

**Canadian Nuclear
Safety Commission**

**Commission canadienne de
sûreté nucléaire**

Public hearing

Audience publique

June 28th, 2018

Le 28 juin 2018

**Pickering Recreation Complex
1867 Valley Farm Road
Pickering, Ontario**

**Complexe récréatif de Pickering
1867, rue Valley Farm
Pickering (Ontario)**

Commission Members present

Commissaires présents

**Dr. Michael Binder
Ms Rumina Velshi
Dr. Sandor Demeter
Ms Kathy Penney
Mr. Timothy Berube
Dr. Marcel Lacroix**

**M. Michael Binder
M^{me} Rumina Velshi
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Secretary:

Secrétaire:

Mr. Marc Leblanc

M. Marc Leblanc

General Counsel:

Avocate générale :

Ms Lisa Thiele

M^e Lisa Thiele

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Pickering, Ontario / Pickering (Ontario)

--- Upon commencing the public hearing on Thursday,
June 28, 2018 at 8:31 a.m. / L'audience publique
début le jeudi 28 juin 2018 à 08 h 31

Opening Remarks

M. LEBLANC : Bonjour, Mesdames et Messieurs. Good morning. Welcome to the continuation of the Part 2 public hearing on the application by Ontario Power Generation for the renewal of the Nuclear Power Reactor Operating Licence for the Pickering Nuclear Generating Station.

Please note where the emergency exits are. They are at the back of the room, there are two doors down there. There are bathrooms located near the entrance in the main lobby as well as on the side here.

During today's business, we have simultaneous interpretation.

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

We would ask that you please keep the pace of your speech relatively slow so that the interpreters have a chance to keep up.

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

Les transcriptions seront disponibles sur le site Web de la Commission dans environ 2 semaines.

To make the 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 continuation of the public hearing of the Canadian Nuclear Safety Commission. Welcome also to those joining us via webcast and teleconference.

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

For those of you who were not here yesterday and the day before and the day before, I would

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

To my right are Dr. Sandor Demeter and Ms Kathy Penney; to my left are Mr. Timothy Berube, Ms Rumina Velshi and Dr. Marcel Lacroix.

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

Marc...?

MR. LEBLANC: This is the fourth day of hearing. We have heard so far the presentations from OPG, CNSC staff, 38 oral interventions and have addressed all written submissions.

Fifteen intervenors are scheduled to present orally today. Ten minutes are allocated for each presentation, with the Commission Members having the opportunity to ask questions after each presentation.

To help in managing time, a timer system is being used. The light will turn yellow when there is one minute left and turn red at the 10-minute mark.

We have in attendance or via teleconference, available for questions from the Commission, representatives from Environment and Climate Change Canada; Fisheries and Oceans Canada; the Ontario Ministry of Environment and Climate Change; the Office of

the Fire Marshal and Emergency Management; and Health Canada.

Your key contact persons will be Ms Louise Levert and Ms Johanne Villeneuve from the Secretariat staff. They are at the back of the room.

The break for lunch is anticipated to be around 12:30 and a break for dinner around 17:30. There will be short health breaks in mid-morning and in the afternoon.

Mr. President...?

THE PRESIDENT: Okay. So the first presentation is by Greenpeace, as outlined in CMD 18-H6.62.

I understand, Mr. Stensil, you will make the presentation. Over to you.

CMD 18-H6.62/18-H6.62A/18-H6.62B

Oral presentation by Greenpeace

MR. STENSIL: Thank you, President Binder.

Hello. Bonjour. My name is Shawn-Patrick Stensil, I am a Senior Energy Analyst with Greenpeace Canada.

That said, today I don't feel like me. Today I feel like Bill Murray in that movie Groundhog Day. Five years ago I sat in this very place and made a

presentation to the Canadian Nuclear Safety Commission, you. Just as today I made comments on a controversial application by Ontario Power Generation to operate the Pickering nuclear station beyond its design life.

And just like today, OPG claimed that the project was needed and economical, but its shareholder, the Government of Ontario, had exempted it from any review by the Ontario Energy Board, so we couldn't validate those claims.

And just as today, we are waiting for a study on the possible accident impacts of an accident to inform whether current emergency planning measures were sufficient to protect the public.

And just as today, OPG couldn't definitively tell us whether the radioactive waste that has been produced at the station over the past 40 years would eventually go to some offsite storage facility.

And just as today, OPG's shareholder, the Government of Ontario, was undermining public safety by encouraging population growth around the station.

And just like today, OPG presented with slogans like, "Our last day will be our best day", while the public warned you what you need to do is avoid that one bad day that will make none of it worth it.

And just like today, the shadow over these

hearings is the unexpected, whether from age, a regulatory blind spot, so an unforeseen event or hostile action, an unexpected event that could cause irreversible harm to Toronto and Canadian society. That's your job.

And finally, just like five years ago today, or five years ago, I am going to tell you the following. It is time to close Pickering. First, it's unneeded. Pickering's political purpose is to pork-barrel for votes in Durham Region, but ultimately I think you have a responsibility under the Act to close the station given its location. Commissioners have said this week that the status quo is operation until 2020. I agree and it should remain that.

To start, Pickering is going to shut down. Ontario announced the station would close in 2010 when it acknowledged the station is too outdated to be rebuilt cost-effectively. Quebec made a similar decision about Gentilly in 2012 and this month South Korea announced that Ulsan 1, which had already been rebuilt, would also close. So 10 out of 31 CANDUs internationally are closed or are closing due to high cost. That's 9 out of 22 in Canada. The CANDU industry is in decline. This is relevant to the Commission because you will oversee the safe decline of the CANDU industry.

So today I ask two things: one, spur some

momentum, we know the station is going to close; and two, rule in favour of our request for an environmental assessment under the *Impact Assessment Act*. This assessment would consider both OPG's approach to decommissioning as well as contingency plans in the event that Pickering becomes a de facto radioactive waste site beside Toronto.

Notably, Durham Region has asked for transition plans to mitigate the social and economic impacts of the station's closure. It has also asked for compensation in exchange for carrying the risk associated with indefinite waste storage. These types of social and economic effects are what would be considered under an IAA review as opposed to one under the *Nuclear Safety and Control Act*. Unlike the *Nuclear Safety and Control Act* review, an IAA review may also make recommendations on the adequacy of CNSC regulations. This is a good thing and a good planning tool. It would assist with both planning before OPG applies for a decommissioning licence in 2028, it would respond to local concerns, and I think it would strengthen trust in CNSC oversight over decommissioning in the long term.

So in the case before you, evidence puts in doubt the licensee's capacity to make adequate provision for the protection of the environment. In fact, I submit

it has a plan to reduce safety and it has a track record of mismanaging oversight of offsite emergency plans. Of course, when I say the licensee, I am referring to OPG and its shareholder, the Government of Ontario. The province is the de facto licensee. It gives OPG direction, it appoints its Board of Directors, and it approves its business plans such as the current proposal to continue operating Pickering. It also receives dividends from OPG and backstops its waste liability. OPG and the Government are the same.

And most importantly for the Commission, the province is responsible for the fifth level of defence in depth. This is protecting public from harm in the event of an accident. The province is responsible for two things that make up the fifth level of defence in depth: emergency preparedness and land use. The Ministry of Community Safety oversees emergency preparedness, the Ministry of Municipal Affairs oversees siting, and the Ministry of Energy oversees OPG. These three bodies are your licensee.

If OPG handled levels 1 to 4 of defence in depth as the province has, you would revoke their licence. The Ministry of Community Safety continues to show it is unable to adequately oversee nuclear emergency response. It lacks sufficient resources to oversee safety and it also

borrowing staff from OPG to carry out its activities. This supports my point, you should consider OPG and the province as the licensee.

According to the IAEA there are three elements necessary to successfully implement every level of defence in depth: appropriate conservatism, quality assurance and safety culture. I am confident that CNSC staff will be able to point to how OPG ensures all of these are implemented for the other levels of defence in depth. I have no confidence that CNSC staff can show how the Ministries of Community Safety and Municipal Affairs implement these for level 5, protecting the public from an accident. Show me the plan, show me the verification criteria.

What's more, it is stated in the Licence Control Handbook: "Any change to the design or programs must have a neutral or positive impact on safety." This is in line with continuous improvement. I support it. If OPG were to take actions that not only reduce safety, CNSC staff would act. In contrast, the province has a policy of reducing safety around Pickering. It encourages population growth around the station and decreases the effectiveness of emergency measures. The province also knows that this is wrong and could invoke sanction from the Commission.

Through Freedom of Information (FOI) I

obtained a Briefing Note that went to the Minister in 2010 recommending eventual closure. One of the reasons it listed to support closure was running Pickering in an area of mandated provincial growth could trigger regulatory sanction. So the province is knowingly implementing population growth policies that undermine public safety. It knows OPG could be sanctioned for this.

The province's intentional dereliction of duty to protect or improve public safety should have an impact on OPG's -- should impact your assessment of OPG's ability to carry out its responsibilities under the Act. In fact, I think it is reasonable to conclude that the licensee is unqualified for the licence renewal. The licensee's encouragement of growth around the Pickering nuclear station is decreasing safety margins in the fifth level of defence.

As population around the Pickering nuclear station has gradually increased over the past 40 years, so have the potential consequences of an accident. Like a frog in a pot of water brought slowly to boil, we have been unable or unwilling to acknowledge the increasing risk that accompanies the growing population around Pickering.

Commissioner Velshi, on Monday you asked about the implementation of the Joint Review Panel recommendation that the CNSC engage with the Government of

Ontario to develop land use planning around nuclear stations. Mr. Frappier responded that the Commission had engaged with the province and that they have updated their land use policy.

While it is true Ontario's 2014 growth plan now includes energy generation facilities, the details of the plan show it's meaningless. Downtown Pickering, where we are sitting, is named as an urban growth centre. The licensee's policy is still to encourage growth and reduce public safety. The policy Mr. Frappier mentioned isn't fit for purpose or intended to maintain safety. This requires Commission action.

And we see some data to this. Emergency time estimates are an indicator of safety decline, or emergency evacuation time estimates. We see a trend where ETEs have lengthened from 4 to 6 hours to evacuate on a good day the 10-kilometre zone to about 7 hours today. The worst case is 9. I have no numbers on evacuation for the new 20-kilometre contingency zone, but that should be available. All this is allowed to happen because the province and the CNSC have never set limits on population growth around Pickering. Other levels of defence in depth have a design limit, not Level 5. That's an oversight that must be corrected.

That said, the province's growth policy is

encouraging reductions in public safety. That is grounds to reject OPG's licence renewal.

I don't have time to discuss my final two points in depth, unfortunately, but in short, the Periodic Safety Review used to support OPG's application lacks sufficient transparency to support the continued operation of Pickering, in my mind. I started filing access to information requests related to the basis for the PSR about three years ago and the Commission has systematically denied information related to CNSC discussions on safety improvements that should be required to permit continued operation. Without such transparency, I don't think the Commission or the public can have the confidence that OPG is in fact making adequate or acceptable provisions to protect the environment. On this basis, I think you should reject the life extension.

And finally, I would ask you to rule in favour of the request for a ruling filed by Greenpeace and CELA asking for amendments to section 5.4 Of the Licence Control Handbook. It is poorly worded, when I read it over, and provides a loophole for Pickering to operate past 2024 without Commission approval.

In conclusion, I don't think you can have confidence that OPG and its shareholder will make adequate provision to protect the environment. You should deny

OPG's request to operate until 2024 and direct the company to immediately prepare transition plans for closure in 2020.

Thank you very much for listening.

THE PRESIDENT: Thank you.

Okay, let's go right into the question period. Who wants to start? Dr. Lacroix...?

MEMBER LACROIX: Thank you, Mr. Stensil, for this presentation. Incidentally, Groundhog Day is one of my all-time favourite movies.

--- Laughter / Rires

THE PRESIDENT: It does have a happy ending, doesn't it?

MEMBER LACROIX: Yes.

--- Laughter / Rires

THE PRESIDENT: For Bill Murray.

MR. STENSIL: When the station closes, yes.

THE PRESIDENT: For Bill Murray, yes, I meant for you.

MEMBER LACROIX: You are opposed to a 10-year licence, but you support a 5-year licence. From a purely safety point of view, can you justify this affirmation?

MR. STENSIL: Requesting a 5-year instead

of a 10-year licence?

MEMBER LACROIX: Yes.

MR. STENSIL: Thank you for the question and it's a very good one. I discussed this at the Bruce hearings as well.

In Greenpeace's view, the move towards 10-year licences in effect reduces a safety measure we have, a verification measure we have for checking in on CNSC staff and OPG as to both of their performances. It basically reduces the ability of the public to scrutinize operations of both CNSC staff and OPG. Why that is important is what we learned with Fukushima and other major disasters is that they are effectively caused by regulatory capture of some kind.

And how do you mitigate regulatory capture? The Commission will always be vulnerable to it because you deal with a very technical industry, like financial markets, and not a lot of people are trained in this area or have the patience to read all the documents. So you need these moments where the public can come in and be looking at these things from a different perspective and provide comment on, you know, looking where things haven't been implemented and also providing views from the Canadian public.

And, you know, I am a big believer that --

to give an anecdote, one of the reasons that I do environmental work is when I was a kid my mom worked at a factory and there was a period when I was a kid she would come home from work every night and have horrible headaches and writhe around on the bed, and it turned out she did some research and found out that the glue they were using for these car carpets had some sort of toxin that caused this. It in fact shouldn't have been used, but it was her research that figured that out. She had an environmental sensitivity and she figured it out. She went to her union and they didn't do anything, they didn't want to bother, and she eventually just went to -- called the Ministry of Energy -- or Labour, Freudian slip -- and they shut the plant down for several days.

And right there is an example of where we need to remember that Canadians are smart. They may not have the PhD's of people on both sides of me, but they can find things out, especially when it affects them and also see things from different perspectives because of how they are affected.

And I will list these again because I think it's really important. I mentioned these at the Bruce hearings. There's a whole line of regulatory improvements that have occurred because of public intervention at these hearings. And if you start delaying,

doing those every 10 years, you will not get the opportunity to do that, you are going to lose the capacity in the civil society sector. It takes a lot to read these documents and keep up on the file and that is something that CNSC staff have never talked to us about.

And to give some examples, in this hearing OPG has been talking about its new multi-unit risk assessment. That was me in the 2013 hearings where I raised an issue and it led to a request for ruling that now CNSC staff talk about. We are a world leader in this. They are a world leader because of public intervention in that. I suggested at the Bruce hearings that you also work that into your narrative as a Commission, because it is good for other regulators in the world to hear that.

Same thing in the last hearing. The main focus of my submission was that OPG has a policy that if it went over certain safety goals or limits it had to develop a risk reduction policy and either do upgrades, analytic, whatever, but they had just ignored it and so had CNSC staff. And I raised this in the hearings, that required a risk reduction policy that they have been doing for the past three years and that's a good thing. Those moments will not happen if you move to 10-year reactor extensions. I think this is very, very important.

THE PRESIDENT: Well, I really would

challenge that because not only whatever -- you are completely ignoring the annual report where you have again the ability to come and provide -- we do value the input, otherwise we wouldn't hold public hearings. So the input, I agree with you the input has been very, very useful, at least the 10 years I have been on this podium, and we have acted on many of them and in fact we enhanced the requirement with the annual ROR and some of the annual RORs will become a public hearing also in the communities. So I don't understand the reduction in public face.

