happens to be a convenient number because the safety report had to be updated, and so the continuation of the operation at the time for

Hydro-Québec had to be maintained.

I know it is out of scope of this discussion, but the reference to 210,000 all the time was more driven by a business decision, just like any other licensee, let it be OPG or not. They decide to refurbish based on economical factors; our job is to make sure that whatever they want to plan to do -- operate, decommission, whatever they plan to do -- is done safely.

THE PRESIDENT: Okay, thank you. I think we would like to move on. I would like to move on to the next submission from Ms Kathleen Chung as outlined in CMD 14-H2.5.

CMD 14-H2.5

Written submission from Kathleen Chung

THE PRESIDENT: Any questions?

No? I think the potassium iodine question was answered. And I guess many people who wanted to see this brochure and would not have had the time to actually analyze it.

I am not sure that you answered my question, were you going to actively seek some feedback on this. And you obviously already

stated that if the KI regulatory document will force you to change this, how are you going to change this?

MR. PHILLIPS: Bryce Phillips, for the record. Before I ask Kevin Powers to provide some of the details, the feedback we did was through multiple focus groups in its development and I will let Kevin talk about future plans around getting feedback on it.

MR. POWERS: Kevin Powers, for the record. As Bryce mentioned, the product itself was developed through multiple focus groups in Clarington and Pickering, as well as parts of Toronto which has brought us the final product.

As I mentioned in my earlier comments, the material has just started landing on doorsteps. We have multiple lines of evidence, I guess, to ascertain whether or not the product has been effective.

We continually get input through our information centres. We are constantly out in the community. We have comments to our website, to our hotline, and so we will be using all of those to assess the effectiveness of the product and we will be working with our partners over the

course of the coming months to determine its effectiveness and how and when it might change.

THE PRESIDENT: Thank you. The next submission is from Ms Josefine Singh as outlined in CMD 14-H2.6.

CMD 14-H2.6

Written submission from Josefine Singh

THE PRESIDENT: Question? No?
I think now is a good time to break for lunch. We will reconvene at...?

MR. LEBLANC: 1:45.

THE PRESIDENT: One forty-five.
Thank you.

--- Upon recessing at 1:00 p.m. /

Suspension à 13 h 00

--- Upon resuming at 1:47 p.m. /

Reprise à 13 h 47

THE PRESIDENT: Okay, we are ready to proceed and the next submission is from the Canadian Coalition for Nuclear Responsibility as outlined in CMD 14-H2.53 and 2.53A.

CMD 14-H2.53/14-H2.53A

**Written submission from the
Canadian Coalition for Nuclear Responsibility**

Questions? Monsieur Harvey...?

MEMBER HARVEY: Merci, Monsieur le
Président.

Just at the first page it is
talking about leak before break, I would like just
to ask the question what is the importance? Is
this a master piece of the whole picture, this
confidence leak before breaks?

I would like the comments of the
staff and OPG.

MR. RZENTKOWSKI: Greg
Rzentkowski, for the record.

I just wanted to clarify the
question. Would you like us to comment on the
concept of leak before break?

MEMBER HARVEY: No. No, just the
importance. We discussed a lot about that, but --

MR. RZENTKOWSKI: Okay, I
understand.

So the leak before break can be

monitored from the main control room and it is important because this is an indication of the crack initiation in the pressure tube. So that means the crack can be detected before pressure tube ruptures. It's very important.

MR. PHILLIPS: Bryce Phillips, for the record.

Leak before break is just one of the many barriers that we have to ensure nuclear safety and protection of the public environment. As I walk through my presentation there are many, many barriers that we have in place, different management systems, training, testing to ensure that the public is safe.

One of the things we do around the integrity of the heat transport system, and pressure tubes being part of that, is leak before break. So it's significance is around that aspect, but it's not the whole story on whether the public is protected.

If there is any detailed questions on leak before break, I could ask Paul Spekkens to answer that.

MEMBER HARVEY: No, no. Okay, I'm satisfied by your comments.

THE PRESIDENT: Can I piggyback?
I always like to ask the doomsday scenario, so what happened with break before leak? So you do have a rupture -- and I'm not going to get into probability if it would happen or not, all I want to know is big rupture, so what is the worst-case scenario? What happens?

MR. ELLIOTT: Mark Elliott, for the record.

Pressure tube rupture is a design basis event in our Pickering Deterministic Safety Analysis and the systems we have in place, the design systems, shutdown systems, emergency coolant injection containment would all respond and keep the plant safe.

THE PRESIDENT: These are automatic or require human intervention?

MR. ELLIOTT: Automatic.

THE PRESIDENT: Thank you.

Monsieur Harvey...? No?

Dr. McDill...?

MEMBER. McDILL: Just a follow-up to that one, and again it's the supplemental.

The Intervener suggests it would be irresponsible for Commissioners to accept

verbal assurances from nuclear proponents that a break before leak cannot happen again, referring back to 1983 and the pressure tube rupture.

Maybe could you list the top five best reasons why that wouldn't happen again? I'm sure there may be more than five, or maybe they are fewer, but we will take top five.

MR. ELLIOTT: Mark Elliott for the record and I will ask Dr. Paul Spekkens to contribute.

I will throw one of the top five in, which is that it's a different pressure tube material. We use a different material than was in use in 1983.

I will ask Dr. Spekkens to elaborate.

DR. SPEKKENS: For the record, my name is Paul Spekkens, I am Vice President of Science and Technology Development for Ontario Power Generation.

I don't know if I can come up with the top five, but let me give you the top few that I think are significant.

The first one is, as Mr. Elliott just mentioned, the pressure tubes that we use

today are a different material than the pressure tube that suffer a rupture in Pickering Unit 2. The significance of that is that the hydrogen uptake rate of the zirc 2-1/2 niobium, which is the modern material, is quite a bit lower than the hydrogen uptake rate of the zirc 2 material that was in Pickering 2 in the early '80s.

The second most significant thing is the recognition of the fact that the devices that are intended to keep the pressure tubes from touching the calandria tubes, the garter springs, when the plant was first designed, Pickering A was first designed, it wasn't recognized that these garter springs would move and it is movement of those garter springs that led to the contact, which led to the formation of blisters and ultimately produced the rupture.

As a result of that event the mobility of garter springs was recognized and we now have extensive programs of locating and repositioning garter springs when there is any evidence of them having moved. So that precludes contact between pressure tube and calandria tube, precludes blisters from forming and should preclude a rupture similar to the 1983 rupture

from happening again.

The last comment I would make is that the inspection programs that we carry out currently at every planned maintenance outage is vastly more extensive than it was in the early '80s. So from an overall point of view we just know so much more about our pressure tubes today than we did in the early '80s and it's all that we know about our pressure tubes in the field that convinces us that these tubes are fit for service and will continue to be fit for service into the future.

MEMBER McDILL: Thank you.

Does staff have anything to add to that?

MR. RZENTKOWSKI: Greg Rzentkowski, for the record.

There are many reasons, already explained, why the pressure tube cannot rupture or why it is very unlikely that it would rupture.

To the response, I would like to add only one more point.

As a matter of fact, we had two incidents of pressure tube ruptures in Canada. They all happened in the '80s, one at Bruce site

and one at Pickering site, and in both instances those breaks were very promptly detected by the main control staff, who manually shut down the reactor and placed it in the safe shutdown state.

So the activation of the safety system was not even required; so an automatic system didn't have to actuate because it is such a simple event that it can be brought to a safe shutdown state using process systems only.

MEMBER McDILL: Thank you, Mr. Chair.

THE PRESIDENT: So can I jump on this one?

Normally in a shutdown and doing the sampling, how often do you have to actually replace a pressure tube, or do you replace a pressure tube?

MR. ELLIOTT: Mark Elliot for the record.

Yes, the sampling inspection program actually includes replacing pressure tubes and taking them out from time to time and I will ask Dr. Spekkens to explain.

DR. SPEKKENS: For the record, Paul Spekkens.

Yes, the CSA Standard sets out the frequency on which plants have to remove a pressure tube purely for surveillance purposes. Basically every four years a plant takes a pressure tube and does an extensive examination on it to look for things like material property changes, the sorts of things that would be significant in understanding the behaviour of the pressure tube. So that's a requirement of the standard and we all follow it.

THE PRESIDENT: So do you find in some of those samplings that some of them actually require replacement?

DR. SPEKKENS: For the record, Paul Spekkens.

No, no. We have not -- in OPG we have never had to replace a pressure tube as a result of finding a flaw or a discovery item. Obviously the pressure tube that ruptured in Pickering Unit 2 in 1983, it was replaced, but beyond that we have not been forced to replace a pressure tube.

What I am talking about is the surveillance, the requirement in the standard to take out a perfectly good pressure tube just to

look at it.

THE PRESIDENT: Thank you.

Ms Velshi...?

MEMBER VELSHI: Thank you.

I will ask staff first and then perhaps follow up with OPG.

So the intervener in his second paragraph talks about requiring OPG to install a filtered vent system. I know one of the hold points that we had was for OPG to report on its analysis around the filtered containment and I know OPG has given us an update on their enhancements that they have planned, but can you comment about installing a new or an upgraded filtered system and why would that be needed or beneficial?

Staff...?

MR. RZENTKOWSKI: Greg

Rzentkowski, for the record.

Before I respond to this question I would like to emphasize that there is no regulatory requirements for the installation of filter venting system for the beyond design basis accident.

The reactor design, including

special safety systems, has to meet the regulatory performance objectives. These objectives are applied in -- are reflected in the release limits established for the design basis accidents, and also safety goals established for the beyond design basis accidents. Core damage frequency is a defence in depth measure that prevents over reliance on the containment, as a matter of fact, and emergency mitigating equipment which has been installed as a result of the Fukushima Action Plan, fulfils this objective by preventing an accident to develop into a severe accident.

Large release frequency safety goal establishes the performance objectives for the containment in terms of the frequency of an accident and in terms of the size of the release. In the event of Pickering, to protect containment, OPG proposed to enhance the power supplies for the filtered air discharge system which is already in place and the limiting design scenario considered for this filtered air discharge system was large LOCA and loss of emergency coolant injection.

In the Canadian regulatory framework this is considered to be the design basis accident, but in fact this is the beyond

design basis accident based on the probabilities.

So this filter has been designed already for extremely challenging conditions, and now, by providing additional power supply and ensuring that the filter can function in the harsh environment caused by severe accident, I think we can conclude that the filtered venting of the containment, which is required under severe accidents, would be provided.

So there is no need to install a separate filtered venting system given the current design of the containment in Pickering.