MR. STENSIL: So this talking point comes up every time we talk about not moving to 10-year licences. You have the annual meeting and that is sufficient. To start off with, no one ever talked to anyone in the civil society community about whether that was an appropriate means of continuing to engage with intervenors and maintaining capacity. That has been the line out of the Commission and told to us.

The parallel I would make, with all respect to Monsieur Leblanc, is for this hearing it was originally scheduled in Courtice and on Day one Monsieur Leblanc said that it's unfortunate that it can't be in Pickering, but in our experience the Courtice facility meets all of our needs. What that didn't -- it meets all of the needs of the Commission, it doesn't meet the needs

of people living in the Pickering area. That site doesn't even have public transport. So it's a funny parallel, but it's being aware of the mindset that what you may think is sufficient is not.

The second issue is -- and Commissioner Velshi, I'm happy to work with this on you as you come into your presidency -- is these hearings have bad procedure compared to other tribunals. We don't have the right to cross-examine, even in an informal way, to gather information. And if you look at how decisions -- improvements to safety have come out through these hearings since Fukushima, it has been hearing to hearing. The Commission has heard themes about how probabilistic risk assessment was being ignored, about emergency management, and it wasn't in a specific meeting. But the reason that happened is because in one meeting we would often, with respect to staff, not be able to nail them down on the transcript about what we were actually trying to say and get them to confirm it. And in another tribunal when we could directly ask -- the example being the other night, President Binder, when you asked, so where is the plan -- this is a request for ruling -- where is the plan for distributing KI in the Toronto as a regulatory requirement? No one answered the question. Like that was just -- it wasn't answered. And that makes it very difficult to

intervene because you have talking points on both sides, that ends up being the transcript, unlike the OEB, where you can gather evidence, have some agreement on facts and then have a discussion about what that means for your deliberations. We can't do that here. It is very frustrating as an intervenor in these hearings.

So to your point, no. To be very clear, the August meetings are not acceptable as a replacement for these hearings. And beyond that, I think the Commission can go further to enhance its Rules of Procedure for both these hearings and the August meetings.

THE PRESIDENT: Thank you.

Questions. Ms Penney...?

MEMBER PENNEY: Thank you for the presentation. I want to talk about the strategic environmental assessment. So what I'm trying to understand is what you are requesting, because when I look at what was in your supplementary, it's a letter to the Minister commenting on the consultation package for the new IAA, and you request that decommissioning get put on the project list, but then in the body of your original submission, 62, you are asking for a strategic environmental assessment, and a strategic environmental assessment is usually on a point of policy. So what I am trying to understand is what you are really requesting. If you could elaborate for me,

please?

MR. STENSIL: Yes, a good question.

To start, and this is said in our request for ruling, we are in a bit of a regulatory vacuum on what triggers an EA, first of all. So that's why there is a bit of confusion. There is no compliance issue right now. If you guys decide to just ignore it, it can just kind of flow through.

So we are appealing to the Commissioners to say we should have an assessment outside of the *Nuclear Safety Control Act* assessments that are taking place under this new Act, because these assessments will look at effects that aren't considered by the Commission. And whether that is a strategic assessment or an IAA assessment -- there's two -- one of the reasons we are asking for it, because it's about policy, is with nuclear waste, with radioactive waste, one of the biggest issues or challenges is there's the technical assessments, and you guys have the guides to that effect. There's also a social and ethical element that comes up -- and economic -- of how these impact communities. That is not necessarily addressed in the CNSC policy for non-fuel radioactive wastes.

If you look to the *Nuclear Fuel Waste Act*, in its objectives it instructed the NWMO to, yes, look at

the technical case but also look at the ethical and social cases in conditions -- impacts of its assessments.

When you step back to the policy, the 1996 policy that predates -- I don't know if everyone is familiar with the long history of how this came out -- there is a general policy which is good that says it's the polluter pays principle. But beyond that, there is not a lot of instruction on how you develop social licence for these communities, what is a socially acceptable policy.

So under one of these environmental assessments we would be able to look at those issues. And I think for the Pickering site it's significant because I believe there is a risk that this station becomes, as I mentioned, a radioactive waste site beside Toronto, and that won't be viewed well, but it may just happen through creeping, creeping up over time. And such an assessment would also be an independent conduit to inform policy that staff could then implement over the lifecycle of decommissioning, because you -- in those assessments, recommendations can come out to influence CNSC regulations, so when you get to licensing.

An example is exactly what Ms Velshi, Commissioner Velshi, the question she asked about siting in the JRP, is they recommended changes to standards to address issues they had heard about social expectations for

safety within hearings. That is not really in the realm of this Commission, but, as I said in my opening remarks, I think urging the federal government to do that would in fact increase confidence in the CNSC's oversight when you get to the licensing stage, because some of these issues that are outside of the scope and expertise of CNSC staff will be better dealt with under that Act.

THE PRESIDENT: Thank you.

MEMBER VELSHI: I'm not sure you answered my question, but that --

MR. STENSIL: I'm not sure either.

THE PRESIDENT: Dr. Demeter.

MEMBER DEMETER: Thank you.

I wanted to clarify my understanding, based on your questions raised in slide 6 about operations beyond 2024. And just to confirm with staff, because they presented on their presentation here on their slide 28 of their CMD H6-C that Commission approval would be required to operate any unit beyond December 31st, 2024. My understanding of their presentation was that this was not a delegated task, this was a Commission task. Understanding that safe storage now is, as you understood it, part of the operations. But any operations from a power production beyond that, any change to the request would require approval at this level versus at staff level.

MR. FRAPPIER: Gerry Frappier, for the record.

That's correct. Actually, the quote that he has on his slide there, the underlined part is not in the LCH there right now. I think it might have been in an earlier version, and that was an error. So in the section 15.4, end of commercial operation, it is very clear. If you just strike out the part that's underlined, that's what's in there now. So it would read that the licensee -- well, I'll read it:

"This licence condition also ensures that operation beyond December 31, 2024, would constitute a change in the licensing basis requiring approval by the Commission."

Period.

I think the other thing that's important, independent of that line, is we also have, as you know, putting restrictions on the effective full-power hours. So if they wanted to go beyond 295,000, then again that would be something that would have to come to the Commission, not to staff.

And then finally, in the integrated implementation plan that comes out of the PSR, there were also things that are very clear that they must stop

operation in 2024, otherwise there would be a whole bunch of activities they would have to do and that would have to be coordinated with the Commission.

MR. LOCKWOOD: Randy Lockwood --

MEMBER DEMETER: Thank you.

MR. LOCKWOOD: -- for the record.

I already did acknowledge earlier in the hearing that we would not be operating beyond 2024 -- we never had any intention to -- without Commission approval.

THE PRESIDENT: So sounds to me like there's a vibrant agreement with your recommendation on this one.

MR. STENSIL: Yes, that's good news. But again, note this is what is good about intervenors participating, as we flagged a line that was different from what was in public communications originally.

That said, I'd also like, on the licence control handbook, I'm not sure what version I'm working off of now. This is the one I think from April. When I said it was poorly worded, I would also like to flag for the Commission that the proposal that OPG's talking about is to run two reactors 'til 2022 and then the other four shut down in 2024. That I didn't -- in the version of the licence control handbook that I have in front of me, I haven't seen that reflected. And it was reflected in the

previous 2013 licence control handbook, these types of dates.

It's significant because there's timelines that are tied to I think submission of the SOP and SAPs that are based on when a unit closes. It's like three years before a unit closes, you have to do X. So if those dates are not acknowledged in the licence control handbook, you're going to have regulatory confusion. So --

THE PRESIDENT: Okay, that's a good clarification. OPG?

MR. LOCKWOOD: Randy Lockwood, for the record.

As I've already stated earlier in the hearing, and as we submitted a letter in June of 2016 -- June 28 of 2017, my mistake -- stating our intentions to operate Pickering, the end of commercial operations ceasing the end of 2024.

From a business perspective and a planning perspective, to test the economics and ensure everything makes sense, we did run a business case that considered operations of six units to 2022 and four units to 2024, strictly from a business case. And if the economics for that works out, which it did, then it makes good sense to carry forward. But simply that was a business case summary.

THE PRESIDENT: So it's not a regulatory requirement, staff?

MR. FRAPPIER: Gerry Frappier, for the record.

No, there's no regulatory requirement for them to close two of the units. That's not what this licence indicates. It indicates that it's up to them.

Having said that, there may be business reasons why they would want to do that as they have already done with two of the units at the station, but that is not, in our view, an end of commercial operations of the nuclear power plant, since even if they close two, they'd still have four that's operating, which is a pretty big plant.

THE PRESIDENT: Go ahead.

MR. STENSIL: This is an interesting discussion. As I mentioned in the 2013 licence control handbook, these types of dates were set out. And the reason we raised this issue is the original letter that went from OPG to the Commission in the appendix they mention these dates. These were also the dates that were used in the -- when they were at the OEB.

And the reason why they should look into this further, one, it's for compliance on the SOPs and SAPs. Because if you move back to 2022, I think some of them require submission next year. So if OPG already knows

that, they should know that.

Two, this is very important because I participated in these hearings with the assumption that this was their proposal. So I worry about a bait-and-switch at this point. It's gotten a little sketchy.

And the other issue is, again, if you're moving to shut down all six in 2024, we've seen requests from the region for transition plans to mitigate social environmental effects. Shutting down the whole plant in 2024 will be very different from shutting down two in a staged way, moving 500 workers to something else, and then doing the others in the next step.

So this has implications I think for other aspects of the licence renewal that you should look into.

THE PRESIDENT: I'd really like some clarity. If there's a business decision to stop some operations earlier, 2022, what is the regulatory implication of that?

MR. FRAPPIER: Gerry Frappier, for the record.

So under their current operating licence, they have the right to operate and generate power, and they also have the right to shut it down in an orderly, safe way.

The sustainable operation plan that we're saying they have to provide to us five years before the end of operations is the end of operations of all the units at the Pickering site, because that's the point where they start transitioning in a big way into being something quite different.

If today or next year or before 2022, they decided for business reasons they were going to stop operations of a unit, we would expect them to be telling us about that. And then they would have to have a plan for an orderly shutdown of that plant from a technical perspective, but it would not require them to have a sustainable operation plan and all that in place five years before they make that decision.

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

Mr. President, if you'll allow me, here, with respect to the LCH, we definitely like to put clarity on the fact that in the LCH itself, page 140 of 176, Mr. Stensil talks about LCH for part 1, LCH for part 2.

In addition to what was said by our colleagues, and I will pass it on to Dr. Omar, with respect to the SOP as it pertains to the operation and the plans of OPG, in every regulatory requirement, it requires OPG to come to us. At minimum, whenever there is a change and

with the drop deadline being the December 2024.

So the LCH goes in detail with a shell statement by which that the licensee will have to notify the CNSC of their plans. The safety case is the bounding element. Anything they're going to do within the safety case, if they want to go shut down earlier, that is rendering the site safer.

I will pass it on to Dr. Omar to give you the detail associated with the SAR and all these are referenced in the LCH.

MR. OMAR: Al Omar, for the record.

I just wanted to clarify the point if OPG shut down a unit before 2024, what's the impact of the SOP, for instance, which is the sustainable operation plan. The current plan submission by OPG of the first SOP is December 2019. And in this one here, it will be built on previous submission of the SOP. So we expect that submission to be what we call "mature," addressing all concerns and challenges of approaching the end of commercial operation.

So if an early unit or two units shut down, the SOP will be submitted annually to the CNSC staff for view and inspection. And any impact of early shutdown of any unit would be reflected immediately in the annual submission. And then we'll take it from there.

The impact on safety or safe operation of

the entire station will not be impacted by that change, because all the provisions, including workforce management, the fitness for service of all components and structures, will be indicated in the first submission of the SOP.

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

Sir, if you allow me to go to page 141 of 176 of the LCH, again, for clarity and for the record, what Dr. Omar has mentioned and it is clearly stated in the LCH under SOP specific requirements -- so this is specific requirement -- it is the shell statement is being implemented or being referred to.

"The sustainable operation plan shall be developed and implemented at least five years preceding the permanent shutdown of the first unit of Pickering NGS. And for any subsequent Pickering units to be shut down, the SOP shall be updated using lessons learned from previous applications with a report due on the annual basis." (As read in)

So the shell statement does exist and the requirements from regulatory perspective do exist.

MR. STENSIL: This is my point.

THE PRESIDENT: Go ahead.

MR. STENSIL: So I hope I'm working off the same version. But when -- this is what triggered me to say that this seems sloppy, is saying that

"the [SOP] shall be developed and implemented at least five years preceding the permanent shutdown of the first unit." (As read in)

So, yeah, that assumes 2024 if it's December 2029.

My assumption, intervening in these hearings, is that two units will be shut down in 2022, so this is a question of: what is the proposal in front of us that we're being consulted on? When I saw that, I'm like, that's not the usual kind of issue Greenpeace will worry about, but it's just kind of sloppy, because it just affects when things get reported.

Perhaps it should have something in there, if there was guidance on when Pickering A shuts down, like, "If OPG decides to operate Pickering A beyond this, they need to notify the Commission by --"

THE PRESIDENT: No. What I understand staff is saying is if they decide to close earlier there will be an earlier SOP or an earlier update. That's the way I understood --

MR. JAMMAL: Ramzi Jammal, for the record.
That's very true, sir.

To confirm to Mr. Stensil, the fact that, again, in the LCH, the licence condition ensures that operations beyond December 2024 would constitute a change in the licensing basis, requiring approval by the Commission. 2024 is the last date of the -- anything before, if they want to shut down, then, as I said, the bounding element of the safety case, it's a no-go beyond 2024 without your approval.

THE PRESIDENT: Okay.

Look, there's lots of other issues I'd like to talk about. I think we have heard enough, maybe the final word on this one. We have lots of other parties that I'd like to bring to the conversation.

MR. MANLEY: Robin Manley, for the record.

If the Commission would allow us to just put our perspective on that particular story briefly.

OPG completely understands the requirement, both in the previous Licence Conditions Handbook of our existing licence and in the Licence Conditions Handbook that is proposed in front of us today. We have been compliant with the existing Licence Conditions Handbook with the provision of sustainable operation plans from about 2011 through 2016. Then, in 2017, we submitted

a strategic plan aligned with what we submitted in our June 2017 letter that talked about end of commercial operations in 2024.

So, all the way along, we've been meeting the compliance requirements, we've been developing the plans, we've been communicating them with the CNSC, and it's clearly understood by us what the requirements are.

MR. LOCKWOOD: Randy Lockwood.

I just want to add one more point to make this entirely clear, and it speaks to the openness and transparency that we committed to.

As you know, and we've heard about during these hearings, we completed a PSR for 10 years with the idea that end of commercial operation is in 2024, very clear, for the station.

In addition, we were to supply the shutdown dates for Pickering, which we did, June 28 of 2017. As well, we intended to shut down the Pickering station at the end of 2024.

I will also add that you will find all of this information, the application and this letter, posted on our website.

In addition, I've communicated our plans to the public in the way of community information sessions. I've communicated those to staff, our community advisory

committee, and as well local community councils.

THE PRESIDENT: Okay.

Another question, please?

MEMBER VELSHI: I know, Mr. Stensil, you never need help in what you're asking for, but I just wanted to clarify that in your proposed amendment to the Licence Conditions Handbook, it's not only not delegating Commission authority but you want it reviewed by the public as well, and I just wanted to -- we hadn't discussed that, but that is in there.

MR. STENSIL: Thank you.

MEMBER VELSHI: My question is on your Slide No. 5 on the periodic safety review, and following OPG's comment around transparency, you now are claiming that it isn't sufficient, whether it's OPG or CNSC staff. Perhaps you can elaborate on specifically what you were looking for that you weren't able to get, and why that would be helpful for the Commission in its deliberations, please.

MR. STENSIL: Thank you for the question.

About three years ago, I started preparing for this hearing and trying to gather -- it's very difficult to get information, so it's time-consuming, and I started putting in access to information requests. What interests me most is what are the safety upgrades that are

being done and are not being done for this four-year application. This is very relevant to safety because, again back to the Groundhog Day issue, five years ago we had an application where OPG said, "We're going to run to 2020. We're not going to refurbish the plant and upgrade to a higher level of safety, closer to modern plans." There are cost-benefit decisions that happen when you decide how long you're going to operate the plant. Cost-benefit decisions, to my understanding, are they partly use the probabilistic risk assessments, but time is also a factor of what is the benefit or the cost, so when they applied in 2016, theoretically, if you run to 2020, you have a shorter amount of time, so there will be less benefit and more cost, theoretically.

Now we have a situation where they've come back again and said, "We want to run to 2024." It's Groundhog Day, and it's for a short period. I have no clarity on what their baseline was. Are they using just this four-year period or did they go back and re-establish a baseline from the original date? If they had applied in 2013, theoretically, I don't have access to this data, they would have looked at all that and said, "Okay. We're going to run for 10 more years." It may have affected those decisions.

What we've heard within the scope of this

hearing are the good things, the safety upgrades, the strengthening of programs. What we haven't heard is the discussion of what wasn't taken up in this analysis. What I was looking for was what was on the list and what wasn't on the list. That is a fair discussion.

At the Bruce hearings last month, the lawyer for the Saugeen made an interesting comment where they want to be involved when it comes to -- I think around fisheries decisions and cost-benefit decisions, because they want to make sure their values are reflected in those discussions. I have no access to any of that information, and for me that is key.

OPG is saying it's appropriately safe. I don't know what their measure is. The first request I asked for actually came from an OEB document. I know, Commissioner Velshi, you are now on the OEB. The OEB has a lot more transparency than the Commission in terms of filings, and OPG had submitted to the OEB its technical case for the continued operations to 2022 and 2024. There was a line in there that basically said the cost-effectiveness will also depend on agreement with the regulator on the time period under which these safety upgrades will be considered, so there was some sort of agreement between the two.

For the new commissioners, one of the

issues with the vulnerabilities of the Canadian Nuclear Safety Commission's framework is it's not prescriptive, that can also be a quality, but where it's vulnerable is it involves a lot of negotiation between staff and OPG because it's not prescriptive, there's not a clear rule to state compliance, so they have to decide on what is acceptable. It's that agreement that I am often interested in, because that's where the compromise on public safety may happen to the benefit of OPG's financial case. When I asked for that line in an access to information request to the Commission, "Can you provide me all documents on what the content of those discussions were", I got a letter back, and it was kind of unusual for an access to information request because it said, "These are all redacted, and we invite you to participate in the hearings two years from now to show your views", on an access to information letter. It was very odd.

To me, this just prevented -- I was thinking about this three years ago -- this has just basically prevented me from making any valuable comment to the Commission on these types of issues, and without that information, I can't have confidence that they are in fact going for the best.

So, not in short, but that's a summary of my concerns.

MEMBER VELSHI: Thank you.

I'll get staff to comment on what we've heard from the intervenor.

MR. FRAPPIER: Gerry Frappier, for the record.

I'll ask Al Omar to talk a bit about the PSR process, because I think that's really what is being asked about.

I would say that there was a PSR done by the licensee with a date of the 2020. That was done before and was important to our last hearing. When they decided they were going to go until 2024, then that was one of the requirements that was placed on them by the regulator, that they must update that PSR now that they're going to be going for an extra four years, so certainly at that point they had to take a look and see what is appropriate, given that they are going to continue operating a little bit longer.

With that, I'd ask Mr. Omar to talk about how we looked, at the various meetings, at the gap between modern standards and what they're proposing.

MR. OMAR: Al Omar, for the record.

When OPG hinted at least that they may go beyond 2020, we sent a formal letter requesting OPG to perform a PSR for going from 2020 to 2024. The PSR itself

is a systematic internationally-recognized process to confirm how close the station requirements are to current code standards and standards, whether the licensing basis will continue to be validated, and what kind of improvements can be added to enhance the safety, the station itself is safe, but just to enhance the safety to bring it, as practical as possible, to a new build. The last requirement or objective of the PSR is to ensure that programs, including processes, procedures, and so on, are in place to ensure the effective implementation of these safety enhancements.

The PSR includes four very specific steps. The first step is to establish what we call the basis document and this is more or less a contract between the regulator and the operator on how the PSR will be conducted, what kind of coverage of code and standard and what methodology will be used and what will be the output of that.

The second step is to perform a review of what we call 15 safety factors. Every safety factor addresses a specific aspect of operation or design, human performance, safety performance, radiation protection and so on and so forth. And these are the most extensive review, and part of that review will include all relevant new code and standard, as well as what we call task review

based on internationally recognized IAEA document.

The output of that, we call it gaps, meaning a finding of a potential requirement to satisfy the current code and standard that will be considered in the next steps that will lead ultimately to enhancement in safety to bring that station closer to a new built.

So, the next step is what we call global assessment, that you take all the output of the safety factor report review and have all consideration, including defence-in-depth, what do you have good practices and you assess the global assessment, global safety of operating beyond that to 2024 and have a determination whether -- related to continued validity of the safety case to operate to 2024.

Out of this it comes the implementation -- Integrated Implementation Plan and the current one include 72 actions --

THE PRESIDENT: I think the process is well known and well described.

MR. OMAR: Sure.

THE PRESIDENT: The question was, is any of this in the public domain?

MR. OMAR: Okay.

MR. JAMMAL: It's Ramzi Jammal, for the record. We published CMD in Part 1, and again this is for

clarity, I have no issues at all with the concerns raised by Mr. Stensil.

So, if you look at page 18, section 3.3 of Part 1 CMD, clearly list the references that were established by staff in exchange with OPG. Those references are publicly available.

With respect to the cost/benefit analysis, I will like to make a comment that no regulator in the world should pretend that they can do a proper cost/benefit analysis because we don't have the expertise, nor the knowledge that the operator does.

The USNRC and other regulators when they were audited on the cost/benefit analysis, they told them, don't do it because you do not know what you're doing.

So, what we do ourselves is, we look at the cost/benefit analysis with respect to safety enhancement. Is the safety enhancement adequate so that there is no compromise?

So, based on risk and from decision-making, there are safety enhancements the licensee must take without any cost/benefit analysis, and that is referred to in our CMD.

So, risk-significant upgrades are done, no debate about it. So, that's --

THE PRESIDENT: Were they all in the

public, that's what --

MR. JAMMAL: Yeah, they are all referenced --

THE PRESIDENT: That's what I think they need.

MR. JAMMAL: They are all referenced.

THE PRESIDENT: So, the intervenor said they asked for the documentation and didn't get the documentation.

MR. JAMMAL: Well, I heard he got the documentation...

THE PRESIDENT: Okay. OPG?

MR. GREGORIS: Steve Gregoris, Deputy Site Vice-President, Pickering, for the record.

As Mr. Omar discussed, Pickering completed an extensive PSR. Just for perspective, so aligned with regulatory requirements, international standards, it took a hundred people two and a half years to do this. That is the level of effort, okay.

When we completed this PSR, as Mr. Omar said, we identified improvement opportunities as part of the global assessment report. That global assessment report is published, it's on OPG.com, it's available.

The global assessment report identifies all safety improvement opportunities identified through the

PSR process. It also clearly explains how those safety improvement opportunities are grouped based on commonality, how they're ranked specifically to safety improvement significance, and then how they're chosen or not chosen. All laid out in the global assessment report, it's available to the public.

Based on safety alone and the safety improvement opportunities and the biggest safety improvements, actions were then chosen, again, shown in the report and those actions were then translated into the Integrated Implementation Plan and those actions and the Integrated Implementation Plan are available for the public.

So, what I'd like to say is, nuclear safety, transparency, two key fundamental commitments for us. This is a perfect example of dealing with safety, safety improvements, how we've made decisions and made it available to the public.

MEMBER VELSHI: So, Mr. Stensil, you're shaking your head. Have you seen this global assessment report and all the references to it?

MR. STENSIL: Yes, I've seen the global assessment report. What we did not hear in this back and forth was why all Access to Information requests I have filed asking for staff's comments on proposals of upgrades

have been withheld. I assume they're not references in that document.

My fear for the Commission is, you're being handed a huge document and it can be very impressive, in the same way that an emergency plan can seem impressive, we've handled everything, but it's drilling down into those details to actually see how those decisions are made that I have not had access to.

And I did not hear a response why the Commission -- why I got this friendly letter saying, we encourage you to participate in three years, and no, you can't have that information. Something -- in French it's *c'est louche*, something doesn't make sense.

And until I have access to that type of information, I can't have confidence and I don't think you should going forward.

THE PRESIDENT: If you're talking about the deliberation and operation of staff, you're talking about the ATIP and this is not the place for us to discuss the ATIP legislation, this is a whole different process.

MR. STENSIL: It is not a whole different thing.

THE PRESIDENT: Okay. Look --

MR. STENSIL: I'm not done my comments to Commissioner Velshi's statement.

If you look closely at my submission, one of the reasons why I was worried about this, is I reference a briefing note that went to the Minister when Pickering was originally closed -- thank you... -- and one of the comments that it made was when they had done their original periodic safety review, PSR 1 that's referred to now, what they found is cost/ benefit analysis showed that little safety improvement would have been derived as a result of investing \$100-million, would result in very little safety improvement.

So, notes like this were being given to the Minister of Energy, that even if they invest a lot of money they're not going to get -- in refurbishment, they're not going to get a lot of safety improvement.

But what we hear here is, we've done this wonderful PSR and we're approaching, you know, safety of a new reactor. This does not add up to me and ATI is, in fact, part of this process, respectfully, Mr. Binder, so a lot of my submissions have been influenced by it or informed by it.

I'm not finished.

THE PRESIDENT: What --

MR. STENSIL: And when you look at -- I'm not finished, excuse me.

Commissioner Velshi again, at the Ontario

Energy Board what you'll often see, OPG will file documents saying, we would like this included in our rates for "x" safety improvement and they will give you three scenarios; medium, high and low for benefit.

They release that to the Ontario Energy Board. We have no equivalent at the Canadian Nuclear Safety Commission for these types of decisions.

And I would encourage you, I can't see it being done in time for this project, but for other PSRs for the Bruce, they're doing them every 10 years, I think improvements can be made on how those discussions take place publicly and we haven't had them this time, and that's why I'm saying this PSR, it's a wonderful large document, but I can't verify it.

MEMBER VELSHI: Thank you. And staff, last word on this.

MR. FRAPPIER: Gerry Frappier, for the record. So, as mentioned the IIP is available in the public, it's attached to our submission. The global assessment report is available to the public. And the safety factor reviews that are what we undertake, if you like, so each one of the -- I forget the number of safety factor reports there are, has been reviewed by staff and that's available upon request.

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

THE PRESIDENT: No, I want to move on to emergency management. We have a lot of people in here and are willing to talk about this. I think we've heard enough about the previous topic, and we have opportunity to re-raise it a bit later on.

But right now I'd like to start with the Office of the Fire Marshal. The intervenor made a lot of comments on that.

We also have, I understand, Dr. Kyle from Durham Regional Health Department available. We have Environment Canada and Climate Change and Health Canada.

So, all of these are available to discuss this topic which is very prominently discussed in this intervenor's submission.

So, Office of the Fire Marshal, over to you, please.

MR. MORTON: For the record, I'm Mike Morton, Director of Emergency Management with the Office of the Fire Marshal and Emergency Management.

As the legislated off-site lead for emergency management and emergency preparedness for nuclear emergencies in Ontario, we very much appreciate the opportunity to participate in this public hearing.

As we discussed during the hearing on Tuesday, as well as at previous meetings of the Commission,

and we have heard Ontario has strong emergency plans in place for nuclear and radiological incidents, including very specific plans for the Pickering Nuclear Generating Station.

These plans are consistent not only with the Canadian Standards Association N1600 standard for nuclear emergency management in Canada, but are also consistent with international guidance such as IAEA, GSR-7 and GSR-2.

These plans, as well as the scenarios that they're based on, have been developed in close consultation not only with CNSC and Health Canada staff, but they have been put out for public review through a 75-day review period and we received, as I reported on Tuesday, 1,600 comments in response to that.

All of those comments were reviewed by an international advisory group that has provided us a validation of those scenarios, as well as recommendations on how we can even further enhance our programs. Many of those recommendations have been addressed in the 2017 PNERP which was released in November and are further reflected in the site-specific plan, released in March of 2018.

As reported yesterday in the hearing, we are also seeking global review of these programs. We are confident that our programs meet national and international

standards, and we are working closely with Health Canada to support the visit of an EPREV mission to Canada that will assess these programs through peer review, experts from around the world to look at all of the aspects of our emergency management programming.

While we have gone on the record over the last days on a number of aspects of emergency preparedness, including the contents of the plans; some of the upgrades to the plans; we spoke a lot on Tuesday about evacuation; we have referenced public alerting; we did want to go on record to provide some further clarity around arrangements related to distribution of KI and particularly when KI would be used as one of the protective actions that is available to us, along with our primary protective actions of evacuation and sheltering.

So with the Commission's permission, I would just like to turn it over to our chief scientist, Lori Whitcombe, who is sitting to my left. Lori can provide some background as to a little bit further in-depth as to the scenarios and planning, understanding this is an area that the intervenor has expressed interest in.

Lori?

MS WHITCOMBE: Lori Whitcombe, OFMEM, for the record.

As Mike just stated, the PNERP, we have

spoken over the course of the last few days how the PNERP outlines the provisions that are already in place for KI distribution in the automatic action zone, the detailed planning zone, and the contingency planning zone. We have also outlined over the last few days how the PNERP revision that was undertaken in 2017, incorporates the principles of optimization of strategy and has always incorporated the fundamental principle of reducing or avoiding entirely any radiation exposure.

The detailed modeling that underlies the planning basis in the current PNERP indicates a deposition beyond the automatic action zone and the detailed planning zone is not anticipated in most accident scenarios. In the highly unlikely and low probability scenario that deposition is anticipated to for beyond the detailed planning zone, the consumption of KI in specific sectors of the contingency planning zone and the ingestion planning zone would be implemented.

To be clear, in a severe accident, KI consumption in the automatic action zone is a default protective action. KI consumption in the detailed planning zone for those who are not able to evacuate prior to the start of the release would be implemented under the authority of the Chief Medical Officer of Health of Ontario.

If KI is necessary beyond the DPZ, in the CPZ or the IPZ, a key strategy would be employed. That is, for populations in sectors that align with the direction of the plume, KI would be recommended as a protective action for those sectors that cannot be evacuated.

As we have mentioned previously, we are also undertaking a technical study at the current time. That technical study will be used to inform any decisions that are necessary with regard to the revision of our zones, and KI distribution.