MEMBER VELSHI: OPG, can you comment, then, on the hold point, which was a new reporting back on the analysis that you did. So was it like a cost-benefit analysis that you did or did you look at here is what we have, here are the enhancements we are planning and they should be sufficient?

MR. ELLIOTT: Mark Elliott, for the record.

It was an assessment that we did to look at the accident scenarios and the various ways to mitigate those.

Let me say first of all that

filtration is very important for design basis and beyond basis, that we want to have a filtered vent because obviously in a nuclear reactor there is continually heat being produced, you have to have that heat be removed. Eventually the only way, you are going to have to vent and a filtered vent is the right answer.

So what we did is a comparison of the various ways to filter and this option of repowering the fans and the motorized valves and also to kind of less the demand by improving volt cooling and to reduce the energy. So reduce the demand, beef up the system was the best choice and we presented that to our senior management last year and it was accepted. So that's documented in an assessment.

MEMBER VELSHI: So what do you think this intervener is getting at then about installing a filtered vent system, other than what you have done?

--- Pause

MR. ELLIOTT: Mark Elliott, for the record.

The only think I can think of is that this is an alternate approach that we are

taking. Another approach would have been to put in a separate containment filter vent. There is nothing wrong with doing that, it's a good defence. We found this alternate way and the intervener may not know all the details of that alternate way.

MEMBER VELSHI: Thank you,

MR. RZENTKOWSKI: If I may, may I add?

THE PRESIDENT: Go ahead.

MR. RZENTKOWSKI: Greg Rzentkowski, for the record.

I would like to add to my previous response because the solution proposed by OPG has been already accepted by our staff under the Fukushima Action Plan. It has been accepted because we look at the performance of the containment in the more holistic manner. So this means reducing the challenges to the containment is the first layer of defence and this has been achieved by emergency mitigating equipment.

Second, it's also to increase retention of the molten fuel in the calandria vessel. This has been also achieved by emergency mitigation equipment. This reduces the stress on

the containment environment of course.

The third one is to increase retention of radioactive material in the containment so that it doesn't have to be released. This has been achieved by installing additional power supply for air coolers in the containment.

So the last line of defence is the filtered venting and this filtered venting is in place. It can be slightly undersized for the condition expected, but it truly doesn't matter that much if you look at this from the performance perspective.

THE PRESIDENT: Anybody else?

I have one question. Again, this intervener puts lots of importance to the CEO of Hydro Quebec, Monsieur Vandal, and claimed that he considered it to be a hard deadline, the 210,000.

So what I would like to know is, did Hydro-Québec Gentilly-2 consider the 210,000 to be hard line from us? Did the CNSC ever imply to them that this is a hard deadline?

MR. RZENTKOWSKI: What we have done is, we included it as a hold point in the operating licence for the Hydro-Québec station and

there were two conditions attached to: either refurbish or stop operation.

But the technical reason underlying our decision was different, because the degradation mechanism which affected pressure tubes at Gentilly-2 was different than the one at Pickering. It was predominantly elongation of the fuel channels and there is very little one can do with this problem because the pressure tubes simply have to be replaced, and a relatively large population of the pressure tubes were already elongated to the point that they needed to be replaced.

THE PRESIDENT: Just so I understand, does that mean that if they came to the CNSC and wanted a 5-year extension you automatically would say no? Is that what the hard line deadline means?

MR. RZENTKOWSKI: That's correct. Because those tubes which were already significantly elongated, falling off the supporting bearing pads, would have to be replaced to continue operation.

THE PRESIDENT: So why can't you then -- again, the implication is that 210,000

should apply everywhere. That's the implication.

MR. RZENTKOWSKI: Actually, the problem has manifested itself much sooner at G-2 and some of the pressure tubes had been already replaced there because of the elongation, not because of the fracture toughness, which is the problem at Pickering.

This is coming back to the fact that 210,000 hours of effective full-power operation was only an assumption at the design stage because the designers didn't truly understand what would be the main degradation mechanics affecting the performance of the pressure tubes. And it's different. It's different depending on the reactor design, depending on the operational condition over the lifespan of the facility. And we see that. We see it.

THE PRESIDENT: Mr. Jammal...?

MR. JAMMAL: Ramzi Jammal for the record.

To just add to what Greg Rzentkowski mentioned, I did not want to leave with the impression of all the pressure tubes at Hydro-Québec required changes. The number -- as a

matter of fact there were 17 pressure tubes that were required to be changed.

As I said, the CEO and le P.dg d'Hydro-Québec decided for economic reasons and political reasons not to operate that facility.

So they had the hold point to determine two things. First of all, change the pressure tubes, because they were operating safely -- operating safely -- because those pressure tubes were isolated and were operating safely.

Again, I am out of scope of this discussion here, but the safety was never compromised. And Hydro-Québec, the changes of a pressure tube is not a cheap task that any licensee will take, so they have to spend millions in order to make the changes to the pressure tubes, so Hydro-Québec again was in an economical decision, but a number was thrown out to represent to 110,000 hours.

THE PRESIDENT: Okay. Thank you.

I would like to move on to the next submission from Ms Monica Whalley, as outlined in CMD 14-H2.7

CMD 14-H2.7

Written submission from Monica Whalley

Monsieur Harvey...?

MEMBER HARVEY: One quick question.

A point that hasn't been touched yet is underground leaks. Is there any problems with -- that's on page 2. Bottom of page 2.

Do you have any concern with underground leaks?

MR. ELLIOTT: Mark Elliott, for the record.

We have a buried piping program as one of our engineering programs at our plants. That program looks at the risks of any underground piping potentially being damaged or degraded. We actually dig up sections are most at risk and have a look at them, and so that program is ongoing at Pickering and we are monitoring that and taking action, replacing piping where needed. So we are keeping that buried piping in proper condition.

MEMBER HARVEY: Okay.

MR. RZENTKOWSKI: Greg Rzentkowski, for the record.

It is also important to point out that the CANDU reactors are designed in a way that there is only conventional piping underground, so there is no radioactive material.

THE PRESIDENT: Okay. There's a lot of stuff in here that does not pertain to our scope here and it is an American.

Anything else?

THE PRESIDENT: So I would like to move on to the next submission, which is from Ms Fanny Guilmet, as outlined in CMD 14-H2.8

CMD 14-H2.8

Written submissions from Fanny Guilmet

THE PRESIDENT: Dr. McDill...?

MEMBER McDILL: On page 8 the intervener has a PSA table which is considerably different from -- somewhat different from the table presented by OPG? Perhaps OPG would comment on where. I could put the tables side by side, but I think it's better on the record if it's said. And then staff can comment also.

MR. YALAOUI: Yeah. Smain Yolaoui for the record. The table which was provided by

the intervener is just double counting. Like, if we -- in -- we consider that the reactor is operating at full power, so what the intervener has done, he took the same numbers and put the -- and put the numbers for the shutdown. This means that over the year you have the reactor 100 percent operating and 100 percent at the shutdown state, which doesn't make sense. So we say -- when we say it's -- it's bounded by the at power, we think that 100 percent of the time the reactor is operating and this is the number. So if -- if you're putting the same number for the shutdown means that you are just -- this -- this happens in two years, not in a year.

MEMBER McDILL: So the major difference then is in the internal fire, for example, being counted twice?

MR. YALAOUI: Yeah. Yeah.
Because the -- as the fire is the major one.

MEMBER McDILL: OPG, you concur?

MR. ELLIOTT: That's what it looks like. You see -- you see fire is counted twice for at power and outage and that's clearly not correct. You should look at the percentage of time that the unit is operating, as we have done,

and -- and address that, and then the percentage of time the unit is not operating and in that mode we have -- we have so much more time that we're able to reduce the risk considerably. So, simply adding the two is not correct.

MEMBER McDILL: Thank you, Mr. Chair. There are a number like that in this -- in this presentation. The intervener has done quite a bit of work.

THE PRESIDENT: Mr. Harvey.

MR. HARVEY: There is a concern about the word "align", and it's our opinion that "align" is nothing more than double speak for not compliant. What do you mean when you say "align with the requirements"?

MR. RZENTKOWSKI: Greg Rzentkowski for the record. Yes, proba-- what we meant by "align" is "in compliance" with the methodology, and the methodology was in compliance with the regulatory requirements. Yeah, we probably should have chosen a better expression to reflect this fact, but, nevertheless, I would like to repeat that the methodology has been accepted by the CNSC staff and the PSA performed by OPG is in compliance with our regulatory standard.

MR. HARVEY: Thank you.

THE PRESIDENT: Monsieur Tolgyesi.

MEMBER TOLGYESI: On page 3, the last paragraph, it's stated that there is -- according to OPG there is not yet an acceptable method:

"accepted methodology for calculating risk aggregation and [the intervener is saying that is not true because] 'there is very clear and well defined methodology for calculating [the] aggregation [as stated] in the guidance referenced in OPG's [Licensing --] Licence Condition[s] Handbook'."

Could you comment?

MR. RZENTKOWSKI: Mr. Miguel Santini will respond to this question.

MR. SANTINI: Miguel Santini for the record. We -- we explained in several instances of why we don't believe the aggregat-- simple summation of the frequencies is -- is not concensed at international level and is not

totally right because there is lots of bias in the result. That is why we believe that for the multi-unit PSA for which you need the aggregation for a single unit, that will be the first part of that -- that project, to first come up with an acceptable and concensed methodology to aggregate the external and internal events for a single unit, and then bring that number to the whole site.

MEMBER TOLGYESI: But what they are saying, that it's a kind of well-defined methodology is exists and it's in the guidance referenced in OPG's Licence Handbook.

MS AKL: Yolande Akl, Director of Probabilistic Safety Assessment & Reliability Division. The intervener is referring to IAEA document SSG-3, and where the state aggregation is -- he is referring to simple summation, but it is internationally acknowledged that the simple summation provide biased results, so due to the uncertainty and conservatism. And there -- there is a specific clause that I can -- I read that says, "... the results of the PSA should be compared with the probabilistic safety goals or criteria if these have been specified in national

regulations or guidelines ... unless the safety goals or criteria are formulated to specify a PSA of limited scope ..." (as read) So, the -- it is very clear from -- from this clause that that's -- there is no -- first of all, there is no specific methodology, and, secondly, the application of -- of the aggregation, it depends on the availability of regulation and depending on the scope of the PSA.

THE PRESIDENT: Monsieur Harvey.