I would also like to reiterate that residents of the CPZ and the IPZ that are concerned about radioiodine exposure can visit the PreparedtoBeSafe website at any time to order KI for themselves and their families.

THE PRESIDENT: Before -- I'm sure that you just raised many, many questions, but before we do this, I'd like Health Canada, if you want to make a statement right here and now.

Health Canada?

MR. AHIER: Can you hear us?

THE PRESIDENT: Yeah, go ahead, please.

MR. AHIER: Yes, this is Brian Ahier, Director of Radiation Protection Bureau at Health Canada, for the record.

I just want to start by saying that we

appreciate the opportunity to participate in the hearing and from the federal perspective, we believe that our federal arrangements, as specified in the Federal Emergency Response Plan and the Federal Nuclear Emergency Plan are sound, well-aligned with IAEA, relevant IAEA safety standards and we have validated that through many exercises with the Province of Ontario in other situations.

With respect to some of the specific comments from Mr. Stensil, we also believe that the current version of the Ontario Provincial Nuclear Emergency Plan is an adequate plan. We can provide a bit more information on our view on this, and I would like to hand the microphone over to Mr. Kevin Buchanan, who was the lead on undertaking the technical hazard assessment that we did in support of the PNERP revision.

MR. BUCHANAN: Kevin Buchanan, for the record.

So as Brian had said, so Health Canada does believe that the current version of the PNERP is adequate. Just to restate that, that the current version of the PNERP is adequate. Health Canada contributed a technical study to inform the current version of the PNERP as we previously heard.

So the modeling in the report used two source terms that represented different INS-level seven

events in terms of the iodine content. This has come up before and I need to reinforce this, that the modeling that was done did represent an INS-level seven event, in terms of the iodine content. So we can put that debate to rest.

The source terms were provided by the CNSC, and Health Canada respects and relies on their expertise and guidance regarding its applicability to emergency planning.

The modeling that was done previously by Health Canada indicated that some intervention levels might exceed the operational intervention levels in the previous PNERP. So stated in a different manner, the plume exposure zone could extend -- could extend beyond the previously defined primary zone in the 2009 PNERP. So if you're not familiar with the designated plume exposure planning zone, this is a zone that's defined within REGDOC-2.10.1

So at the conclusion of this work, Health Canada recommended that the Province of Ontario increase its zone sizes to adequately protect the public, which they did. We understand that this led to the inclusion of a contingency planning zone and we are very happy to see the results adopted into the current version of the 2017 PNERP.

So to clarify this improvement for everybody, in terms of international standards, the 2017 PNERP addition of a 20-kilometre planning zone, beyond the

10-kilometre detailed planning zone, addresses the same response issue covered in IAEA's recommendations for urgent protective action planning zones, which is, if it hasn't come up before, between 15 to 30 kilometres. So it falls within the ranges recommended by the IAEA.

Okay. So now from the 2017 PNERP, the improvements are described as follows: The contingency planning zone is an area beyond the 10-kilometre detailed planning zone where contingency planning and arrangements are made in advance so that during a nuclear emergency protective actions can be extended beyond the detailed planning zone, as required to reduce the potential for exposure.

So we had heard the response from OPG, and Health Canada accepts Lori Whitcombe's explanation of how that would be interpreted within the contingency planning zone. So, Health Canada believes that the current version of the PNERP, if executed as intended, represents a substantial improvement from the 2009 version.

I'll make the following statement. It does tie in with Lori's comments. So because the intent of the statement in the 2017 PNERP and the definition of the designated plume exposure planning zone, Health Canada recommends and would expect that all arrangements in the contingency planning zone be reviewed to ensure that they

are consistent with the hazards assessment and implementable and executable.

We had heard from Lori that this is in fact the case.

THE PRESIDENT: The only missing piece --

MR. AHIER: So Brian Ahier, for the record, just to close.

To reiterate, we believe that the PNERP is adequate and, certainly at the federal level we remain ready to implement our federal arrangements to support the province, if required. And just to close this comment, we would also just want to reiterate that, as was previously mentioned earlier during the hearing, we are working with our federal, provincial and industry partners to plan for an IAEA peer review of our arrangements against the relevant IAEA safety standards and that planning -- the planning for that peer review is in process. The review will be conducted within the coming year.

THE PRESIDENT: Thank you for that.

So the only missing piece is on the execution, and we have Dr. Kyle here, who I assume is going to be the trigger to make this thing in case of an emergency. So maybe you can shed some light as to how this is working or will work in case of an unlikely --

DR. KYLE: Robert Kyle, Commissioner and

Medical Officer of Health, Durham Region Health Department.

To my right is Mary-Anne Pietrusiak, who is an epidemiologist who can answer any questions the Commission may have either now or later with respect to cancer and that sort of thing.

So what I would say is this. I am an implementer. The PNERP, the site-specific plans and the Durham Region emergency master plan, although we may have input into the latter, we are more implementers and I really don't have any comments as to the adequacy of either the PNERP or the site-specific response.

Currently, as a department, we are responsible under our master plan for the pre-distribution of KI pills within 10 kilometres to vulnerable groups, namely schools, child care centres, long term care homes and certain emergency personnel.

Our current focus this year is on replacing the current stock of KI pills whose shelf life is expiring.

So the other thing that we do in addition to pre-distribution is we work with OPG when it was directed to pre-distribute to all residents and businesses within the 10-km zone. Our role was more on the communication side of things, and I'm going to say health information side of things.

We have up to five pharmacies within the 10-km zone that are stocked with KI pills and three times a year, through press releases primarily, we advertise the availability of local stocks and we also direct interested members of the public to the Prepare to be Safe website should they want to access KI pills.

So if pre-distribution was to expand beyond 10 km, there would certainly be some capacity challenges. Depending on how far, you'd get into multi-jurisdictional, I guess, coordinated requirements. So to our west is the City of Toronto, to the east, depending on how far you go out, are more rural health units, Haliburton, Kawartha, Pine Ridge and Peterborough.

So there'd need to be a lot of coordination to make that happen. But we would do our part to work with OPG or whoever's directed to lead pre-distribution.

I don't really have an opinion on how far pre-distribution should go. Should it be 20 km, should it be 50 km. But what I would say is the farther you go the more complicated it is, the more multi-jurisdictional it will be and, quite frankly, we would need assistance from the province.

As you've heard from the Office of the Fire Marshal and Emergency Preparedness, I would not direct

the public to ingest, it would be the Chief Medical Officer of Health.

I think those are my preliminary comments. I'm happy to answer any questions. But the further out you go, the more problematic it is.

Finally, what I would say is the voluntary approach does not work if people are stuck in their cars or otherwise unable to evacuate if they happened to be exposed to a radioactive plume. So I do think if that is a serious consideration, you do need to think about a pre-distribution strategy.

Whether it's the entire population, whether it's particularly vulnerable population, say children and youth who you're most concerned about with respect to thyroid cancer. The depth and breadth, all those options have pros and cons, and you'd need to give some thought to that.

Finally, there's the issue of payment. So any instrument you could use to require OPG to pay for it I think would be appreciated by multiple stakeholders.

Thanks.

MR. LOCKWOOD: Randy Lockwood, for the record. If I may, President Binder, we've looked at various pieces through the hearing here, and are disjointed in my opinion.

I believe what I would have liked to -- because I'm actually concerned about members of the public listening to this because we're talking about it in kind of disjointed manner. It's paramount that they understand in the unfortunate event we had that happen today, right now, that we're prepared to go, and that we have tested that and exercised unified control in December 2017.

So I would like to ask the Commission permission to turn this over to Scott and let's start back from the beginning and tell the story how this would unfold. If you would allow us that permission?

THE PRESIDENT: By all means. There's lots of other questions that we'd like to know. So really focus -- what our concern over the last few days is we did not get clarity about what we -- I think we have clarity on what happened in the 10-km zone.

We're not sure about the 20, and we definitely don't know about the 50. We really would like to see the detailed plan, to answer your question, if it happened tomorrow morning, who does what and how, and where are they pre-distributed kind of thing.

So that's what's really missing. So if you can shed some light onto that aspect, it would be welcome.

MR. LOCKWOOD: Randy Lockwood, for the

record. So I will turn it over to Scott Burns. But I do think that it's important that we start from the beginning to make sure we understand how things would unfold.

MEMBER VELSHI: I just want to reiterate what President Binder has said. I don't think we need to worry about the primary zone now. I think the focus should be on the other two.

MR. LOCKWOOD: Randy Lockwood, for the record. I understand, but it's important that we put the items in order in terms of the various emergency operation centres spinning up and how they spin up, because that factors into the back end which we're trying to talk about.

MR. BURNS: Scott Burns, for the record. Thank you for the opportunity to clarify. As Mr. Lockwood mentioned, we have heard lots of concerns raised about emergency preparedness, and I want to make some comments to give the Commission and the public a sense of confidence on this.

So to introduce my comments, I would say we'll assume that an emergency has happened today. So OPG would go through a process of identifying and activating the emergency procedures and notifying the Province and the CNSC as per those guidelines.

OPG, CNSC, the Province, the City of Toronto, and the Region of Durham would all activate their

emergency operations centre.

I'm not sure why this is happening right now, but... that was not part of the planning.

--- Laughter/Rires

MR. BURNS: So all of these organizations, Health Canada, as well we've heard from them, they would activate their emergency operations centre. People would start arriving -- trained experts, professionals, would start arriving to each of those emergency operations centres and take up their roles and responsibilities within those.

They would have procedures to follow with respect to their specific role, and they would begin to work on those things. Within the Province, we've heard health would be there, transportation would be there, we'd have scientists looking at the plant emergency data, which gets automatically transferred to the Province and to the CNSC from OPG.

We would be, if we're thinking about what's happening later, reception centres would be activated, emergency worker centres would be activated. If we use the example of the Durham Region, school boards, hospitals, long-term care facilities, childcare facilities, they'd all be notified. The region knows their list of folks. Public alerting would begin. We have the whole

system for that.

Inside the region, and I'm speaking a little bit for the region, but inside their specific role, so you've asked for details, the roles inside the emergency operations centres for the region would include: health, Dr. Kyle's group; social services; police; fire; EMS would have representation in there; works department; transit, and under those specific roles there's a whole army of people that would be responding to this.

This would be everyone's priority on this day. All of these centres, all of these people, would have two focuses; we'd have off-site, and we'd have on-site focus.

The two priorities for off-site would be protective action levels and communicating with the public. This whole army of people would be focused on those details. If it got to the point -- so we've heard from the Province about this ingestion planning zone, the contingency plan zone, they're divided into sectors and the ingestion planning zone is divided into subzones. The purposes of that is to assist the decision makers in making decisions around protective actions.

So if we got to a place where we were looking at a hot spot, so to speak -- we've heard the Province reference that earlier on in the week -- it would

be a smaller defined area that they would be focused on to deliver KI pills in the ingestion planning zone.

I'd also mention at the same time there's other things happening. This would be happening and transpiring over time. There'd be consideration for a venting strategy, as that would be over time, many hours, before we got to the decision where the Province gave direction to the Region of Durham in that emergency operations centre, and that army of people underneath there, that it's time to distribute KI.

Our KI strategy is stockpiling, which is found to meet the requirements under the PNERP and the Regulatory Document. That strategy was discussed at our Nuclear Emergency Management Coordinating Committee, all the partners were there. It fits for our demographics.

In the reception centres that we have we have 250,000 (a quarter of a million) pills in those reception centres ready to be distributed to the public.

THE PRESIDENT: So, really --

MR. BURNS: So the detailed planning would be the sole responsibility on that day of the emergency operations centre within the Durham Region and would be deployed through all of those functional responsibilities within that emergency operations centre and executed, implemented, by the people that support that emergency

operations centre.

So we heard from the Province earlier. Their focus is not just on nuclear, but emergency management. They deal with large-scale emergency and deliver of goods in a lot of different scenarios. They know how to execute this work. The emergency service personnel and organizations on the ground know how to execute this work.

The plans closer to the source of the event that I'm talking about, the hypothetical event that I'm talking about, they require more detail because the urgency and the risk involved is greater closer to the source. This assumes that the emergency mitigating equipment and all the safety systems we heard about earlier in the week, they haven't worked. They haven't worked, so --

THE PRESIDENT: Okay. Look, you keep repeating things that we already know --

MR. BURNS: I know you know it.

THE PRESIDENT: -- and we understand this. We asked a very specific question, I want to follow the pills. I'm not interested in anything else.

MR. BURNS: Okay.

THE PRESIDENT: I want to know where the pills -- you mentioned 25 reception areas. Where are they,

where are the locations, what is in each reception area?

MR. BURNS: The reception --

THE PRESIDENT: Why can't we get a straight answer?

MR. BURNS: That's my point.

THE PRESIDENT: So please get to it.

MR. BURNS: The reception centres contain 250,000 pills.

THE PRESIDENT: Where are they? Are they all -- do they cover the whole 50-kilometre zone?

MR. BURNS: They are in the contingency planning zone.

THE PRESIDENT: What about the 50K zone?

MR. BURNS: So in terms of the 50-kilometre zone, we don't currently -- we have a host community that is outside of -- a host reception centre, a host community that is outside of that. There are not reception centres currently located. As I mentioned, the contingency planning zone is -- the name of it states that there will be contingency plans in place, that is part of the Provincial Nuclear Emergency Response Plan, and organizations responsible for these plans are looking at and starting to implement these --

THE PRESIDENT: There is something called 50-kilometre ingestion zone.

MR. BURNS: Correct.

THE PRESIDENT: There are two regulatory provisions that make it clear that you have to have distribution of that, some plan for distribution. We have not yet seen that plan.

MR. BURNS: So what --

THE PRESIDENT: Excuse me, okay. I would like to turn to staff now, and again, let's go through those two requirements. They are not guidance, they are requirements, and I want to understand what is the plan for fulfilling those two requirements. And Dr. Sandor, you can jump right in there. I know this is something dear to your heart.

MEMBER DEMETER: Just for background, because I like the here and now analogy, the Nuclear Emergency Preparedness and Response REGDOC was put out in Version 1 in 2014, that is four years ago, Version 2 in 2016, but there was no change to the language that for the ingestion planning zone there should be pre-stocking and efficient distribution and particular concern to sensitive populations such as children and pregnant women. So if we are talking about the here and now, if we had to distribute KI pills in the ingestion planning zone, I just need to know how. Who is accountable, who is responsible and how will it be distributed in an efficient manner? That's all

I want. I really understand the detailed planning zone, I really understand the contingency, the scalable, but there has been a significant lack -- I just need the details to understand how it will be distributed and who is accountable so that I can feel comfortable that it is there and it can be distributed efficiently, especially to the vulnerable populations.

THE PRESIDENT: I don't want to put -- I understand there is a transition of government, I understand bureaucracy issues, I understand tariffs, I understand all those things. Just please share with us what it is that you can share with us now and what you can share with us later if it doesn't exist.

MR. MORTON: Mike Morton, for the record, Office of the Fire Marshal and Emergency Management.

I am going to turn to Kathy Bleyer, who is our Senior Nuclear Emergency Preparedness Officer. She will speak just a little bit more about the zones, and apologies if a little bit of that is on the record previously, but I think it is really important to understand the scenarios in which KI would be considered.

This is not about simultaneous distribution to everybody within a 50-kilometre zone. These scenarios have been carefully modelled by Health Canada, who could speak further to some of the specific

credible scenarios that again have been peer-reviewed. Kathy will just talk a little bit about this under the severe accident, which really is the only time where we would have indication of KI ingestion, and again, KI ingestion having a very specific purpose during a situation where radioactive iodine could be inhaled as a plume passes over. We are always going to prefer to evacuate people to have them not exposed to radiation and that is why the automatic actions are in place that Lorie outlined in the 3-kilometre zone, as well as very specific and detailed preparations and actions in the detailed planning zone. So Kathy will take us a little bit into the overall scenario, how that relates to the CPZ.

Again, Health Canada may want to emphasize some of the specifics of that scenario.

And then Jonathan Stone, who is our Manager of the Planned Exercise Unit, he is ready to speak to the specifics that have been asked about the REGDOC and how it's --

MEMBER DEMETER: Yes. I think just for timing, the precision I want is today, the Chief Medical Officer says yes, there is a plume, distribute the KI. I want to know who and how and the accountability. There's a lot of scenarios, but today you have a zone, you have a certain sector of people you can't evacuate, you have to

distribute it, who and how? Who is the accountability, who are the players?

MR. MORTON: Mike Morton, for the record.

I think we can provide further detail on that through the scenario itself, which is the only scenario in which case we would be considering this outside of the 10, which is the severe accident scenario. So I will just leave it to Kathy or Jonathan to decide who is best to go first on this, but provide us with that context.

MS BLEYER: I don't want to be repetitive, so I will try and narrow the focus down as far as possible.

So when we did the planning basis review, we looked at the severe accident scenario. So based on that severe accident scenario and specifically in terms of the need to ingest KI pills, the modelling indicated that the dose -- the intervention level for KI pill ingestion would be reached out to 7 kilometres and that that 7 kilometres was looking at sort of the mean dose.

So we looked at two doses -- or Health Canada actually looked at two doses: mean dose and maximum dose.

So the mean dose was the average dose, and in terms of the mean dose, the mean dose defines a zone where exceeding the generic criteria or intervention level is highly probable and to that distance in a range of

directions. So basically given that dose being reached, we are looking at the entire radius potentially having to ingest KI pills.

In terms of a maximum dose, a maximum dose defines the area where the risk is in a very specific direction and range best defined by environmental monitoring.

So basically you have the mean dose which we found would go out to a 7-kilometre area where KI ingestion might be needed. The maximum dose was 33 kilometres, so that of course takes us into the ingestion planning zone, but that would be in a very specific direction under the plume.

So basically, again, our first protective measure of choice is evacuation. Under even the most severe accident scenario there is the element of time where we could call for an evacuation. For the event where there might be some kind of severe weather situation where people can't evacuate or where there are some people left in the area who can't evacuate, we could do a focused distribution of KI pills to that area.

So in terms of the way we see the accident progressing, to do pre-distribution out to a whole 50-kilometre area just doesn't make a whole lot of sense, given that in this highly unlikely scenario, and on top of

that the highly unlikely weather event that would prevent people from leaving the area before the plume, we could undertake a focused distribution. It is the kind of thing we do under different kinds of emergency situations. We would involve emergency responders to take the pills out to the area as needed. So that's basically how we foresee the situation going.

THE PRESIDENT: So even in your scenario, who distributes the pills to the 33 kilometres? Where do they get the pills from and who actually distributes it?

MR. STONE: Jonathan Stone, OFMEM, for the record.

So as noted, at present there are 6 million doses of potassium iodide that are pre-stocked, available and stored at the provincial government pharmacy in the GTA. This constitutes --

THE PRESIDENT: Is it one -- sorry, I'm going to interrupt you. Is it one place?

MR. STONE: Yes. So the 6 million doses for the IPZ are stored at the provincial government pharmacy in the GTA. Now, this constitutes a credible location as required in section 2.3.4 of REGDOC-2.10.1. These pills have been procured by OPG as required and stored under the control of the Ministry of Health and Long-Term Care. These doses do account for sufficient

numbers of pills to cover populations of children under 18, pregnant women and breastfeeding women. That is also consistent with the requirement of REGDOC-2.10.1. So that constitutes your sensitive populations.

These pills are located in a place so that they could be readily accessed and efficiently and promptly provided to members of the public as required based on the scenario that has just been discussed. The location of these pills was selected by the provincial KI Working Group following the publication of REGDOC-2.10.1. The Working Group included our office, the Ministry of Health and Long-Term Care, the licensee as required by the licence. So everyone who needed to be involved in the discussion pursuant to the REGDOC was involved with selecting the location, and the justification for that really relates to the requirement within the PNERP Master Plan.

So at Annex I of the Master Plan there is a requirement for the Ministry of Health and Long-Term Care and OFMEM to develop and maintain a strategy for the distribution of pills within the IPZ as necessary during an emergency. So the distribution strategy would rely on the mechanisms that we have in place.

As noted by OPG, the PEOC is regularly called on to undertake complex emergency response and emergency logistics operations throughout Ontario, notably

to coordinate the evacuation of communities threatened by floods and forest fires. So we frequently move large numbers of people from remote northern communities into host communities far away. So we are not moving pills safely, we are moving people safely. We do that every year on a regular basis. We just completed an evacuation and repatriation of James Bay Coast communities this spring. We also did it last year. So the experience gained through these operational activities would be used to coordinate the emergency distribution of KI in the IPZ. These aren't exercises, these are the results of real operations that we do on an annual basis.

So the strategy for the distribution of KI pills within the IPZ as necessary to the specific locations would be as follows. Should the need arise to coordinate the distribution, the PEOC would coordinate that delivery as part of the overall response strategy. We wouldn't be able to know obviously in advance where the pills would need to go because that would be based on modelling. So the PEOC scientific section would use modelling to determine exactly where within the IPZ these pills would need to go and where that specific distribution would be. And again, keeping in mind the key holding strategy, these would in large part be sent to places for people who could not be evacuated.

MEMBER DEMETER: I understand that.

MR. STONE: Okay. So --

MEMBER DEMETER: Just stop for a second, please.

MR. STONE: Yes. Right.

MEMBER DEMETER: So let's say you have a plume, you have to distribute, all I want to know is who has the accountability to go to the central radiopharmacy, pick up the drugs and transfer them to the sites that are within that plume, within that modelling? Is the Office of the Fire Marshal accountable for the physical delivery or is it another -- I know this is multijurisdictional but I still -- I need a mechanical answer to who is accountable for distributing if the decision to distribute is made.

THE PRESIDENT: Just to make it even more complicated, we are dealing -- there's a clock going. Those KI pills, if you are going to be two days later, forget about it. So there is a clock. You want to do it on time to be as most effective as possible. That is why we are so preoccupied with distribution, because if it comes from one centre and you have to distribute to 300,000 people, let's assume the plume is right through all those schools, I have no idea how you are going to do it.

MR. MORTON: Mike Morton, for the record. Building on what Kathy Bleyer said about

this scenario and understanding this is a limited geographic scope specifically of people that could not be evacuated, and from what we heard on Tuesday from Ministry of Transportation as well as the statistics and timings that they have provided at past hearings even beyond the 10 kilometres in terms of evacuation and based on the scenario that Kathy outlined, it is very possible to evacuate people from the zones, and particularly in an area of geographic focus based on modelling before and up to release. So if these pills had to be distributed, again, it is on a limited basis.

To specifically answer the question about distribution, all of these decisions are through the Provincial Emergency Operations Centre in terms of leading the emergency response. We are the legislated lead of that. The ingestion of the pills, as we heard, is ordered by the Chief Medical Officer of Health. We have at our disposal in such an emergency all of the emergency response resources of the Province of Ontario and, if necessary, of the federal government and neighbouring jurisdictions. The legislation is clear that we can direct those resources. So every municipal emergency responder, provincial emergency responder, federal responder could be utilized to carry out these actions, to take pills to the targeted populations that could not evacuate or the choice was made

not to if we felt more harm would be done through such an evacuation, to provide them with those pills.

And to be really clear, not only are pills at the government pharmacy, that's where the 6 million doses targeted to the IPZ are, but, as OPG has indicated, they are staged at locations throughout the entire radius of the 10-kilometre zone as well and those locations are specifically in the plan. So it's not just that if there was an issue with the provincial pharmacy, they could be drawn from those other sites which are very geographically dispersed.

MEMBER DEMETER: So that really helps that we got there. So just for the record and to make sure I'm understanding, the accountability and the responsibility for the delivery of KI pills if need be is with the Office of the Fire Marshal?

MR. MORTON: Mike Morton, for the record. That is correct. We take our lead from our Cabinet, of course, who has the ultimate responsibility, the Cabinet Committee on Emergency Management, for all emergencies in Ontario and who approves the PNERP, and the Provincial Emergency Operations Centre is the mechanism through which the government coordinates and actions its command and coordination activities.

THE PRESIDENT: Again, I would argue that

staff, as a regulatory, if you like, compliance, you would want to make sure that you understand the process in great detail. If you waited -- normally those accidents happen at two o'clock in the morning, there is no Cabinet, and by the time you wait for a Cabinet decision it could be all over in terms of effectiveness. So you want to make sure that you have the authority a priori delegated to you guys to -- in case of an emergency to be able to ring the bell and things to happen.

MR. MORTON: Mike Morton, for the record.

And apologies if any sort of delay was implied by my comment. We have a strong system of delegated authorities. Our Provincial Emergency Operations Centre operates 24 hours a day, seven days a week, 365 days a year. It is staffed at all times. This is not an on-call system. We have officers in place in our Operations Centre and we have delegated decision-making processes 24 hours a day. We are actually required to set offsite response levels within 15 minutes of OPG notifying us of any circumstance. So even from the most minor reportable events up to a general emergency, we have 15 minutes to provide direction to all of our emergency response partners, including the designated municipalities and ministries of the government, on the predetermined automatic and procedural actions that they would take under

any scenario that develops from the facility. That authority comes from Cabinet and that's why we have a Cabinet level plan that allows us to take those actions, to make those decisions without delay.

So there is absolute vigilance on this and a very well practised system that has multiple drills per week within the Ontario government and on a regular basis on more minor reportable events, regulatory events and so on, has proven over and over for decades that we can do that within a 15-minute timeline.

THE PRESIDENT: Mr. Stensil...?

MR. STENSIL: First of all, that's a lot to respond to and I will try to make it concise.

The top line that I heard in all of that back and forth is that the new PNERP is adequate and we are waiting for a study to confirm it. So in this way we are very similar to 2013 when we were in these hearings, we heard the same messaging, that the PNERP is adequate. And for the new Commissioners -- Commissioner Velshi, you may be a bit bored of this -- but what has driven a lot of the debate that we just heard was due to after Fukushima intervenors in Greenpeace asking for evidence to demonstrate the adequacy of offsite emergency management. What people said was we need studies modelling what an accident would look like offsite so that we can see whether

this -- we don't want just assurances. And the fact that we are still waiting for a study to definitively confirm these things eight years later shows you that intervenors have been patient and persistent.

We are getting the better decisions, but we still have a ways to go. And what is behind that originally is I think the Commission staff and the Canadian industry have had a blind spot to offsite -- the impacts of offsite emergency. They are almost scared of their own shadow. They seem to think if you model a big accident like this from a credible Health Canada that it would be the end of their company. I think that has been shown not to be the case, so I would encourage them to be more forthright moving forward.

But we have a lot -- we are still yet to be on par with European regulators that did similar studies within three years after Fukushima. So all that said, Commissioner Velshi, in your presidency this will be an ongoing thing, but I think we can get up to those levels over time. So that's a first background.

For KI, in regard to KI -- in my comments I am going to quickly try to summarize where I think there is evidence on the record for you to act based on what you know already and have heard and what you have not been told, and also where you need to continue asking questions

for more evidence and to provoke improvements to offsite emergency management.

And to start with KI, the story that was not said is the biggest improvement to the 2017 PNERP was caused by the Commission's implementation of the REGDOC on emergency management in 2014. That came in response to the 2013 Pickering hearings and what you heard from Commissioners about the -- not from Commissioners, from intervenors related to the inaccuracy of offsite emergency response and complacency within the provincial government and within OPG. So that is to your credit. You have moved this file forward.

That complacency, however, still exists and I think we have heard it in these hearings in that five years after that guide, I think Commissioner Demeter you mentioned this, we still don't have clarity on how it's being implemented. And even when the PNERP was under review last year, in spite of the fact that the Commission had put out this REGDOC, the discussion paper put out by the province said we will not be including KI within the planning basis. It was really weird. Luckily, Greenpeace was in agreement with CNSC staff and municipalities that said, No, we want this. This is something that the public wants.

So now the question comes to

implementation. And I think for your decision-making, your guide should still be your REGDOC and not the PNERP. I actually see it as stronger than the wording that came out in the 2007 [sic] PNERP. And you have the licensing authority to drive improvements to provincial offsite emergency management, and I encourage you to continue doing that.

The issue related to KI, I think the tangible thing that you can act on in these hearings is related to vulnerable communities and whether what we just heard is adequate and believable. And I don't think it is. We've already heard that Bruce Power made a decision to stockpile KI where the most vulnerable are. This makes sense, no matter which way the plume will go. They made that decision.

But we don't really have clarity on why there was a decision to not stockpile it around OPG's facilities. That's very unclear to me. Going back to cost-benefit analysis, I worry it may have had something to do with that. No one's just putting that forward.

And ironically, President Binder, after 10 years, at your last Commission meeting, by the line of your questions, I think we agree on this one. Took 10 years.

THE PRESIDENT: [indiscernible - distance from mic]

MR. STENSIL: It's just like *Groundhog Day*.

And I think you have clearly -- you have a rule that needs to be applied. And I would recommend that you apply it consistently by adopting the Bruce Power model

You have a public expectation for this. You heard from the TDSB, but also all the municipalities, including Durham Region and Toronto, have asked for KI pre-distribution to be expanded. So this is something that will be welcomed.

And while we keep hearing from the line "we're waiting for a technical study to confirm whether this is adequate," you already have the evidence base to direct stockpiling in schools. It is from your own staff. It's in my supplementary submission. CNSC staff, in their submission to the PNERP review, basically effectively said -- I can't find the citation -- both the SARP study and the Health Canada study show that vulnerable communities will need ready access, may need ready access to this.

Based on those two studies that I think are inadequate, we don't need to wait for this other study. You have a basis already to move forward on that. And that came from your staff. So I'm in agreement with them. It was not adopted explicitly in the PNERP, but I think that

may be for a lot of reasons that are out of scope here.

So for KI, I'd encourage you to move forward on that.

The second issue that came up over and over around the zones. We're waiting for them to be confirmed. What we've learned, I think, by starting to model larger accidents, is that the zones in which we've traditionally or historically planned for detailed or flexible measures are probably too small. And we haven't -- there was this contingency zone that has been superimposed that no one really knows what it does. It doesn't have any additional requirements, and we're told that it's for severe accidents.

I did some looking for the source of it. It's based in the CSA guide from 2014. When I went back to look at where the source from the CSA guide was, it was an IAEA guide that based it on the IAEA has recommended something called the "extended planning distance," that you deal with hot spots, this type of contingency planning.

In other countries, that extended planning distance is about 100 kilometres. And when staff were talking about the benchmarking with Switzerland the other day, they did not mention the extended planning zone. It's 100 kilometres in Switzerland.

So I expect in the future -- I don't think

it'll be at this hearing -- we'll see an expansion of the ingestion planning zone. And the contingency planning zone is a half-measure, as I stated.