MR. HARVEY: Just on page 14, 4.2, just a quick answer to that, the C-- about the CNSC staff, about that survey. You've got four or five points there. And --

THE PRESIDENT: I -- I don't want to get into this. This is out of scope. We have already discussed some of this in previous hearing and meetings. This is not kind of a part of our deliberation today, Monsieur Harvey.

MR. HARVEY: Yeah, okay. I don't mind. It was just if you were aware of that, that's all. Okay.

THE PRESIDENT: Dr. Barriault.

MEMBER BARRIAULT: Just a brief question. On page 6 the intervener comments about

fires in the control room. And I guess my question would be what -- what systems do you have in place in the control room to extinguish fires and control fires?

MR. PHILLIPS: Bryce Phillips for the record. We have automated fire systems that address fires in the control room. We also have procedures that direct staff on how to respond to those fires. We have our Emergency Response Team that responds to fires, including the control room, and -- and their procedures and their training addresses fires in the plant but also in the control room.

MEMBER BARRIAULT: Do you have an alternate control room that you can go to if you have to?

MR. PHILLIPS: Yes, we do.

MEMBER BARRIAULT: Okay. Thank you.

Thank you, Mr. Chairman.

THE PRESIDENT: Question, Ms Velshi.

MEMBER VELSHI: My question is on the supplementary information filed by the intervener, H-2.36B, asking for an additional week

to review the transcripts and the information posted by OPG last week on their website or on the PSA. I'll ask OPG first on any comments they have on that and then staff.

MR. PHILLIPS: I'll ask Carlton Mathias to speak to that.

MR. MATHIAS: Good afternoon, Mr. Chairman and Commissioners. Carlton Mathias, in-house counsel at Ontario Power Generation. And I would like to make a submission on the company's behalf with respect to the request that was filed by New Clear Free Solutions, which the Commission took under advisement this morning. It provided OPG an opportunity to respond and I would like to -- to do that now.

The request was that after today's proceedings that this hearing continue with additional questions from interveners, followed by additional submissions from interveners, as well as responses from OPG and CNSC staff, as well as submissions from us. And the timeline proposed for the continuation of this was for two weeks after the availability of today's transcript.

One of the reasons given for the extended hearing request is -- and that's what I

will call it, is that this hearing does not allow for oral submissions from interveners. OPG respectfully submits that the extended hearing request should not be granted. This case should be heard in its entirety today. It has been scheduled and has been published for a substantial period of time now. As -- as the Chairman noted this morning, there was a full hearing on the licensing renewal of Pickering before the Commission in May 2013. That renewal proceeding was an extensive multistage process and the Commission has said this morning that the issues from that proceeding will not be reconsidered.

In August of 2013 the Commission rendered its decision to issue Pickering a five year operating licence; however, the Commission wanted to see three specific pieces of evidence in order to allow OPG to proceed beyond the regulatory hold point it had imposed. In the record of proceedings the Commission set out fairly clearly, in paragraph 23, the following, "The Commission will consider this matter in a future proceeding of the Commission with public participation. The Commission will allow written comments only."

In February 2014 the Commission issued a Notice of Public Hearing for the hold point removal. Members of the public were invited to present submissions in writing. In the Commission's initial Notice of Public Hearing and in its subsequent notices with respect to the hearing, the Commission set timelines for OPG to file its material. OPG has complied with all of those timelines. In addition to meeting the timelines set out for the public hearing, OPG was required to meet timelines for the filing of the actual evidence required by the Commission with respect to the hold point removal itself. These timelines were set out in the Licence Condition Handbook for the Pickering NGS. OPG has met all those timelines as well.

The basis for the extended hearing was written as follows:

"Usually there is an opportunity for participants in hearings, with high public interest such as this one, to present oral submissions. Oral presentations may be used to provide additional

information, question other participants, respond to supplemental submissions from CNSC staff, or licensee[s], or comments made at the hearings."

OPG responds that the Commission has already made a decision about this process for this hearing. The Commission was clear about the process in the record of proceedings last August and it has appropriately implemented that decision leading up to today. The Commission has set timelines and deadlines and ample opportunity for notice, and notice has been given to everyone in this proceeding.

The second basis for the extended hearing request is that Pickering -- is that OPG published a Pickering A PSA Summary Report on April 29th and informed the CNSC staff on the same day, providing a link to the document. The adjournment request or the extended hearing request is made so that interveners can have more time to review the summary.

OPG submits that the request should not be granted on this basis either.

First, OPG's filing of this additional material was in compliance with the filing deadline set by the Commission. In fact, on April 28th OPG received a letter from the Senior Tribunal Officer confirming that OPG may file by April 30th material necessary to supplement or amend OPG's original submission.

Second, the Summary Report that OPG filed is not a document that the CNSC directed OPG to file. This is not a regulatory requirement that OPG file such a report and this has been confirmed this morning by CNSC staff. The underlying document of which this report is a summary was previously filed by OPG within the deadline required by it.

Excuse me.

Third, the matter of the PSA Summary Report was raised at a public meeting held on March 27th before the Commission that was convened specifically to discuss the PSAs. In this March 27th meeting OPG advised that the summary report would be a technical report, approximately 100 to 200 pages in length. OPG confirmed that the summary would be published in April. The Commission confirmed this commitment

and OPG did, in fact, publish the report in April. And the discussion for this is found at pages 258 of the transcript.

From a review of the transcript, when you have an opportunity to see it, it is clear that interveners were not particularly pleased about the timing of it, but they said that they wanted something different for future hearings. None of the interveners said anything about this hearing. At that time no one made the submission that this hearing should be adjourned because of the April publishing, and no one made any submission there or soon after that time that the entire hearing process should be amended because of an April publishing of this PSA Summary Report. And OPG believes that New Clear Free Solutions did, in fact, participate in that March 27th meeting.

So for -- for all those reasons OPG submits that the extended hearing request should not be granted. The Commission has already set an appropriate hearing method for this case. OPG has complied with its obligations to file material for this hearing and has filed it with CNSC staff. The staff are in the appropriate

position to review and assess the information filed. And the Commission is in an appropriate position to oversee that the requisite information gets filed and to receive staff's recommendations in respect of it. In this respect OPG submits that a substantial change in the procedure of this hearing at this late stage is not appropriate.

So that's our submission with respect to the New Clear Free Solutions' expanded hearing. As the Commission may know, another request for ruling was filed about an hour ago by New Clear Free Solutions. And if -- I am prepared to speak to that now or later if the Commission has had an opportunity to review it or not.

THE PRESIDENT: Speak up. You're the legal counsel here.

Legal counsel gives you the green light.

MR. MATHIAS: Well, thank you to legal counsel.

So New Clear Free Solutions has filed, I think around 12:45 this afternoon, another request for ruling that certain documents be put on the record for this proceeding. As I understand it, one of those documents is an OPG

document and another one purports to be an e-mail from the IAEA to -- to the lead consultant for New Clear Free Solutions.

This morning I believe the -- the secretary to the Commission indicated that there are 58 interventions in this proceeding already; however, it was also indicated that three were rejected and one of the reasons given for those was lateness and there may have been some other reasons that certain interventions were rejected for this proceeding.

So as a point of procedure, OPG submits that the Commission timeline should be respected and the fact that this intervener is now looking to file additional documents on the record, as -- as a point of procedure those should not be accepted.

As an alternative submission, obviously with respect to OPG's own document, we would be comfortable speaking to it. We would not have any trouble with our own document forming part of the record so long as it's relevant and within the scope that Mr. Chairman has admonished all the parties to be mindful of.

However, with respect to the

e-mail, OPG has not been a party to that e-mail. We are not aware of any context. We are not aware if it's a chain among many e-mails. It's simply signed off, if you -- once you have a chance to see it, by the name "'Greg'" in quotation marks. So we don't know who the author of that e-mail is. And I would submit that without the Commission or OPG having any of that kind of information as to the authenticity of that e-mail, it is not appropriate that it form part of this record and it's certainly not appropriate that OPG should have to speak to it. Thank you.

THE PRESIDENT: Okay. Thank you. I have just a question. I think that some of the interventions concerned, and, by the way, mine also, I was trying to absorb the PCA for Pickering A and B and the Fukushima. You know, the 200 pages you sent us. And it's not exactly an easy bedtime read. So I was trying to absorb that and that was a challenge. So I think what is -- the question is if the Commission decided to give the intervener just a little bit more time to absorb those three documents, you know, a. is that a reasonable kind of thing, and b. would you -- and then they're going to comment on that, would

you -- what kind of time element would you need to -- to have the final say? Anybody want to venture an answer on that? Am I -- am I clear what I just asked?

MR. PHILLIPS: Bryce Phillips on the record. With respect to timeline, it would take -- it would take OPG at least a week to -- to respond to what an intervener would -- would put forward, and then there would be the timeline associated with the interveners doing their work. So you can see it would be a multi-week evolution to -- to allow -- allow other documents that did not meet the Commission's timeline. It would be -- I believe it would be into a multi-week evolution.

THE PRESIDENT: Okay. Thank you. I interrupted Ms Velshi. You were --

MEMBER VELSHI: I'd like to get staff's comment on this as well, please.

MR. RZENTKOWSKI: The CMD filed by the staff, by the deadline established for this Commission hearing, provided all necessary information to demonstrate that OPG is in compliance with regulatory requirements. Based on

this understanding we recommended to the Commission the release of the hold point. Any additional information which was provided in the supplemental CMDs, both OPG's and CNSC's, responded to the public interest, but this public interest really takes the entire problem we are discussing here beyond the scope of the conditions established for the release of the hold point. So I think we can treat it in a different way, we can respond to those requests for additional information, but we can use another platform to do so, like, for example, the NPP Annual Report. I think we can do it this way because it's not directly related to the issue we are discussing here, and the issue is did OPG satisfy all conditions established for the release of the hold point?

MEMBER VELSHI: But I would venture to argue on that in saying that the summary PSAs are very much tied to the hold point and is information that is very relevant to understanding what was done and does it comply with the requirements.

MR. RZENTKOWSKI: The staff's CMD, in the attachment, provides the summary of PSA

results provided by OPG. It's there.

MEMBER VELSHI: Right. It's a summary of -- from the staff's perspective of the results as opposed to the summary of the PSA itself and details around the methodology and scope and all the other good things that are in the hundred page document.

THE PRESIDENT: Mr. Jammal.

MR. JAMMAL: Ramzi Jammal for the record. At the end Mr. -- Dr. Rzentkowski presented the -- the fact that the information presented to staff and our assessment. The decision and the *Rules of Procedures* apply to staff as they apply to the intervener.