So I think that's an area where you need to continue asking questions that I don't think were sufficiently covered.

An aside, also, something in front of you is about public awareness and advertising. Dr. Kyle just spoke. And one of the ways that we can create more conservatism in emergency management is by having more people aware to order the pills. It's fewer people to distribute to over time.

There are ads in GO stations within Durham Region. About a year ago I noticed that those ads said, "If you are within the 10 kilometres, you can order KI pills." And I was like, well, actually, if you're within the 50 kilometres you can order those KI pills.

And I sent a note to Dr. Kyle as the chief medical officer of health for Durham Region, and I said, "This doesn't make sense. The REGDOC actually says 50 kilometres. Your own council has said we would like expanded KI delivery."

I didn't hear back from him. He's a busy man. But I have noticed that the messaging in the advertising has changed to 50 kilometres. I don't see that

yet in Toronto.

But what this indicates to me is that the mindset is still do the bare minimum for availability.

THE PRESIDENT: We have a biological challenge here. It's been two hours.

--- Laughter / Rires

THE PRESIDENT: We need a break. So the question is do we have lots more to discuss.

So you'll have to stick around. We're going to take a 15-minute break. Come at quarter to 10 -- is it 10? To 11. I can't read this. Quarter to 11. Thank you.

--- Upon recessing at 10:30 a.m. /

Suspension à 10 h 30

--- Upon resuming at 10:49 a.m. /

Reprise à 10 h 49

THE PRESIDENT: Okay, we are back and continuing with our questioning session.

Who wants to -- Madame Velshi.

MEMBER VELSHI: Thank you, Mr. President.

I have a question for the Ontario Fire Marshal's office and Emergency Management.

We've had, as you know, a number of

intervenors express concerns about lack of awareness about the nuclear facility and emergency management, particularly folks from the GTA. And the City of Toronto, in their submission, have also asked the Province and the CNSC to undertake some action to address this need.

So my question to you is do you have any plans to address this need, and what are they.

MR. MORTON: Mike Morton, for the record, Office of the Fire Marshal and Emergency Management.

On Tuesday we did provide some background as to the current requirements, and particularly with respect to the committees that are developed for each of the areas around the nuclear facilities. And we did hear from OPG about the extensive education efforts that have taken place in the detailed planning zone, 130,000 kits distributed, and so on. So we do feel that measures in that area have been quite substantial, and based on the information we have, have been effective in getting across their message.

We also spoke to the Canada-wide education program that we've been very involved with around public alerting, the Alert Ready program -- because public alerting is such an important element of any emergency, and particularly of a nuclear emergency -- to ensure that Ontarians know how they will be alerted and what to do if

they are alerted.

That said, our committee that looks at the area around the Pickering Nuclear Generating Station -- and again, many of the stakeholders are on this, including OPG -- are indeed looking at ways that they can further increase awareness. This is actually going to be a topic of their next meeting.

We heard about some of those efforts before the break with respect to advertising about how people can get pills within not just the 10K zone but the 50K zone. The group recognizes that there are further opportunities, despite having really good mechanisms and systems online where people can go on and very quickly learn about pills, order pills, have them shipped if they're anywhere in the 50K zone.

We do feel that we can do more in this area, and the group is exploring strategies to do that, understanding that every municipality is required to have an emergency management public education program, that our programs are risk-based, and there are a large number of topics that we, at the Office of the Fire Marshal and Emergency Management and our municipal emergency management counterparts, want to ensure that people are aware of. You know, various hazards from weather to technological. And balancing that is always an important consideration and

challenge.

But our group is looking at opportunities to go even further. And I'm not sure if this is something OPG as a member of the committee also --

MEMBER VELSHI: Well, let me ask you the specific question, because the City of Toronto has asked the Province and the CNSC to do this. And I think what I'm hearing you saying is that this is a municipality responsibility, and really the City itself should be doing it, maybe getting help and resources and support from the other parties, but it is their responsibility.

MR. MORTON: Mike Morton, for the record.

So there's two discrete things that are being discussed. There's the general requirement under the *Emergency Management and Civil Protection Act* for all of Ontario's 444 municipalities to have public education programs. And it is risk-specific. It states that those programs should reflect the identified risks through the mandatory risk assessment that each community carries out. And our communities across Ontario do have those programs.

This area is somewhat unique in that there are additional requirements for risk-specific public education for the nuclear facilities. And again, those requirements through the PNERP place additional requirements on those areas. So we would, through the

PNERP, see this very much as a shared responsibility. The Province works to coordinate those public education committees; the municipalities actively participate; and across the province, the operators do provide significant resources to support the implementations of those programs. They've invested heavily in those programs, and they've expressed an openness and interest in continuing to support those.

So when the group meets, Toronto is a part of those discussions; Durham's a part of those discussions. They are looking at strategies to -- you know, from the perspective of the risk assessments and what target audiences would need to know at what point, there is the opportunity to put forward those ideas, to propose strategies directly with the operators.

And in the past, where that has occurred, that's led to the campaigns that we have now. And again, the industry's put a lot of financial support toward those.

MEMBER VELSHI: Is the CNSC part of that group?

MR. MORTON: Mike Morton, for the record.

As far as I know, the CNSC does not directly participate in that, but those groups report to the Nuclear Emergency Management Coordinating Committee. They are actually subcommittees of that. And the CNSC is

on the overall coordinating committee.

THE PRESIDENT: So that raises an interesting regulatory question. In your REGDOC about that particular subject and about the distribution and make it available for the 50K, is there any communication requirement under that to make this program effective? So in other words, you know, we've been hearing all along that the KI pills are available if you ask for it, but somebody got to know what is that that I have to ask for. Somebody have to know that it's available. So the vast majority of people that don't know about it, they're not going to ask for it. So how do we overcome that challenge?

MR. FRAPPIER: Gerry Frappier, for the record.

I'd ask Richard Tennant to talk a bit about our compliance program associated with this REGDOC.

MR. TENNANT: Richard Tennant, for the record.

With respect for what compliance activities we implement to oversee the distribution of KI, the REGDOC applies to the licensee. So what we've done is we've kept in contact with the licensee, looked at records and management systems and kept track of the progress of how the distribution was implemented.

We also, through site staff, have been

able to inquire as to where they live within the GTA, for example, and ask whether or not they've received the product and pills.

So we've kept abreast. We've kept our finger on the pulse through communications with the licensees and where that has been distributed, also through participation with the mentioned EMCC, the Emergency Management Coordinating Committee with the Province. We're also in dialogue and aware of the progress through that avenue as well. So we're very well up to speed on how the KI has been disseminated, pre-distributed, and stockpiled since the REGDOC came into effect.

THE PRESIDENT: But, again, we do have an outreach program. CNSC has an outreach program. I don't understand why you wouldn't within the outreach program make it a requirement that, within the 50K, it's known -- it's known that those pills are available if you go to that site and ask for it.

MS GERRISH: It's Meghan Gerrish, for the record.

Within the CNSC's outreach program, there are many avenues where licensees as well as CNSC staff go out and make this known to the public.

Now, with OPG, there is a requirement to communicate with emergency responders as well as with us in

terms of how are they communicating with the public to let them know that this is available. So up to the 50 kilometres they have a plan in place, a proactive public relations program where they disseminate this information through various tools.

THE PRESIDENT: So if I hear, you are politely saying yes, we can become a little bit more, you know, requirements to make sure that there's a campaign to all residents within 50K?

MS GERRISH: Yes, I believe that that's something that we can achieve together.

THE PRESIDENT: Okay, thank you.

Ms Velshi?

Question? Dr. Demeter?

MEMBER DEMETER: Thank you.

This is a question for the epidemiologist with Durham Health. Sorry, I forgot your name.

So a number of intervenors have brought up issues of health status around nuclear power plants, around Pickering. Based on your sort of health status reports and health status indicators, can you comment if there's any unusual clusters or concerns relative to chronic diseases, specifically cancer, any health status issues relative to low birth weight or congenital abnormalities? Like is there anything that sticks out that makes people who live

around a nuclear power plant, this time Pickering, different than the provincial standards?

MS PIETRUSIAK: Mary-Anne Pietrusiak, for the record.

We have done a lot of work around health status in Durham Region and in Pickering municipalities, and also in the health neighbourhoods. And no, there's nothing that comes out in terms of particularly higher rates that would be linked to the nuclear plants.

For example, childhood cancers are not higher in Durham Region. In terms of cancer rates for Pickering, we do not typically have cancer data below Durham Region level. So except for special studies where we have done on radiation and health, typically, we look at Durham Region as a whole.

MEMBER DEMETER: And maternal-fetal health status indicators?

MS PIETRUSIAK: Mary-Anne Pietrusiak.

In terms of fetal-maternal health, Pickering actually does very well in terms of those kinds of indicators.

There are some higher rates for small for gestational age, and that is likely due to the ethnic population. We have a lot of immigrants in the Ajax-Pickering area, and when we're looking at small for

gestational age, we can't look at what the ethnic make-up is. We do know that we do have a fairly high population of Asian as well in those areas, so they typically have smaller babies, not necessarily that that is a higher risk to health.

So, generally, we have actually extremely positive indicators for Pickering and for Durham Region. There are some rates that are higher, depending on what you're looking at. A lot of this information is available at durham.ca/neighbourhoods or durham.ca/healthstats. We have cancer reports. We have detailed reports for health neighbourhoods, for our 50 health neighbourhoods in Durham Region.

MEMBER DEMETER: Thank you very much.

THE PRESIDENT: Just as a follow up, did you have a chance to read Dr. Fairlie's presentation and his recommendations that women and pregnant women should move out of Pickering?

MS PIETRUSIAK: Mary-Anne Pietrusiak.

I did look at Dr. Fairlie's report. In terms of the methodology of that report, from what I understand, basically they took the Fukushima plume and just adjusted it to Durham Region, which doesn't really apply, so in terms of a recommendation like that, I would say totally, no, that of course pregnant women and children

have a very healthy environment within Durham Region.

THE PRESIDENT: He had two studies, sorry, I should have said. He had a study that for all living near NPPs globally it's not healthy, it's not good for you.

MS PIETRUSIAK: Mary-Anne Pietrusiak.

I'm sorry, I can't really comment on that, in terms of all nuclear power plants, but in terms of Durham Region, I would say that we have a particularly healthy population. Typically, Durham Region is very similar to Ontario, which is similar to Canada, and Canada does well globally in terms of a lot of its comparators for health indicators. That's not to say that there aren't areas for improvement, there always are.

In terms of our areas of focus, we tend to look more at health equity. We have seven priority neighbourhoods in Durham Region that are linked to lower income, and those areas definitely do show poorer health status compared to other areas in health. None of those priority neighbourhoods are in Pickering, I might add. There is downtown Ajax, downtown Whitby, and then five neighbourhoods in Oshawa, so those are really, for us, more of a priority in terms of improving the health of the population.

THE PRESIDENT: Thank you. Questions?

I think it's over. The last word is for

you.

MR. STENSIL: First, I'll do a little bit of cleanup, because I didn't finish what I was going to say before the end of the break, if that's okay.

THE PRESIDENT: Okay.

MR. STENSIL: On the question of advertising within the 50 km area, Commissioner Velshi, you were asking questions about this, I would remind the Commission that even the programs that are in place now within the detailed planning zone were driven by your licensing authority, not by the province and the multijurisdictional committees that you've been hearing about. Those committees are very slow. You have the authority to, as I said at the top of my presentation, spur momentum in exercising in your ruling. I urge you to do that.

What we've heard about the awareness campaigns is there's already one in place across Durham Region, OPG is fine with that, but we haven't seen it over into Toronto, so there's a blind spot there.

As I mentioned off the top again, what we've learned about the recent studies that we've had since Fukushima is that the geographic risk footprint of the station is larger than we thought in the 1970s. That's why we need these types of campaigns based on the evidence.

One small suggestion that maybe staff could undertake, I've been told by my colleague in Belgium that for KI distribution in their extended planning zone, which is 100 kilometres -- I don't have confirmation of this from actually reading their document but what has been conveyed to me -- is that, under the new Belgium system, doctors are actually instructed to prompt parents and pregnant women when they visit a doctor's office to ask them if they have ordered their KI pills. That could be a very simple thing that could be implemented within the GTA to start addressing that specific regulatory requirement, so just a suggestion to throw out there.

The other piece that I wanted to talk about, and it goes back to momentum, you've heard a lot at these hearings from all sides on the multijurisdictional committees that make decisions on emergency management. They're all great people, but these committees are actually part of the problem that we've been seeing. They're the bottleneck. I think we heard the other night, in the first round of questions on stocking KI in schools, OPG said something along the lines of, "We would never make a unilateral decision to change the stocking plan without the consent of the rest of these committees." Bruce Power did. Right there I think is part of the problem, where you can help address that.

The Nuclear Emergency Management

Coordination Committee, which you've heard about a lot, operates by consensus. As an intervenor that intervenes in the public interest, what I worry about is OPG and Bruce Power are on this committee. If it operates by consensus, and if there is a proposal to go beyond, to seek the best, that may be against their financial interests, and based on the process, it will be a disincentive to doing that. A clear example is that those committees made a decision against KI pre-distribution after Fukushima. This Commission, though, came to the opposite conclusion. That's why there needs to be very close monitoring of these committees, and the Commission could also mandate, if it works by consensus, that staff can also have a role in making sure that consensus pushes forward and is not brought to the bottom.

You'll find, in my submission, a complaint, what's called an "integrity complaint", that I've sent to the Deputy Minister of Community Safety. That is related to my concern that the ministry has been borrowing staff from Ontario Power Generation to fulfill its role. For a public service intervenor, if this were pipelines, this would be like asking Kinder Morgan to come up with the emergency plan. It hurts the credibility and the trustworthiness of what you hear. What I documented in

my submission is that an OPG staffer was actually involved in the PNERP review, behind the scenes, so this is what I was intervening in, and others have been demanding for years. It wasn't the government that we seek to defend the public interest, there was a role of OPG in that process, and it's unclear to me what steps were taken to avoid conflict of interest, so when I hear the 2017 PNERP is adequate, and yet the only major upgrades to that plan were the KI requirements that this Commission triggered in 2014, I'm not satisfied that this plan is in fact adequate, and we have a lot more to do.

I wanted to bring that up because I think CNSC staff could have a very good role in making that committee more transparent. They also deny freedom to information requests constantly, which raises more issues. So, as you can see, there is a problem in the operations and governance of this issue, and it goes back to the main point of my submission, which is that you're not only licensing OPG, you are licensing the province, they're sharing staff, and in that you should feel a large mandate to exercise your licensing authority to drive continuous improvement of the PNERP. You have done it before. You should do it again.

Commissioner Velshi, in your presidency we may end up having a review of the *Nuclear Safety Control*

Act. In the United States, there are elements of the legislation that allow the NRC to review municipal and state-level emergency plans. We're effectively doing that in an informal way here. That might be an improvement we could bring to the Act that I'm happy to work with you on.

All that is to say I don't have trust in the 2017 PNERP. We know continuous improvement will be coming, but I urge you to continue asking questions. In your decision, you've been given a few very tangible things where you can take action where there is sufficient evidence on KI pre-stocking in Toronto and on awareness campaigns, and perhaps setting some timelines for implementation. I encourage you to do that.