And with respect to the debate of enough time for reviews, I can confirm one thing, that staff evaluation is based on fact and science and they rendered their recommendation accordingly with respect to the hold point. However, the final decision lies with the Commission on its own to determine if there has been enough information submitted before it to render a decision. That's where I'm going to leave it at this point.

THE PRESIDENT: Thank you.

Anything else on this one?

I'd like to move on to the next commission is from Canadian Environmental Law Association as outlined in CMD 14-H2.31.

Monsieur Tolgyesi.

MEMBER TOLGYESI: I have one question. The last page of this submission, the second line is that -- stated that, "... severe accident emergency response was not evaluated by the Commission in the 2013 hearing[s] on the Pickering life extension proposal ..." Staff, could you comment?

MR. RZENTKOWSKI: I will ask Mr. Miguel Santini to respond to this question.

MR. SANTINI: Miguel Santini for the record. We don't agree with that statement. I think that it was discussed at length. What transpired from the hearing was that there were lack of understanding from members of the public in terms of how to respond to emergencies. And I think the that was addressed by directions from the Commission requesting OPG to prepare the -- the information documents that they have -- they are distributing this week. But it was discussed at length. There was discussions also -- discussions related to CSA N1600, and there were

discussions as well of the evacuation requirements. I believe that it was discussed at length.

Maybe Mr. Luc Sigouin could provide more details.

MR. SIGOUIN: Luc Sigouin, Director of Emergency Management Programs with the CNSC. So as Mr. Santini has said, it was discussed at length. The -- and we have covered earlier that the emergency plans, both on site and off site, do address much more than beyond design -- than design basis accident, they go into the design basis realm.

MEMBER TOLGYESI: And it's taking into consideration other interveners, like Ontario Emergency Management -- Emergency Management Ontario and the other ones, the municipality and fire chiefs. The question was does it include also this civil accident emergency response plan, includes also interventions of other interveners like, as I said, Ontario Emerg-- Emergency Ontario and the fire chiefs and regional interveners?

MR. PHILLIPS: Bryce Phillips for the record. Our emergency plans are well-established and we routinely exercise and drill

them. Our consolidated nuclear emergency plan is well-integrated with those other stakeholders that you mention, with the EMO, with the province, and with the municipalities, with Toronto. So we are well-integrated.

And I'll ask maybe Jim Coles, do you have anything you may want to add to that?

MR. COLES: Jim Coles for the record. There were two recommendations in the CELA report that touched on severe accidents, multi-unit severe accident planning and resource allocation. And as others have said here just a few minutes ago, we did discuss this at length. We had a joint presentation led by the -- the province speaking to the integration of our plans, and I believe Mr. Dave Nodwell spoke to the fact that the provincial plan in particular, which -- which we all need to comply with, addresses beyond design basis accidents as well.

THE PRESIDENT: Anything else?

Okay. I'd like to move on now to the next submission is from Ms Marilyn McKim as outlined CMD 14-H2.9.

The next submission is from Dr. Frank Greening as outlined CMD 14-H2.12.

Dr. McDill.

MEMBER McDILL: Thank you. On page 3 the intervener makes reference to a reduction in ductility of -- of the ... So we'll start:

"Spacer Integrity:

Assumptions have been made concerning the capability of annulus spacer to fulfill design function..."

"Neutron irradiation adversely affects mechanical properties of metals..."

And:

"Testing of ex-service spacers has indicated a reduction in ductility (particularly I-X750)"

Can you just touch on that? I think it follows on with the questions previously, so it's --

MR. PHILLIPS: It does. I'll ask Dr. Paul Spekkens to -- to address that.

DR. SPEKKENS: So for the record, Paul Spekkens. The -- the annulus spacers in

units 5 to 8 of Pickering are -- are made of the zirc-niobium-copper alloy. There are a very small number of Inconel X-750 spacers, approximately three dozen or so. The testing that we have done on removed zirc-niobium-copper spacers indicates that their ductility is excellent even at -- in recently removed samples. So there is really no concern with changes in ductility of the -- of those spacers.

For the Inconel X-750, we have been doing testing on -- on Darlington's spacers removed at various points along the life over the last few years. Because of the difference in fluence between Darlington and Pickering, the Darlington fluence being quite a bit higher, the -- the performance of the Pickering Inconel X-750 spacers is bounded by the performance of the Darlington spacers, and that performance of the Darlington spacers is well beyond the acceptance criteria at this point. So we don't foresee any significant issues with spacer ductility at -- at Pickering.

Now, Pickering 1 and 4, all the spacers are Inconel X-750, but those spacers are really much younger than -- than anything that's

in the field at Darlington or -- or at Pickering 5 to 8 for that matter. So again, we do not anticipate any ductility issues with -- with Inconel X-750 spacers in units 1 or 4 of -- of Pickering.

So, spacers are not -- we -- we don't feel that spacer ductility is an issue at all for the Pickering plant.

MEMBER McDILL: Thank you. Just one follow up. That ductility is over the full temperature range, operating temperature range of the reactor?

DR. SPEKKENS: No, we actually measure ductility at room temperature in a -- because these tests have to be done in a -- in a hot cell, the -- the tests are done at -- at room temperature; however, we know that ductility gets better as the temperature goes up. So tests done at -- at room temperature are actually bounding compared to performance under operating conditions.

MEMBER McDILL: So there is no expectation that you would be below room temperature at any time?

DR. SPEKKENS: No.

MEMBER McDILL: On some kind of bizarre lower shelf?

DR. SPEKKENS: No. No. And -- and the -- the margins are -- are very considerable between the required load carrying capacity versus what's -- what's measured on the Darlington -- on the Darlington spacers.

MEMBER McDILL: From a metallurgical or materials perspective, some of these -- these are all metals, but if you have read this intervention, does any of it resonate as -- as a real concern to you?

DR. SPEKKENS: Paul Spekkens for the record. No. No. The -- many of the concerns that are in this intervention are based on information that's a number of years old. We have -- we have come quite a long way in the last, say, three, four years. So there's really nothing in this intervention that would -- that would represent a real concern to us.

MEMBER McDILL: Could I ask staff to follow up on that. For example, there is reference to fracture toughness with low hydrogen equivalents in surveillance tubes normally tested at 250 C [sic], that sort of thing.

MR. RZENTKOWSKI: The objective of the research project, which was initiated by the industry five years ago, was to provide additional information, and we received this additional information. In the context of this intervention, I believe many of the arguments are outdated, and we have done a lot of studies in the meantime. From the regulatory standpoint, we looked in a very systematic and comprehensive fashion at all outstanding safety issues -- what we considered -- and we arrived at a list of approximately 80. Then, we applied the risk-informed decision-making process to select a subset of those issues which required prompt regulatory resolution. So we believe we have done our due diligence; we understand where we have to direct our regulatory attention and the industry effort. And we are on the right track to resolve what some think may be of potential regulatory concern -- it's not a concern yet, but it may be.

So, I don't think that this intervention brings anything new to the scenarios which have already been considered by CNSC staff.

MEMBER McDILL: So one last question. For example, on page 4 the intervener

states:

"There is recent operating experience concerning spacer wear." (As read)

Is that relevant, not relevant?

DR. SPEKKENS: For the record, Paul Spekkens. That operating experience is from 2008 and we did extensive -- this was at Pickering Unit 7, channel Alpha 13 was found to have a peculiar arrangement of spacers that led to a crack in the calandria tube and, as part of the investigation of that it was found that there was wear on one of the spacers.

We have since gone back and looked at a lot of other inspection data for over 200 fuel channels and don't see anything similar to what we saw in that particular channel. We have concluded that this was a one-off situation caused by a combination of an unusual spacer arrangement in the channel along with relatively high vibrational environment caused by the fact that it was the outer most channel in the core.

So, again, this is six-year-old information. We have spent a lot of time looking at it and we don't think there is any reason to

have a concern over this.

MEMBER McDILL: Thank you, Mr. Chair.

THE PRESIDENT: So I would like to follow on this. In the last, I think it is page 28, the intervener shared with us that he was watching the March 27 public hearing -- which is good to know that people are watching those hearings -- and he went through point by point issues that he believes that OPG failed to mention in their analysis.

So my question is to both Staff and OPG. Did you go through this line by line and what is your reaction, without going here through line by line?

MR. PHILLIPS: I'll ask Paul Spekkens to answer the detailed questions.

DR. SPEKKENS: For the record, Paul Spekkens. I'll comment on the lines that relate to fuel channels and feeders.

Of the items listed on page 28, there really isn't anything there that is unknown to us. In the March 27th presentation, we focused on specifically the fracture toughness issue and the consequences of that issue for leak before

break, for fracture protection, and ultimately for the overall core assessment.

We did not touch on some of these other issues because they are not particularly new, so there really wasn't --

THE PRESIDENT: No, but on page 27 -- if you look at page 27, those bullets, I thought they were associated with --

DR. SPEKKENS: On page 27. Again, we've submitted to the CNSC Staff detailed models of hydrogen pick-up in roll joints; we've submitted -- every time we do a scrape sampling, we submit the results and there is nothing that is exceptional in those results.

So we did comment on March 27th about the fact that the highest levels of hydrogen are near the roll joint, that was in the presentation. So there is really nothing in any of these bullets that is outside of our comfort. We have a lot of data on this.

THE PRESIDENT: So, Staff, when somebody points out, according to them, such deficiency, what due diligence do you do to make sure that you haven't missed anything?

MR. RZENTKOWSKI: We, of course,

take it into consideration as operating experience. And in this particular case, I grouped all the information into three categories.

One is pressure tube fitness for service, which is being addressed by the research project conducted by the industry. So we posed many of those questions up front when a decision was made on the scope of the research activities.

The second group is related to operating events. Many of those events have been discussed as a matter of fact in the public domain and our position has been accepted by the Commission.

The third group is PSA. We have discussed this at length today and really, to be honest, personally, I didn't learn anything new from this list.

THE PRESIDENT: Thank you.

Question? Ms Velshi...?

MEMBER VELSHI: In the intervener's April 9th submission, from those multiple submissions, he talks about aging issues and how those have been addressed in the PSA.

And his specific question is:

"Could OPG please describe

what PSA studies it has performed or plans to perform that include an assessment of aging effects?" (As read)

And as I was looking at the PSA Assessment Summary Report it didn't pop out as to how aging effects had been incorporated in that assessment. So maybe you can shed some light to that, please?

MR. ELLIOTT: Mark Elliott, for the record. The way that aging is taken into account is that we get the most recent failure data. So I talked earlier this morning about tens of thousands of components that are modelled. We take the latest information on the reliability or probability of failure of those and factor it in.