In conclusion, because I can see you're getting antsy, President, one issue that we didn't in fact talk about at all was the siting issue, which was the focus of my presentation. The focus of my presentation was on the fifth level of defence in depth. This discussion has effectively been on emergency management, which is an aspect of that. I mentioned in my presentation that, according to the IAEA, you need three elements for defence in depth. The safety culture, I think I've just pointed out there's some issues with safety culture in the way that these bodies interact. They're all great people, but I think, as operations, there's something not working

in the public interest, conservatism.

When we're hearing these comments about being able to distribute KI to one -- from one point in the City of Toronto at 2:00 a.m. in the morning, as you said Mr. President. I don't see any data to show, is that adequate?

I made a recommendation in my submission actually for, parallel to evacuation time estimates, if this is the way we're going to do, maybe there should be a requirement for KI distribution time estimates for the City of Toronto, because I don't think this is believable, and there's no evidence to substantiate it.

And so, in terms of the IAEA requirement, I don't think they meet that.

And the final one is quality assurance. And, as we've seen over the past seven years, I don't think they're there. I bring this up because I think there's a role CNSC staff could have in trying to implement these elements to the fifth level of defence-in-depth, a lot of this is over my head, but I don't see it in the way it's rolling out right now.

But back to siting, the other element of the fifth level of defence-in-depth is controlling land use. And, as has been brought up with other intervenors in these hearings, is there are no limits to population growth

around the Pickering Station. This doesn't pass the common sense test for most people, that you can just operate an old nuclear reactor in an urban area. There's just -- this is not an issue of whether OPG complies with the CNSC regulation, it's a question of whether the CNSC has adequate regulations on this factor.

And Greenpeace and CELA have tried to constructively intervene in this process over the past 10 years, commenting on the siting guides, for example, and we're told it's a provincial issue. We filed a request for review by the Environmental -- with the Environmental Commissioner for the Ministry of Municipal Affairs to actually set standards. They brushed us off and said, we just updated in 2014. Those rules are inadequate.

So, again, this comes back to you and your licensing authority. You have the ability under the *Canadian Nuclear Safety Control Act* to ensure that there's adequate provision for the protection of the public.

On siting, we don't have any rules, we don't have any limits, we don't have any conservatisms. That had been discussed in these hearings.

So, I think there's latitude for you to act and this is where it comes back to Groundhog Day. There is a provision in the Licence Control Handbook that could by December 31st, 2022 to apply to operate the

reactor longer. So, this would be coming back to Groundhog Day again.

And I think we're at the point where you should be able to say, enough is enough. And if you're going to come back again and your government, your shareholder is knowingly increasing population around the Pickering Nuclear Station, you have a responsibility to do something about it.

So, in the same way that this Commission has intervened and forced action from the Ministry of Community Safety, I think in the event that there's a re-application in 2022, you have a responsibility to intervene so that the Ministry of Municipal Affairs shows how that it will, at a minimum, maintain safety margins for off-site management.

So, for this reason, Greenpeace respectfully makes the following request for ruling under Rule 23 of the CNSC's Rules of Procedure. I will provide it to Marc by email after this presentation.

Greenpeace requests that the Commission include an additional requirement related to land use planning in section 15.4 of the Licence Control Handbook.

The Licence Control Handbook currently lists a series of analyses and reports, OPG must provide the Commission, by December 31st, 2022, if it applies to

operate any Pickering unit beyond 2024.

Greenpeace requests this list be amended to include documentation to show OPG will ensure that it can control the use and occupation of land within 20 kilometres of the Pickering site to maintain safety margins for the fifth level of defence-in-depth by preventing the intensification and development of residential dwellings. This could include the Province's growth plan for the Golden Horseshoe which is scheduled to be updated in the middle of 2022.

I think I've summarized my reasons for this. I think it is a very reasonable request, and I think it's incumbent on the Commission for this site, of any site with your mandate under the *Nuclear Safety Control Act* to cause irreplaceable harm to Canadian society, you must ensure that there are rules in place to maintain safety at the fifth level of defence-in-depth.

We have not seen it. OPG has already taken us through this once in 2013, we're here again, and if they come back they should expect sanction from the Commission because the Ministry of Energy was aware of it when they approved the life extension originally in 2010, they knowingly increased -- have policies that undermine public safety.

With that I'll conclude. President

Binder, I wish you well in retirement, it's been a great ride, and Commissioner Velshi, I look forward to working with you in the future.

THE PRESIDENT: Thank you. I'm really going to miss those interventions.

So, thank you for those, too.

--- Laughter / Rires

THE PRESIDENT: And we are now going to move on to the next presentation by the Toronto Regional Board of Trade as outlined in CMD 18-H6.27.

I understand Mr. Parker will make this presentation.

CMD 18-H6.27

**Oral presentation by the
Toronto Regional Board of Trade**

MR. PARKER: All right. Well, thank you, Dr. Binder and congratulations on wrapping up your term as President of the CNSC and, obviously, congratulations to Ms Velshi for taking ownership of this important institution.

And, of course, quick thanks to Louise and all the CNSC administrative staff who provide such a valuable service and allow these hearings to actually take place. I know they sometimes get forgotten behind the

scenes, but I always think it's important to recognize it.

So, thank you again for allowing the Toronto Regional Board of Trade to appear before you today in support of Pickering Nuclear's licence renewal and extension.

As an aside, I told my young three and a half-year-old son today that I was going to be appearing before the Canadian Nuclear Safety Commission and his eyes lit up and said, are they football players? And I told him that one day when the CNSC is in the Grey Cup, they will have a fan in Ajax cheering for them. So, it's maybe a broader mandate in your future, Mr. President.

So, what I want to talk about today is a bit of a shift in focus from what we've heard for the past three hours. I wanted to bring it back up to a broader context because that's what I believe that's what these hearings need to hear.

You hear a lot from experts in the field, safety experts, environmental experts, nuclear technicians, but sometimes I think we need to get beyond the particular details which are crucial, but also remember, what is the broader context in which you're making these decisions?

And on that note, I want to talk about three things in particular. One, the need for a continued source of reliable low-cost power; a laudable safety record

that we see at Pickering and through our entire nuclear fleet in Ontario; and finally, ensuring a sustainable environment and how important that is.

And throughout that I want to focus specifically on how the extension of Pickering Nuclear's licence supports the goals and priorities not only of the CNSC to protect safety, to protect the environment, but also -- and this is, again, one of those neglected parts of the mandate that don't get discussed here enough -- it supports our responsibilities under international nuclear agreements and international nuclear treaties, and I think that's something that we don't lose sight of.

So, briefly about us. The Toronto Regional Board of Trade has been around for more than 170 years. We have a diverse membership of actually now more than 13,500 business professionals and influencers, unfortunately that number just got updated after the -- or before the slides had to go in and we count Ontario Power Generation as one of our valued members, as well as many other members in the business communities throughout this region.

Our energy work, which is growing and extensive, is founded on trying to achieve the balance between three main things: affordability, reliability and sustainability. And one of the reasons we're so passionate

about nuclear power at the Board of Trade is that we believe that nuclear is the rare technology that actually achieves these objectives, that can actually manage to get to all three without having to sacrifice one for the other.

And as anyone who has followed energy policy globally or within the province, you're usually making trade-offs. Nuclear is an area where, when it's properly managed, properly regulated as it is in Ontario, as it is in Pickering, we can actually achieve all three of these goals and we think that's very valuable and part of why we support the licence renewal.

Very briefly on the issue of cost because I know that's -- it's an important issue to us and our members, but obviously not necessarily the focus of all we're doing at the hearing. Pickering has been the basis of low-cost baseload electricity to the grid in Ontario, and specifically serving our membership throughout the Greater Toronto Area.

We feel that the continued value for money we get out of Pickering, even as the aged nuclear plant, is still evident, it's still outperforming other sources of power that are more expensive.

And when we're talking about Pickering's role within the broader system, within this broader context, we're talking once again about if not Pickering,

then what, then gas power, then intermittent wind or running more nuclear power, hydropower where there's some flexibility in our other resources.

So, we believe that having Pickering as a stable part of that not only makes electricity cheaper and more reliable, but that has broader benefits for our community that we think are important.

But to focus specifically on the issue of safety, it's really important to remember that nuclear is still the safest way to make reliable electricity. It doesn't produce almost any emissions, it doesn't produce the broader air pollution and greenhouse gas emissions that we see from fossil fuels, and even compared to something like hydroelectricity, which I know we don't see here because we couldn't find a perfectly comparable stat, it's still safer in terms of the amount of land lost to damming and to reservoirs, as well as the deaths that have been caused through hydroelectric construction around the world.

It's a high energy source that produces very few safety concerns and we need to, again, remember in context, that if not nuclear, if not Pickering, then what else? And those other sources come with actually a worse safety record received than our nuclear fleet.

And if you don't believe me, consider your own staff and your own work before that Pickering, along

with the rest of our nuclear fleet in Ontario, has been given a fully satisfactory or satisfactory ratings on safety, on reliability, on worker safety, and on the management of the waste products.

So we believe that the CNSC does a very good job of continuing to monitor our nuclear resources to continue monitoring their safe operation and we would urge you simply to listen to your own advice and the best practices of your skilled staff.

Beyond that, of course, Pickering in particular has made a special effort to increase worker safety and achieving only 0.06 injuries for 200,000 hours worked, which in almost any injury is a remarkable safety achievement. In fact, I even wonder if the Office of the Board of Trade have quite -- so a laudable safety record for something as large and sophisticated as a nuclear plant.

But the broader environmental context is also something that we really need to be concerned about here. I think it's very important, particularly in the context of where we're going with the nuclear refurbishment plans that we're seeing at Darlington and we're seeing at Bruce.

In particular, this is why the 2024 extension is so important. 2023 is sort of the magic year

for nuclear refurbishment in Ontario. We are going to have two units down at Bruce and two units down at Darlington at the same time. That's going to pull more than 3,000 megawatts out of our total electricity supply, 3,000 megawatts of clean energy.

If we take Pickering out of the equation as well and the four units that are expected to be servicing the grid in 2023, that's pulling another 2,000 units of clean energy off the grid as well. We think that's very troubling if we're truly committed to our international commitments on emissions, on climate change, that we're already going to have to increase our immediate sources of electricity to manage these situations. It makes very little sense to us at the Board of Trade that we would handicap ourselves further, assuming Pickering could be safely run, to further take clean energy off the grid by not extending that licence through that critical period of refurbishment.

Of course, if you're curious about whether or not we could substitute with other sources of power, well, the Intergovernmental Panel on Climate Change has already done the math on where the stronger emitting sources are, in terms of CO2 per kilowatt hour and nuclear again comes out best when we start comparing even things like solar.

Once again, of course, very quickly we would remind you of the fact that we were only able to close coal in this province because we were running more from our nuclear fleet. Again, that's very germane to the fact that as we are going through refurbishment and some of that nuclear fleet is offline, we need to make sure that there is clean energy to replace it.

But finally, I want to talk a little bit our international commitments and why this extension is important. As you may recall, back when we were here at the Bruce hearings, I talked about the need to support a strong, robust Canadian nuclear industry to help with things like non-proliferation because CANDUs are much more difficult technology to gain offensive nuclear materials out of, and a strong industry in Canada, a peaceful leader in technology, allows us to be a strong leader internationally for the peaceful and safe deployment of nuclear technology.

But specifically how we wind down Pickering and the next steps and the service extension to 2024, give us this additional period to show best practices to the world about how you complete operations and eventually wind down operations on existing and legacy nuclear technology. We know that there are nuclear reactors in the United States, in South Korea, in Europe

that are reaching their end of life as well, and we have an opportunity here through the stage shutdown and the final operations to show how best practices can be on aging but still useful and still safe nuclear reactors, so that we can show the world how the best way to run a peaceful and safe nuclear industry is. I think that's very important. I think that's something that merits consideration for how we leave the world in terms of nuclear power.

So on that I simply close by saying that the CNSC has a very successful track record in licensing continued operations, in licensing refurbishments, in licensing shutdowns. You have an excellent staff here and obviously intervenors who are going to come and give you the best perspective possible.

I simply urge you. You've got good staff. You've got good policy. You've got a good legislation. Stick to it, and I think you'll find that we'll have an extension to Pickering and a robust nuclear industry for many years to come.

Thank you.

THE PRESIDENT: Thank you.

Questions? Ms Velshi...?

MEMBER VELSHI: A comment that the intervenor made, I just want to ask OPG and then staff.

So where do you look for best practices on

how to safely, effectively shut down the plant and get it ready for decommissioning? Who do you look to for examples on who has done that really well?

And then staff can answer from a regulatory perspective.

MR. MANLEY: So Robin Manley, for the record. I am the Vice President of Nuclear Regulatory Affairs and Stakeholder Relations.

First off, we have some internal experience of our own, right. We have safe stored a couple of units. In addition, we have experience, as we have done before, of retubing units. So it's not like we have no internal capacity or experience of our own.

We have participated by sending staff and participating in refurbishments of other CANDU units, right? So we've got that experience as well. In addition, we participate in external conferences and benchmarking and go to sites that are involved in decommissioning processes, so we learn from others.

MEMBER VELSHI: I can't remember which intervenor mentioned -- it may have been the PWR Diablo Canyon as a place that it wasn't just shutting down because I know you have, but I meant the overall station shut down and getting ready for decommissioning. Where do you get best practices for that?

MR. LOCKWOOD: Randy Lockwood, for the record.

I'll ask Art Rob to speak to your specific question. We'll point out that as part of the OSART we did ask for someone to look at long term operation and how we were going to blend operations now, so to speak, into the shutdown stage and beyond.

Art, if you could elaborate a little bit on what we're looking at and other plans we're looking at for best practices.

MR. ROB: Good morning. It's Art Rob, VP of Decommissioning for the record.

So much like Robin Manley indicated, OPG does an extensive amount of benchmarking. We're actually linked to groups in the IAEA and we look at best practices internationally for decommissioning. We actually participate in several groups that study benchmarking opportunities and we actually do field visits to some of the actual sites in the States and take OPEX directly from some of the decommissioning projects that are underway right now.

MR. FRAPPIER: Gerry Frappier, for the record.

From the staff's perspective, certainly as far as shutting down and putting into safe storage, we have

lots of experience on that, G2, Pickering as has been mentioned a couple times, has a couple units that are there. But we also have on the previous generation of Douglas Point NPD. From our perspective, we also look at the research reactors so NRX and NRU, Whiteshell.

So as far as safe shutdown into sort of a long term stage, I think we certainly have the regulatory framework for it, and we have the experience with respect to what we need to be looking at.

I think the interesting part of your question is the decommissioning part, if you like, the actual disassembling of nuclear power plants. For that we certainly participate in international groups with the International Atomic Energy Agency and the Nuclear Energy Agency out of OECD. Right now, we are very much involved in looking at that with respect to NRU, Whiteshell NPD.

Perhaps I'd ask Ms Karine Glenn in Ottawa to give you some more details.

MEMBER VELSHI: No, my question wasn't around decommissioning. It was looking at the SOP or the continuous operating plan, what are best practices around that and who do we look to from a regulatory best practice in those?

So really, yeah, I'll leave the decommissioning for later, but it's the get ready for end

of commercial life.

MR. FRAPPIER: Sorry, my misunderstanding. Gerry Frappier, again.

So certainly in those areas we have a lot of experience but also, again, internationally there's been lots of working groups that we have participated on to look at both long term operation and end of commercial operations.