But I think it's worth pointing out that we renew our equipment, we keep our equipment in top condition, as Mr. Phillips talked about before, we replace it as it ages, we do preventive maintenance. So we are not kind of monitoring it going slowly and worsening and then trying to effect the PSA, we're trying to keep the equipment at a very high level.

And on things like pressure tubes,

again, its fitness for service, so we have to make sure that we meet the reliability -- the rupture frequency of the pressure tubes and we meet that, we talked about meeting that with margin earlier today.

So that rupture frequency is factored into the PSA. So we make sure we meet it by doing our inspections and maintenance and then we put that number in. So it's not affected by the pressure tube aging because we have to meet fitness for service every time.

So I would say we keep the plant in top shape, that's the main reason, and we look at the most recent failure data.

MEMBER VELSHI: When you have a component like, I don't know, steam generators -- which you don't replace -- your analysis would look at data that is specific, relevant to that age; is it?

MR. ELLIOTT: It's handled in kind of a different way. We have to maintain the steam generators fit-for-service as well. So you meet this high standard and you don't let it slip and then that is the standard you put into the PSA.

So we plug tubes, replace tubes,

we do that kind of maintenance so that the risk of a leak from a steam generator is kept low.

THE PRESIDENT: Okay. Anything else?

Okay. I would like to move on to the next submission from Ms Kelly Clune as outlined in CMD 14-H2.13.

CMD 14-H2.13

Written submission from Kelly Clune

--- Pause

THE PRESIDENT: I would like to move on to the next submission which is Tania Szablowski as outlined in CMD 14-H2.14.

CMD 14-H2.14

Written submission from Tania Szablowski

THE PRESIDENT: Question? If not, the next submission is from the International Institute of Concern for Public Health as outlined in CMD 14-H2.41.

CMD 14-H2.41

**Written submission from
International Institute of
Concern For Public Health**

--- Pause

THE PRESIDENT: Dr. McDill?

MEMBER McDILL: Thank you. On page 7 of this intervention, at the bottom of the page, there is a reference to:

"...levels of exposure during routine operations and what additional exposure they may suffer as a result of allowing pressure tubes to operate beyond EOL and expected operating...without this information CNSC is not in a position to approve the removal of the Hold Point."

(As read)

Perhaps Staff can comment on that and OPG as well.

MR. RZENTKOWSKI: Mr. Miguel Santini will respond on behalf of the CNSC.

MR. SANTINI: Miguel Santini, for

the record. Before I go to our specialist, Patsy Thompson, I would like to emphasize that the exposure is regulated by the Protection Regulations and the limits are admittedly respected based on that. Besides that, there is the application of the ALARA Principle which is also in the regulation.

MS PURVIS: Good afternoon. Caroline Purvis, Director of the Radiation Protection Division, for the record.

OPG has a very comprehensive radiation safety program. They have internal levels to minimize the doses to workers. They have a long-term ALARA Plan. So they are planning to the end-of-life and that on a collective scale, their collective doses are stable, if not with a declining trend. So this in itself would not affect the removal of the hold point, the radiation protection program is place.

MR. SANTINI: Miguel Santini for the record.

No, it will not affect.

MR. PHILLIPS: Bryce Phillips for the record.

Before I turn over to Robin Manley

to add any details, you know, we do have an ALARA program and our -- for reducing dose to staff. Part of that program is to continuously lower the targets that we shoot for, to continuously reduce the dose that workers are exposed to. That drives us to do things like remote inspections, special shielding to keep dose to the workers as low as reasonably possible.

So I don't see a connection to the statement being made in this submission, and I'll ask Robin Manley if he has anything he wants to add to that.

MR. MANLEY: Robin Manley for the record.

In addition to what Mr. Phillips has already said, yes. To reinforce beyond the legal requirements for maintaining doses, less than safe limits, OPG has in addition administrative limits which we stay well below, and we have exposure control levels which we stay below.

We have very highly trained staff and whenever we're doing work which has any potential for any significant exposure we ensure we have additional controls established. We have

a great deal of experience doing -- dealing with these kinds of inspections. We have experience changing pressure tubes. We know how to do that work. We know how to do it safely and we do, do it safely. And we ensure that all the workers' doses are maintained, not just less than all of the limits, but also lower than that still using the ALARA principle.

MEMBER McDILL: Thank you, Mr. Chair.

THE PRESIDENT: Anything else? Any other questions? Dr. Barriault?

MEMBER BARRIAULT: Thank you, Mr. Chairman.

On page 9, the intervenor's second paragraph, the intervenor states that:
"OPG states the vast majority of time the reactors are either at full power operation or shut down, at which time fractured toughness behaviour is not an issue and..." (As read)

The intervenor goes on to say that there's no evidence to support this claim. Do you want to comment on those, either CNSC or OPG?

MR. PHILLIPS: Bryce Phillips for the record.

Out performance is a matter of public record. You can -- anybody can look on our website or other public documents that show how often any unit is online and how often it's in an outage. So I -- you have different --

MEMBER BARRIAULT: But would -- I maybe, misunderstood what I'm asking, really. She says there is no evidence to support this claim, that the vast majority of time the reactors are either at full power operation or shut down at which time fractured toughness behaviour an issue. Is that correct?

MR. PHILLIPS: That is correct in the terms of where the hydrogen uptake occurs is not at full power operation, but I'll ask Paul Spekkens to add some details to that.

MEMBER BARRIAULT: So in reality there is evidence to support that.

MR. PHILLIPS: There is overwhelming evidence to support the fact that hydrogen uptake occurs mostly during lower temperatures that don't occur when you're operating.

MEMBER BARRIAULT: Thank you.
Thank you Mr. Chairman.

MEMBER McDILL: Could I have a bit more on that please, fracture toughness behaviour?

MR. PHILLIPS: I'll pass it over to Paul Spekkens for some of the details I think you're looking for.

DR. SPEKKENS: Can you just repeat the question to make sure I've got it clear? Paul Spekkens for the record.

MEMBER McDILL: Where does the H₂ uptake occur, principally that affects the fracture times behaviour of the pressure tubes?

DR. SPEKKENS: So the highest levels of hydrogen in the pressure tube occur near the ends of the tube in a zone maybe 20 centimeters long, close to the rolled joint. And the reason for that is that the hydrogen basically comes from three different sources.

It comes in as a result of corrosion of the zirconium alloy that the tube is made of, and that happens all along the length of the tube. It can hypothetically come in from the annulus gas side, but that's stopped by addition of oxygen. And the most important source is that it comes in by diffusion from the end fitting.

The end fitting is stainless

steel. It corrodes at a relatively higher rate than the zirconium alloy of the pressure tube, and so the hydrogen levels in the end fitting migrate into the pressure tube. And as a result you see the highest levels of hydrogen very close to the end fitting where the pressure tube rolls into it.

So that's where the hydrogen comes from and it happens, essentially exclusively, at full power. As the temperature reduces the rate of migration of hydrogen drops very quickly, the rate of corrosion of zirconium drops very quickly. So there is really no ingress of hydrogen into the pressure tubes when you're at low temperatures. It all happens at operating temperatures.

THE PRESIDENT: Dr. Tolgyesi?

MEMBER TOLGYESI: Yes. And then at page 9 of the submission, at the top, the intervenor's stating that -- saying that uptake in deuterium has been observed to vary significantly between tubes by as much as a factor of three. What's the consequence of this variation, or should I say, when do start to worry about this difference? Should you worry about this difference?

DR. SPEKKENS: Paul Spekkens for

the record. Yes, you have to worry about that, what that -- the practical result of that is that you can't -- you can't just monitor one tube and extrapolate that result to the rest of the reactor.

That's why when we sample of hydrogen, we sample in multiple tubes and we collect all the results up. And what you end up is a distribution of uptake rates. So the reasons why different tubes pick up hydrogen at different rates has to do with, you know, small aspects of the micro structure of the material, and the reasons aren't all fully understood.

The consequence is that you have to monitor a number of tubes to get a good distribution of what the -- all the tube in the core are like to be doing. And that's why we don't just monitor one tube, we monitor many tubes.

MEMBER TOLGYESI: So you monitor what? These what 380 tubes?

DR. SPEKKENS: There's 380 tubes in a Pickering.

MEMBER TOLGYESI: So how many you monitor and what's the frequency of monitoring?

DR. SPEKKENS: We measure hydrogen uptake, or we sample for hydrogen at every planned outage. Typically we will sample 10 to 15 tubes at every outage. Some we do as repeats to get a good rate of a given tube over time. Other's we do as new tubes to get a broader distribution across the core.

THE PRESIDENT: Okay. Thank you.

I'd like to move to the next submission from the Society of Energy Professionals, as outlined in CMD 14-H2.19. It's the same thing we just heard about, this inspection.

CMD 14-H2.19

**Written submission from
The Society of Energy Professionals**

THE PRESIDENT: Next submission is from Mr. Robert Azzopardi. His outline is CMD 14-H2.20.

CMD 14-H2.20

Written submission from Robert C. Azzopardi

THE PRESIDENT: Any questions?

Dr. McDill?

MEMBER McDILL: Thank you.

The intervenor makes an interesting statement in number five that OPG wants extensions on the Pickering Reactors because of the cost of decommissioning. Perhaps OPG would like to comment on that?

MR. PHILLIPS: Bryce Phillips for the record.

We have a regulated decommissioning fund that we maintain and that's there for decommissioning, regardless if we end life this year, next year, or 2020. So operating beyond the initially assumed period isn't related to decommissioning, or decommissioning costs.

MEMBER McDILL: So the funds are present to decommission regardless?

MR. PHILLIPS: Correct.

MEMBER McDILL: Thank you.

THE PRESIDENT: I think he's making the allegation that you're making more money by keeping the funds in the -- in a hyperactive market then start spending it. I think that's what the implications are here.

MR. PHILLIPS: No comment.

THE PRESIDENT: Okay.

Next submission is from Mr. Michel Duguay, as outlines in CMD 14-H2.35, and 2.35A. Me. Harvey?

CMD 14-H2.35/14-H2.35A

Written submission from Michel A. Duguay

MEMBER HARVEY: Mr. Duguay has concern about the feeder pipes. So could you on the feeder pipes -- degradation of feeder pipes. So could you comment about that? What is the importance and the overall picture?

ME. ELLIOTT: Mark Elliott for the record.

I didn't know if you were looking at that.

Feeder pipes are what we call major component in our system that we have a lifecycle plan for -- where we monitor, we understand the degradation mechanisms. We monitor, we inspect ever outage. We have done in the past some replacements of feeder elbows.

But our knowledge of them and our

inspection program is quite advanced and we actually haven't had to replace feeder elbows recently, and we expect a very small number of those going forward. Because we keep watching for anything that couldn't happened. Thinning, we see some thinning but the rates are slow and don't affect 20/20 operation.

Cracking has occurred at Lepreau. It was brought up hearing that we understand where that came from. We have not seen any cracking at OPG. So it's a -- it is an important component, a sensitive component, we monitor and look after it.

MEMBER TOLGYESI: Is it easier for you to monitor the feeder pipes than the pressure tubes?

MR. ELLIOTT: I don't know whether I'd say easier. It's -- the pressure tubes are more of a -- done with remote tooling, with kind of robotics that go down the channel. The feeder pipes are much more hands on and we're very careful about the dose that people get when they do that.

So they're both significant inspections. They're different approaches. And we invest a lot in the technology to reduce the

dose and to be more accurate with our inspections. So they're both significant inspection programs.

THE PRESIDENT: Do you have access to all the feeder pipes? In other words, they can -- you can actually go to all those areas where there are feeder pipes, so you can do sampling?

MR. ELLIOTT: We can go to all sensitive areas where these elbows that get the most thinning, we can get to those.

THE PRESIDENT: There's nothing buried that you can't see, in walls and things of that nature?

MR. ELLIOTT: The -- there is some instrument tubing that is -- that can be difficult to reach. The feeders, no, we can reach those. But there's instrument tubing that can sometimes contact the feeder and wear, and we've on occasion seen a leak of an instrument tube. This isn't a feeder leak. This is the instrumentation that is monitoring the reactor for other things. And we've seen those things and some of those inspections and repairs are quite difficult, quite difficult. I can ask Dr. Spekkens to mention, maybe, some of our recent experience with those.

DR. SPEKKENS: So for the record, Paul Spekkens.

So perhaps I can add to Mr. Elliott's answer. We've looked at the sensitive area of every feeder in our plants. We've done a full baseline. So to that extent we have a more complete picture of feeder degradation than of fuel channels. So we have a very good understanding of the thinning and the rate at which it's happening.

As Mr. Elliott mentioned, there are some components which can touch a feeder, instrument lines are one example. There are some structural parts of the cabinet that the feeder is run through. On occasion we have seen something touching a feeder that leaves a little wear -- wear mark. We have never found any that are sufficiently severe that they've had to be repaired.

Typically, what we do is we will put a shield over the wear mark and just prevent the mark from propagating any further. We can demonstrate by analysis that the worn spot still meets all the structural requirements, all the code margins. So the -- we see that every now and

then.

We inspect in our feeder cabinets at every outage to look for that sort of happening. And as Mr. Elliott mentioned, we do thickness measurements on the thinnest feeders at every outage, so that we keep a good understanding of whether those feeders will eventually need to be replaced. Our current view is that the number of replacements at Pickering between now and end of operation of the reactors is going to be very small. Perhaps zero.

The problem of feeder thinning is one that the industry has done a lot of work on over the last, I'd say 15 years, and it is largely under control.

MEMBER TOLGYESI: I would like to hear the staff about the -- how do you follow that? How did you -- did you assist those in -- those inspections? How do you make your idea about the compliance of what is done with the requirements?

DR. RZENTKOWSKI: I understand the question. And before I turn this question over to Dr. John Jin, I would like to put this problem more in the context of the safety analysis or in

the context of safe operation of the plant because the feeder lines, form a part of the pressure boundary of the primary heat transport system.

So if a feeder breaks, there is a loss of coolant, but there is no surprise there because loss of coolant accidents have been considered at a design stage of the CANDU reactors. So a single failure of a process system, like for example a feeder line, is combined with a failure of safety systems to analyse the consequences, and, basically, to demonstrate that an event of this sort is not going to develop into a design basis accident and the release limits will be met.

So an entire spectrum of possible scenarios has been analysed and we know that no matter what happens, we'll always end up in the safe state. And the safe state means that the reactor will be shut down and maintained in the safe state. That's the story. That is the context. Now, regarding the inspection, I'll ask Dr. John Jin to respond.

DR. JIN: Thank you. My name's John Jin, okay, and I'm the Director of the Operational Engineering Assessment division.

I used to be a technical lead in conducting the review of the submissions from the licensee about the feeder interior maintenance. All I want to make sure is that the licence has this option, level of understanding of the automation mechanism. It is a pretty important to know where to inspect or how often you have to inspect. And I'm confident that industry does a fairly good job and through the joint industry project, in terms of identifying the major problem affecting the degradation which is to flow it through corrosion.

One of the major problems is the flaw characteristic. If there is a higher flow (indiscernible) or a higher mass flow rate you have to pay attention. So if there is any turbulent flow, you know, in plain language, if there is a sudden change in the geometric characteristic you have to pay attention.

So from this sense I had the assumption of confidence from the industries project and more -- another important aspect is that we have to know how quickly the degradation is going forward, or the progress of rate of degradation. Industry developed a mathematic

model to predict and they verified the models through the several repeat measurement. Industry has made, inspect more than 500 feeders between the timeframe early 2000 until 2012. And many of the feeder has been predicted for a repeat measurement.

And lastly, the most important one is that we have to know how thin we allow the feeder pipe, based on the structure (indiscernible), and the industry developed a very refined methodology, and it was verified by other international experts, by a third party review, as well as the CNSC staff, including myself. And I have a high level of confidence on the validity of the -- or the question of the methodology.

It has been included in the fitness of service guideline and I -- the CNSC staff accept the guideline in timeline of 2010. And after that we continued to review the life cycle management plan, which include the inspection program. The inspection program we focused at the sufficiency of the inspection program and we are comfortable in having the high level of confidence on the feeder pipe integrity.

THE PRESIDENT: Okay. Thank you.

A quick follow up. We're going to move on, really.

MEMBER McDILL: Understood. If you cover -- you said it's possible to cover -- I'm trying to use generic terms -- flaws, wear. Do you go back and see, is there any expectation that some covered flaw could grow in some unknown failure mechanism and then cause a failure later?

DR. SPEKKENS: For the record, Paul Spekkens.

No. The flaws have to meet certain criteria. They can't be sharp. If flaw is sharp, then by Code you would have to re-inspect it. These flaws that we're talking about are from two round objects rubbing into each other. So there is really no sharpness to them.

So as long as there is sufficient residual thickness to satisfy all the code requirements for structural strength, just preventing further wear is sufficient to protect that feeder, essentially forever.

MEMBER McDILL: And then if, big if, something did happen then --

DR. SPEKKENS: Then the consequences will be at the maximum, at the

maximum 10 millisieverts releases.

MEMBER McDILL: Thank you, Mr. Chair. Thank you.

THE PRESIDENT: Okay. I'd like to move on.

Next submission is from Mr. Dan Holtl as outlined in CMD 14-H2.22.

CMD 14-H2.22

Written submission from Dan Holtl

THE PRESIDENT: You want to do this, Mark?

MR. LEBLANC: So the next submission is from Ms. Susan Holtz, as outlined in CMD 14-H2.23.

CMD 14-H2.23

Written submission from Susan Holtz

MR. LEBLANC: The next submission is from Mr. Mike Darmon, as outlined in CMD 14-H2.24.

CMD 14-H2.24

Written submission from Mike Darmon

MR. LEBLANC: The next submission is from Ms. Rachel Gladstone-Gelman, as outlined in CMD 14-H2.28.

CMD 14-H2.28

Written submission from Rachel Gladstone-Gelman

MR. LEBLANC: I should state that many of these submissions are very similar or address issues that have already been touched on or discussed.

The next submission is from Mr. Albert Pietersma, as outlined in CMD 14-H2.29.

CMD 14-H2.29

Written submission from Albert Pietersma

MR. LEBLANC: The next submission is from Ms Nonie French, as outlined in CMD 14-H2.30.

CMD 14-H2.30

Written submission from Nonie French

MR. LEBLANC: The next submission is from Ms Gail Cockburn as outlined in CMD 14-H2.32.

CMD 14-H2.32

Written Submission from Gail Cockburn

MR. LEBLANC: The next submission is from the Ontario Clean Air Alliance as outlined in CMD 14-H2.33.

CMD 14-H2.33

Written Submission from Ontario Clean Air Alliance

Dr. McDill?

MEMBER McDILL: Thank you.

The intervener makes reference to no CANDU's operating life has ever been extended beyond its design life. Could you comment on that?

MR. ELLIOTT: Mark Elliott, for the record.

MEMBER McDILL: Are you really going where no nuclear engineer has gone before?

MR. ELLIOTT: Mark Elliott, for

the record.

No Canadian CANDU. I will ask Dr. Spekkens to talk about worldwide performance.

DR. SPEKKENS: For the record, Paul Spekkens.

The Embalse unit is actually the lead CANDU at this point. It is operating out to two hundred and twenty something thousand, so statement in the intervention technically isn't correct. There has been one CANDU that has operated beyond the 210,000 originally assumed designed life, and that is Embalse.

MEMBER McDILL: Where exactly is that?

DR. SPEKKENS: That is in Argentina.

MEMBER McDILL: Oh. And is it at 220,000 or is heading for 220,000?

DR. SPEKKENS: No, I think it is at 220,000 and it is still operating. It will be refurbished in -- I think the current plan is 2015, so it will operate for another several months before it enters its refurbishment outage.

MEMBER McDILL: And will there be -- I am assuming there will be a fair amount of

industry information exchanged at that point in time. Is that possible?

DR. SPEKKENS: We, yes. Paul Spekkens, for the record. In fact, we are currently looking at two pressure tubes that were removed from the Embalse reactor in the last year or two for different reasons. They replaced a small number of pressure tubes and we arranged with them to get access to those pressure tubes.

And we are currently doing a very careful surveillance examination because they are the lead pressure tubes in the CANDU fleet worldwide, so they give us excellent information on how pressure tubes behave when they get beyond their originally assumed design life.

MEMBER McDILL: Thank you.

THE PRESIDENT: I would like to take this opportunity maybe to ask a question.

So the American, and it is always dangerous to compare one to another, but the American design was normally for 40 years. I hear they are now getting application for 80 years.

Did their vessel have the equivalent of the 210,000 kind of design numbers? I know they don't have pressure tubes, they have a

different kind of a structure. But they must have an engineered design also, do they?

DR. SPEKKENS: For the record, Paul Spekkens.

I am not familiar with the details of the licensing arrangement. What I can tell you is that conceptually the concerns with pressure vessels in a pressurized water reactor are a little bit like our concerns with pressure tubes, in that there are areas of concern.

There has been a large amount of R&D over the years to demonstrate that the pressure vessels are fit for operation beyond what was the original licensing period which, as you correctly say, was 40 years.

So as reactors operate, as licensees do R&D on their critical components, they can convince themselves and their regulators that continued operation is in fact acceptable and perfectly safe.

And that is what we see in the light water reactor fleet, particularly in the U.S. where the vast majority of the reactors that have applied have been approved for operation beyond their original 40-year licence period.

THE PRESIDENT: Thank you.

Anything else?

Mark?

MR. LEBLANC: The next submission is from Mr. Graham Lodge as outlined in CMD 14-H2.34.

CMD 14-H2.34

Written Submission from Graham Lodge

MR. LEBLANC: The next submission is from Ms Colleen McLaren as outlined in CMD 14-H2.37.

CMD 14-H2.37

Written Submission from Colleen McLaren

MR. LEBLANC: The next submission is from Mr. Louis Bertrand as outlined in CMD 14-H2.38.

CMD 14-H2.38

Written Submission from Louis Bertrand

MR. LEBLANC: The next submission

is from Ms Linda Hicks and her family as outlined in CMD 14-H2.39.

CMD 14-H2.39

Written Submission from Linda Hicks and Family

MR. LEBLANC: The next submission is from Mr. Zach Ruiter as outlined in CMD 14-H2.40.

CMD 14-H2.40

Written Submission from Zach Ruiter

MR. LEBLANC: The next submission is from the Parkcrest Tenants' Association as outlined in CMD 14-H2.42.

CMD 14-H2.42

**Written Submission from
Parkcrest Tenants' Association**

THE PRESIDENT: One more time with respect to the KI pills. The interveners, there is no numbers that I can see, says "Toronto residents must order own KI pills."

Is that true?

DR. RZENTKOWSKI: I will ask Mr. Luc Sigouin to respond to this question.

MR. SIGOUIN: Luc Sigouin, for the record.

The residents of the City of Toronto that are included in the 10-km primary emergency planning zone can obtain KI through the Toronto Emergency Management Office. So they are accounted for in the stock or quantitative KI that is purchased for OPG in accordance with the Provincial Nuclear Emergency Plan.

THE PRESIDENT: But outside that zone, if I wanted some KI pills, where do I get them?

MR. SIGOUIN: Luc Sigouin, for the record.

So there are no provisions within the Provincial Nuclear Emergency Plan for residents outside of the 10-km zone to have access to KI. They would have to obtain it on their own.

THE PRESIDENT: But do we know, are they available in pharmacies in Toronto?

MR. SIGOUIN: Luc Sigouin, for the record.

I have no information about that.

THE PRESIDENT: Mr. Nodwell, are you still with us?

MR. NODWELL: Yes, I am, I am still here. Luc Sigouin is correct, that KI is available through the Toronto Emergency Office. They are currently not, to my knowledge, stocked in Toronto-based pharmacies. And the provisions within the plan are related to the 10-km zone.

THE PRESIDENT: So let me understand. So if I live in Scarborough, you mentioned that Scarborough would be part of at least the emergency plan. What do they do if they want KI pills?

MR. NODWELL: Dave Nodwell, for the record.

For those within the primary zone or the portion of Toronto that resides in the primary zone, they are able to obtain KI pills through the Office of Emergency Management for Toronto.

THE PRESIDENT: So it is beyond the primary that is problematic. Okay, thank you.

MR. LEBLANC: The next submission is from Mr. Jeff Brackett as outlined in CMD

14-H2.43.

CMD 14-H2.43

Written Submission from Jeff Brackett

MR. LEBLANC: The next submission is from Ms Carrie Lester as outlined CMD 14-H2.46.

CMD 14-H2.46

Written Submission from Carrie Lester

MR. LEBLANC: The next submission is from Ms Corine Psarrou-Rae as outlined in CMD 14-H2.48.

CMD 14-H2.48

Written Submission from Corine Psarrou-Rae

MR. LEBLANC: The next submission is from Ms Jacquie Allen as outlined in CMD 14-H2.51.

CMD 14-H2.51

Written Submission from Jacquie Allen

MR. LEBLANC: The next submission is from Mr. David Skripac as outlined in CMD 14-H2.52.

CMD 14-H2.52

Written Submission from David Skripac

MR. LEBLANC: The next submission is from Mr. A.J. Kehoe as outlined in CMD 14-H2.54.

CMD 14-H2.54

Written Submission from A.J. Kehoe

MR. LEBLANC: The next submission is from the Ad Hoc Committee Against Industrial Nuclear Facilities in Ontario and Canada as outlined in CMD 14-H2.55.

CMD 14-H2.55

**Written Submission from
Ad Hoc Committee Against Industrial Nuclear
Facilities in Ontario and Canada**

MR. LEBLANC: The next submission

is from Ms Louise Lanteigne as outlined in CMD 14-H2.56.

CMD 14-H2.56

Written Submission from Louise Lanteigne

MR. LEBLANC: The next submission is from Mr. Chris Barry as outlined in CMD 14-H2.10.

CMD 14-H2.10

Written Submission from Chris Barry

MR. LEBLANC: The next submission is from Pat Reed as outlined in CMD 14-H2.11.

CMD 14-H2.11

Written Submission from Pat Reed

MR. LEBLANC: The next submission is from Ms Linda Heron as outlined in CMD 14-H2.15.

CMD 14-H2.15

Written Submission from Linda Heron

MR. LEBLANC: The next submission is from Ms Brenda Thompson as outlined in CMD 14-H2.16.

CMD 14-H2.16

Written Submission from Brenda Thompson

MR. LEBLANC: The next submission is from Ms Sarah Sherman as outlined in CMD 14-H2.26.

CMD 14-H2.26

Written Submission by Sarah Sherman

MR. LEBLANC: The next submission is from Ms Sheila-Marie Richardson as outlined in CMD 14-H2.27.

CMD 14-H2.27

Written Submission from Sheila-Marie Richardson

MR. LEBLANC: The next six submissions are grouped as the content is exactly the same, I will read the list of interveners and

the members can ask questions at the end.

So those are written submissions from Mr. Jerome Joseph at 14-H2.2; Anna Wrona at 14-H2.3; Klaus Dohring at 14-H2.17; Jill Lennox at 14-H2.18; Ivan Gallegos at 14-H2.21; and David Collacutt at 14-H2.50.

CMD 14-H2.2

Written Submission from Jerome Joseph

CMD 14-H2.3

Written Submission from Anna Wrona

CMD 14-H2.17

Written Submission from Klaus Dohring

CMD 14-H2.18

Written Submission from Jill Lennox

CMD 14-H2.21

Written Submission from Ivan Gallegos

CMD 14-H2.50

Written Submission from David Collacutt

MR. LEBLANC: Any questions of Members on those submissions?

Mr. President?

THE PRESIDENT: Okay, so this concludes the list of written submissions. We have read them all. And now we have the final round of questions from Commission Members starting with Dr. McDill.

Mr. Harvey?

Ms Velshi?

MEMBER VELSHI: I have a couple, actually I have more than a couple.

And some stuff we have already covered, but I just wanted clarification or to make sure I have got an understanding of it.

So the whole-site methodology that has been submitted to staff by OPG, is that publicly available? This is PSAs again.

MR. ELLIOTT: Mark Elliott, for the record.

The hold point talked about a concept level methodology and a roadmap, both of those are included in a COG, CANDU Owner's Group report that is on the OPG website.

MEMBER VELSHI: Thank you. And

when was that posted on the website?

MR. ELLIOTT: Mark Elliott, for the record.

I will have to get some help on that.

Kamyar?

MR. DEHDASHTIAN: Kamyar Dehdashtian, for the record.

It was posted on March 21st, 2014.

MEMBER VELSHI: Thank you.

At the last Commission meeting we approved a REGDOC.2.42 for PSA. How does that, in high-level terms, differ from S-294 and, you know, PSAs need to be amended, and what likely impact would that have?

DR. RZENTKOWSKI: Greg Rzentkowski, for the record.

The main objective of the revision to the document was to address lessons learned from Fukushima. So the document will address issues like PSA for irradiated fuel bays, and also PSA taking into account multiunits events. So that means interdependencies between the units have to be clearly recognized in the PSA.

Maybe there was something more? I

will ask Ms Yolande Akl to compliment my response.

MS AKL: Yolande Akl, for the record.

The document also we added some guidance for specific areas that we found in the comments from the consultation that needed clarification. So the document now has guidance for some of the requirements.

MEMBER VELSHI: Thank you.

Staff, in your recommendation to the Commission, you specifically make mention on KI pill distribution.

And given that there is a REGDOC coming out that is going to have that as a requirement, I just wondered why you would make that a requirement now as part of this hold point as opposed to when it becomes a formal regulatory requirement for all licensees?

DR. RZENTKOWSKI: Greg Rzentkowski, for the record.

Normally it will take time to introduce this document into the regulatory framework because of course we will have to amend the licences in order to make this document legally binding or forming the licensing basis of

operating facilities.

So going through the entire cycle of relicensing will take a long time. So this will be a much more prompt way to address, I think, an issue of public concern.

MEMBER VELSHI: Thank you, I just wanted confirmation of that.

The next one was around action plans. And I know we spent a fair bit of time around that. But I was particularly curious by OPG's supplementary submission on the page 12. So this is H2.1A.

And so it was OPG's response to Greenpeace Canada's intervention. And point 4 was around claims that the Commission required or directed us to provide an action plan.

And OPG seemed to make a big distinction between whether the Commission requested it or required it. And I just wondered why you would do that?

MR. PHILLIPS: Just for clarification, you are on page 12 of our supplemental CMD?

MEMBER VELSHI: That is correct, Appendix 2. It is 14-H2.1A.

MR. PHILLIPS: And which point under Greenpeace, point 36 --

MEMBER VELSHI: So it is number 4 --

MR. PHILLIPS: -- number 4?

MEMBER VELSHI: -- Greenpeace Canada, and point number 4 under that.

MR. PHILLIPS: I will call on Robin Manley. Do you have that reference, Robin?

MR. MANLEY: Robin Manley, for the record.

Yes. Commissioners, we wanted to put on the record clearly our understanding as to what the Commission was requiring us to do in its record of proceedings.

We read of course the record of proceedings very carefully and make sure that we have our best possible understanding of what the expectations are.

And what we were doing here was identifying that the Commission had clearly directed us to do certain things, clearly with respect to removal of the hold point, and the wording that is written in the record of proceedings.

And this particular section 25 did not reference the removal of the hold point and did not use the word "direct." And so what we are simply pointing out is that the intervener appeared to be misquoting what the Commission had directed us to do. And so we wanted to be clear on what the wording actually was.

MEMBER VELSHI: Right. If I recall, the Commission requested that if the PSA values are between the limit and the target, then OPG should submit an action plan. And from your assessment, not the latest revision -- well, even the latest revision, there are certain categories where you are in that zone and the action plans have not been submitted.

I mean, you have them available, they just have not been submitted and not publicly available.

And is it because of your interpretation of what the Commission directed you or requested you to do?

MR. MANELY: Robin Manley, for the record.

Part of it is our interpretation, part of it also is how the requirements are

specified in our licence conditions handbook.

The requirements around production of a PSA for Pickering 1 to 4, the Fukushima enhanced action plan, the multiunit PSA containment venting, et cetera, those are all written in section 16.3 of the licence condition handbook which is around the hold point.

The section 25 from the record of proceedings is written into the licence condition handbook under licence condition 5 to do with safety analysis and is not stated as a requirement to remove the hold point.

So you are correct, we had an action plan and we have produced a further action plan, and we have provided those to CNSC staff.

MEMBER VELSHI: So I will ask staff for what their expectation was. Because I can tell you, as a Commission Member, my expectation was that that's what we requested the licensee to do, is to submit those action plans as a condition of removing the hold point.

DR. RZENTKOWSKI: If this is a part of the methodology, and I believe it is, I do agree with the Commission's position. But I would like to reconfirm that this is a part of the

methodology.

Yolande?

MS AKL: Sorry, can you repeat the question?

It is not part of the methodology. Yolande Akl, for the record. It is not part of the requirement of 2.4.2.

MEMBER VELSHI: Yes. It wasn't 2.4.2. Perhaps, Marc, you can read out what the request was from the Commission in the proceedings?

MR. LEBLANC: Yes. I will read section 35 or paragraph 25 of the record of proceeding:

"The Commission understands that if the PSA values are between the limits and the targets, then safety improvements should be put in place if practicable, and that if the PSA values are above acceptable limits then safety improvements would be mandatory. As such, the Commission requests that OPG

provide an action plan to address any identified issues should OPG exceed its targeted safety goals." (As Read)

That is how it reads.

THE PRESIDENT: Go ahead, Mr. Santini.

MR. SANTINI: Miguel Santini, for the record.

I don't think that there is no argument here about the OPG following the Commission's directions on providing the plans. The discussion here is was it a precondition or not for the use of the hold point?

Our interpretation from reading the records of proceeding is it was not a precondition of the hold point. That is why we put those actions plans -- requested action plans by Commission directions in section 5 under licence condition 5 of the LCH, because it is part of the safety analysis.

And we put all of the conditions where the Commission set directions for -- as a precondition for release of the hold point under

condition 16 of the licence.

MEMBER VELSHI: Thank you.

My last question was: OPG, in your presentation when you gave us a timeline on safety goals and aggregation and site-wide assessment, and you have made certain commitments to dates, but recognizing this is tied into international activities that are going on, would you proceed if those got delayed?

I just wondered how extensive those interdependencies are.

MR. ELLIOTT: Mark Elliott, for the record. We found that the industry and stakeholders around the world are interested, and so I don't expect them to slow us down.

We had a meeting in January that was facilitated by the CANDU Owners Group, we had people from Russia, Sweden, United States, we had representatives from the NRC, CNSC, WENRA and all on fairly short notice came to Canada to participate in this.

So we have had a very good reaction so far. So I expect we will be able to engage them as we go forward.

THE PRESIDENT: In fact, just so

you don't have to guess, practically every time you appear in front of us we are going to ask you that question: How are you doing, what is the progress?

MR. ELLIOTT: Yes.

THE PRESIDENT: And in the annual report we expect Staff to also confirm where this is going. Three years is a long time. We weren't very happy with the three years, but we accept the difficulty and methodology here, but at least we want to see progress here.

MR. ELLIOTT: Understood.

THE PRESIDENT: Mr. Tolgyesi...?

MEMBER TOLGYESI: I have just one short probably. On page 7 of the Staff, we are talking about:

"U.S. NRC established the same safety goals..." (As read)

But there is difference between U.S. and Canada, U.S. is .1 and we have one percent. You are saying, third paragraph from the bottom, before last line that:

"Canadian approach is more stringent than the American

approach." (As read)

Could you elaborate a little bit on that?

MR. RZENTKOWSKI: Greg

Rzentkowski, for the record. I believe I can clarify this point. This is related to the incremental risk to the public posed by the operation of nuclear facilities in Canada and this incremental risk in Canada is expressed as less than one percent and, in the U.S., less than .1 percent.

However, in Canada we calculate this for an average member of the most affected group. So that would be a person at the site boundary.

In the U.S. they calculate this three miles away and 10 miles away for the core damage frequency and large release frequency safety goals respectively. And because of the distance taken you can't -- actually our approach is more stringent, it's more conservative.

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

Any more questions? Dr. McDill?

No?

I have two quick ones. Fukushima mitigation, the plan was to be completed by 2015. Are we still on target to meet the 2015, and presumably, if I understand correctly, that will include SAMG, the Severe Accident Management Guide and all the updated PSA that goes with it; is that correct?

MR. RZENTKOWSKI: That's correct. However, I would like to indicate that Severe Accident Management Guidelines have been already implemented across the Canadian fleet of reactors. They have been tested and exercised and we are satisfied with the state of implementation.

THE PRESIDENT: But they are not part yet of the PSA?

MR. RZENTKOWSKI: No, they are not part of the PSA, but the actual improvement at the site has been achieved.

THE PRESIDENT: When will they be part of the PSA?

MR. RZENTKOWSKI: OPG is definitely leaning that way. I'm not sure if industry will be sharing with -- if OPG will be sharing their experience with the rest of industry. For sure, I hope so.

If this would be the case, I think the next revision of PSA for Bruce Power is expected by the end of June of this year. Most likely this information will be already included and then we are left with Point Lepreau and Darlington. I have to talk to the industry and establish that.

THE PRESIDENT: So if I understand correctly, the annual report for NPPs, it will be coming in August; is that correct?

So is it fair to start asking the question in August? OPG?

MR. ELLIOTT: Mark Elliott, for the record. Always fair for you to ask questions. --- Laughter / Rires

MR. ELLIOTT: Just a little bit of clarification. The Fukushima Action Plan will be done by 2015. We have a large number done, over 70 done already.

There are actions that will take place after 2015, installations that will require unit outages to install, but by 2015 all the decisions will be made, all the plans and schedules and the vast majority of physical work will be done. Some of that does carry on in

individual station action items past that.

As far as when we revise the PSAs, we have two things I would say. First of all, certainly by licence renewal -- we submit for our licence renewal in 2017, actually the licence comes up in 2018, but we submit in '17, it will be definitely done by then.

But our action plan calls for by November 30th of this year to have this mapped out. So the action plan that we've just been speaking about has an interim date of November 30th, 2014.

So as it's always open for you to ask questions any time, it will be better for you to ask them after November 30th, 2014.

THE PRESIDENT: Thank you.

My last question is, maybe even as a comment. The take-away from Fukushima for me personally was the need to cool the reactor no matter what. And we can do all the PSAs -- I'm struck with Mr. Phillips saying the PSA numbers -- what you do is what is important.

So I am stuck on the emergency, that no matter what, no matter what kind of emergency occur or accident, the most severe

accident, you can shut down or you can cool the reactor.

So somebody said that you now have all the mobile assets, the diesel and the water sources, but I am interested in off-site, you actually have provision where everything has failed, a Doomsday scenario, blackout, very hard to reach, you can bring asset from off-site.

Did I get this right? You now have an arrangement for off-site assets to be brought to Pickering, let's say?

MR. ELLIOTT: Mark Elliott, for the record. We have enough on-site, first of all, to deal with a reactor event on any unit and all units at the same time, for example. So we have enough equipment for each unit. It's located in high areas, a little bit away from the site.

We are working on the next phase that comes up from your question which is an off-site centre to house additional equipment; it's not in place as we speak, we are working on it right now.

THE PRESIDENT: I thought there was an industry-wide, almost North America, the Americans I think they have now in place centres

for off-site equipment. Are you planning to be part of that, or are you on your own?

MR. ELLIOTT: Mark Elliott, for the record. We had entertained the idea of being part of that. That hasn't worked out, to be part of the U.S., although I can absolutely guarantee that if we were in difficulty they would help, and if they were in difficulty we would help, but there's nothing formally in place with the U.S.

And what we're doing with the Canadian is, OPG is managing this alone to make sure we can have a remote facility that we can store equipment on and that project is progressing.

THE PRESIDENT: Staff, do you know if the Americans, the U.S. NRC are making it a regulatory issue, or is it an industry voluntary provision?

MR. TOLGYESI: To the best of my understanding this is an industry initiative in the United States.

THE PRESIDENT: Yes. Any last...?

MR. LEBLANC: OPG has the last word.

THE PRESIDENT: OPG, you do have

the last word, over to you.

MR. PHILLIPS: Thank you, Mr. Chairman and Commissioners. Interesting discussion today and I'll go back to the original thing I talked to you about when I opened up.

My background is a little bit on the unique side. I spent half of my career, 12, 15 years doing nuclear safety analysis and now the other half of my career I'm operating a nuclear power plant that has to live by that analysis, so it's an interesting and unique position to be in.

I fully understand the value of this analyses and how it affects the plant, and I do understand that what you do with that is what counts, and I can tell you with a hundred percent confidence Pickering is safe to operate.

Thank you.

THE PRESIDENT: Yes, thank you.

We are going to take five minutes?

MR. LEBLANC: I just have closing words.

THE PRESIDENT: Yes, go ahead.

MR. LEBLANC: So with respect to this matter, the Commission will confer with regards to the information that it has considered

today and then determine if further information is needed. If additional time is to be provided pursuant to the Ruling request, or if the Commission is ready to proceed with a decision, we will advise accordingly.

Mr. President...?

THE PRESIDENT: I would like to take a little break for the next session to start, so...

MR. LEBLANC: And the next session will not be following the agenda. We had endeavoured to have a presentation on radiation therapy, so we will proceed in 10 minutes with that presentation, Mr. President, and then we will follow the agenda as set out.

Thank you.

THE PRESIDENT: Thank you.

--- Upon recessing at 3:59 p.m. /

Suspension à 15 h 59