MR. GREGORIS: Steve Gregoris, for the record.

Just I'll add there, Commissioner Velshi. From an OPG point of view, we have shut down our coal plants. We have gone through that transition. We have experience with that. We have shutdown Units 2 and 3 at Pickering. We have gone through that experience, and again that's helped inform us.

We are part of the WANO AC Centre in Atlantis there, and we have communications with that group.

We have spoke to individuals in plants such as Diablo Canyon. I have personally to understand their approach. We certainly take those approaches into consideration when we plan ours.

THE PRESIDENT: Thank you.

Ms Penney...?

MEMBER PENNEY: Thanks for the

presentation. I'm not sure if you're aware or if you've looked at any of the other submissions we had but we had from the Toronto District School Board and the Toronto District Catholic School -- what they brought in front of us is two motions that were endorsed by the Toronto city council, one in November and one in April. The first one is about KI pills and we have dealt with that extensively. The second has to do with public information broadly, that sort of thing.

Just wondered what your organization -- in any way do you have communication plans or policy? And you know, how is nuclear or the nuclear industry and your nuclear members who may be providing services, is there any role for you in terms of communication, gratuitous communication?

MR. PARKER: That is a great question.

Jeff Parker.

The communication that we do is mostly at the level of policy recommendations, as well as communication to our members about key items, if there was ever a situation where the government thought there was a need for our communication channels to help spread information or awareness. Obviously, we partner with government all the time on disseminating information and their own different campaigns for awareness, marketing, et

cetera. So there would be a role to play for that.

But our ongoing focus is generally at the level of -- both to policy makers in terms of advocating successful energy policies, as well as to our own membership to update on what our positions are. So I would say that I think there is a potential role that we can play, depending on the need of the organizations involved, including the municipalities, the Fire Marshal's office, but we don't, at this point, have an active role in that field.

THE PRESIDENT: Thank you. Anything else? Okay, thank you for your presentation.

MS COLE: Thanks for your time.

THE PRESIDENT: The next presentation is by Ms Cole, as outlined in CMD 18-H6.75.

Ms Cole, the floor is yours.

CMD 18-H6.75

Oral presentation by Belinda Cole

MS COLE: Thank you. Thank you for the opportunity to present this morning. I'd like to address the Commissioners, and I would urge you to deny OPG's application to extend Pickering's operation.

Here are the facts, as I understand them.

First of all, I understand that Pickering is not up to modern international safety standards.

Secondly, as I understand it, the Pickering reactors don't meet the International Atomic Energy Agency's safety guidelines. Fukushima had a far superior safety system in place, they're in the middle of a catastrophe now. As I understand it, they're a rural area, they're not in the middle of a huge thriving population.

I also understand that Pickering is, on top of all of these, it's past its design life. That OPG came in 2013 and said, would you please extend our licence to 2020? That was granted. Why are they coming again? This is the third time, as I understand it.

My interest here, I'm a citizen of Toronto, I'm a mother of four, and I'm really really worried about the water that sustains us. Here's my problem. If I were to say to my kids, okay, if there's an accident at Pickering, what happens? My number one question is we're talking about all the species that rely on Lake Ontario to survive. We're talking about water for millions of people. As I understand it, half of Ontario gets its water from the Great Lakes.

So what water am I going to be able to give my kids? If there's an accident at Pickering, we know it's past its design life, we know human error is always a

factor. What do I tell my kids? This is a reasonable risk? You know, I might not be able to give you water you can drink because a decision was made that somehow...

We know what happened at Fukushima. We don't even have the safety standards in place there. It's a catastrophe. It doesn't seem -- like, we're not talking about unreasonable. For me, if I was talking to my kids, I'd say, this is madness.

Emergency procedures, I'd like to tell you a story. I don't -- quite frankly, I don't believe anything on paper, and I'll tell you why. I live in Toronto near what used to be called the GE Hitachi plant. A few years ago I asked for the emergency response, what we do in the case of an emergency.

I took it and I called the numbers. This was 7:00 in the morning, I called the first number. I got a voicemail saying, you need to call this number. I called that number, and they said, "Oh, well, we don't know what you're talking about. You need to call this next number." I called the third number and I got a voicemail. That's the emergency planning for my neighbourhood. Everything looks good on paper.

Has there ever been a drill? In World War II, World War I there were drills, because people knew there was a big risk. So where are the drills?

I don't believe, even if there's an emergency plan, let's see it work. I'll believe it when we've had a drill and we can say we can get everybody in the vicinity out of there.

I'm a resident of Toronto, I haven't heard anything about KI pills. I haven't heard anything about what would happen. I go back to this, what water are we going to drink? What is going to be left of this area if this plant goes down? We're not talking about, you know... It's the heart of this area, it's what sustains us all.

All so, as I understand it, we don't need the power. Right now, this power is going to the United States. We don't need it. Why would we take this risk? It's just crazy, in my view.

I would like to add to that just a few points. Yeah, we need that awareness campaign for all of Toronto. I need to know and my neighbours need to know, and everybody here in Pickering and beyond, we need to know what happens. I have no faith that -- an emergency plan basically is going to be of no use. It's going to be finished. It's going to be finished.

So, I mean, it's a little bit crazy to even be talking about this, because it seems crazy to me. Nonetheless, we need closer plans that are subject to an environmental assessment. I have heard since I've arrived,

which is quite recently, that people are talking about, yes, we're on committees, we sit on committees and we're talking about this, practices...

No, I'm not hearing any -- I'm not hearing, here it is, here's the plan. If I don't see a plan and I can't talk to people about whether it looks trustworthy, I'd be crazy to rely on it.

You know, I've talked to some people, we sit on sub-committees and we've got -- you know, we're talking about this. Hang on a minute. This licence was renewed in 2013. It was supposed to close in 2020. Why are people asking -- why's OPG asking for yet another extension, a third?

As I understand it, I would also request that the Commission remove the wording from OPG's licence that allows CNSC Staff the power to allow Pickering to operate past 2024. That's a last-ditch question for me. Because, as you know, please -- like, please...

You know, the plant goes down, like how do we protect ourselves? How do we protect our families? How do we protect our communities? I mean, it's just like -- yeah, this is surprising. I'm sorry, but I...

THE PRESIDENT: Thank you. Have you been here for the last three or four days? That's precisely all the kind of issues we are trying to deal with. So I don't

know if you had a chance to actually listen. But we've been trying for the last four days to try to deal with some of those issues.

So anybody? Any particular questions?

Okay, thank you. Thank you for your presentation.

MS COLE: Thank you very much.

THE PRESIDENT: The next presentation is by the Regional Municipality of Durham, as outlined in CMD 18-H6.67 and 18-H6.67A.

I understand Mr. Cubitt will make the presentation. Over to you.

CMD 18-H6.67/18-H6.67A

**Oral presentation by the
Regional Municipality of Durham**

MR. CUBITT: Good morning. For the record, my name is Garry Cubitt, I am the Chief Administrative Officer of the Regional Municipality of Durham.

Welcome to Durham Region and thank you for the opportunity today to highlight key points from our written submission.

Durham is a unique region in Canada, it is the only municipality with two nuclear plants operating in

an urban area and, for this reason, OPG has been one of the Region's largest employers for decades, and it also means that 51 per cent of Ontario's nuclear fuel is stored in interim facilities in our communities.

Most of Durham falls within 50 kilometres of the Pickering Nuclear Generating Station and as such our community involves all of the zones outlined in the Provincial Nuclear Emergency Response Plan and many regional departments play key roles in implementing that provincial plan.

Over the years Durham Region and OPG have developed successful partnerships that support community safety and awareness. OPG helps fund the work of the Durham Emergency Management Office and the Potassium Iodide Pill Distribution Program, which is delivered by the Durham Region Health Department. During the operational safety review of the Pickering plant, our KI program was identified as best practice for nuclear operations.

Thanks in part to the direction from the Commission, the Durham Regional Police Service worked closely with OPG to create a seamless emergency radio system. Regular communication with OPG occurs through channels such as the Durham Nuclear Health Committee and updates by OPG's staff to Regional Council.

The continued operation of the Pickering

Nuclear Generating Station will allow Ontario to refurbish the Darlington and Bruce nuclear stations without using gas-fired generation to supplement electricity supplies. Having clean, reliable nuclear power available will allow Ontario to pursue its greenhouse gas reduction targets by electrifying our transportation and heating systems.

Durham Region welcomes the sustained employment from continued operation of the Pickering Station. OPG's contributions to dozens of charitable and community organizations such as our hospitals and Chambers of Commerce are important as well. We value OPG's environmental stewardship and education programs that engage our young people. The region is confident that OPG will continue to operate the Pickering Station safely and therefore supports extending its operation until 2024.

This info graphic illustrates activities planned for the Pickering site over the next 50 years. The related impacts are complex. The graphic is drawn on information drawn from reports by OPG, the Nuclear Waste Management Organization and others. Our concerns for the future relate to the direct and indirect job losses over the next 10 years, the accumulating nuclear waste likely to be stored on site for the next half century and uncertainty about when it will be removed, the unknown impacts to property tax revenues and regional service demands. While

OPG's application is focused on the nuclear facility, we urge the Commission to also consider the communitywide impacts.

The Pickering Nuclear Generating Station began operating before the Region of Durham was formed in 1974. OPG has worked with the community to maintain the social licence for its operations. In the ongoing operations phase the region identified a few concerns which we believe can be mitigated.

Some elements of the new Provincial Nuclear Emergency Response Plan are still being finalized. However, based on preliminary review, my staff estimates that additional regional expenditures of at least \$1.25 million annually will be required to implement it. This added cost is for expanded emergency planning in the new contingency planning zone from 10 to 20 kilometres. Regional Council is also concerned that OPG's application included no transition plan for the 1500 high-skilled, high-paid workers affected by the closure of the plant in 2024. This is a potential major impact to our local economy.

Our submission also describes how the province's unfair property tax treatment of nuclear generating facilities shifts more financial burden to Durham taxpayers each year. This is not OPG's doing. The

province regulates property taxes, but their practices should not be allowed to penalize the host community.

Further, as Council directed, the region seeks compensation for storage of used fuel waste. Our concern is about the indefinite interim storage of used nuclear fuel in Durham. While OPG contends that their property taxes compensate the region for nuclear waste storage, clearly the two are not related.

To help mitigate impacts on the community and ensure ongoing host community support to the Pickering plant during the continued operations phase, the region asks the CNSC to require provincial or OPG funding for the region to implement the Revised Provincial Nuclear Emergency Response Plan and that OPG prepare and share with the region their transition plan for loss of jobs.

We also seek compensation for used nuclear fuel storage. Until the federal government approves a permanent waste disposal solution, Durham Region is a de facto host community for spent nuclear fuel. Other communities storing nuclear waste, or offering to do so, are being compensated. Durham Region should be as well.

In addition, we seek the CNSC's support for an end to unfair and inequitable property tax regulations.

OPG seeks approval with this licence to

begin the process of decommissioning in 2024. However, only a preliminary decommissioning plan accompanies their application. As a municipality, the region is mandated to plan for the future. Our land use, servicing and transportation plans are generally 10 to 20 years, asset management plans may extend to 50 years. For this reason, the limited detail in OPG's application about decommissioning impacts and mitigation is a significant gap. There is no transition plan for more than 1100 workers to be displaced in 2028 or the many community organizations that have benefited from OPG corporate contributions in the past. Beneficial reuse of the site is scarcely mentioned and mitigation of the stigma related to ongoing nuclear waste storage on a largely vacated site is not discussed.

Durham Region has been clear in Council resolutions in 2010 and 2015 that it is not a willing host for the used fuel waste. A new social licence will be needed for a closed plant sitting for 30 years with 780,000 bundles of spent fuel. Discussion with the community about a new social contract for the decommissioning phase must begin now. Plans need to be in place when the process begins and 2024 is not far off.

In addition to receiving data about the socioeconomic impacts of each decommissioning phase, the

region asks the Commission to recommend that OPG launch an economic development partnership immediately. This would help mitigate job loss and ensure the beneficial reuse of the Pickering site.

The region also requests information about the transportation system and emissions impacts of each phase of decommissioning for planning purposes. Due to the substantial risk that the deep geological repositories will not be available to accept used fuel and other radioactive wastes when planned, the region seeks compensation until the waste is removed from Durham. In addition, we ask that Nuclear Waste Management Organization formally engage the region in planning for the transportation of used fuel. Regardless of the repository location, the route will pass through Durham.

Due to the duration and impact of decommissioning, we ask that the region be engaged as a key stakeholder in the scoping, planning and execution of the decommissioning EA or impact assessment. We may need experts to assist us. At present the region does not qualify for the CNSC's intervenor funding. Nevertheless, our petition should be funded impartially and transparently so that an additional burden is not imposed on Durham taxpayers.

To summarize, the region has suggested

straightforward solutions to several of our short-term concerns. These include funding of additional emergency planning costs, data-sharing and regulatory changes to resolve the property tax issues. Our concerns about decommissioning impacts and waste storage must be resolved through early engagement in the EA or impact assessment process and through negotiated agreements.

The region appreciates the opportunity to comment. The effects of the activities proposed under this licence are long-lived in our community. As such, we must plan now for the future.

In closing, the region wants to extend great thanks to Dr. Binder for his leadership and his work with us over many years and extend our best wishes in his retirement and extend our commitment to welcome and work effectively with Ms Velshi as she takes over this important role.

Thank you for your attention and we look forward to your questions.

THE PRESIDENT: Thank you.

Questions? Who wants to start? Dr. Demeter...?

MEMBER DEMETER: Thank you very much for your presentation. I think it's important to achieve our nuclear emergency preparedness and response activities that

there are adequate resources to meet those, so help me understand, one, from a staff point of view, whether they have reviewed whether the resources are adequate for the host community and the local areas to carry out those activities and maybe help me understand, someone, the means of how money flows from the PNERP process to the communities affected. That might be a PNERP question, but -- the first one is, has staff looked into this relative to adequate resources to carry on the mandate for emergency preparedness for the local community?

MR. FRAPPIER: Gerry Frappier, for the record. So I will ask Mr. Ramzi Jammal to comment on that.

MR. TENNANT: Richard Tennant, for the record.

Just with respect to RD-2.10.1 and 2.3.4, the public preparedness requirements, the REGDOC clearly states the requirement that licensees shall provide the necessary resources and support to provincial and municipal authorities in implementing the provincial and municipal plans to do the following. And therefore it states the requirements of IPZ and communication, but I will pass the microphone to Ramzi Jammal.

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

So we have to be careful with respect to a

business agreement between the municipality and -- or the flow of funds provincially. As was stated in our requirements, the licensee has a responsibility to be working with the community. From our mandate perspective, again, I want to reiterate the fact that there is a resources requirement that must be in place. The province has a role to play, the municipality has a role to play and so does the licensee. So I would prefer that the question be given to OPG with respect to the relationship with the municipality and how they are providing them with support.

From a regulatory perspective, we provide training to first responders, we provide assistance with respect to clarity, but we don't have the financial means in order to provide resources or what is being requested by Mr. Cubitt.

MEMBER DEMETER: OPG...?

MR. LOCKWOOD: Randy Lockwood, for the record.

First of all, I want to thank the Region of Durham for coming here today and making the intervention. I was pleased to hear them speak about our long relationship in the Region of Durham. We share priorities and interest in the community to make it a better place to live. As I mentioned on day one, our staff not only work here but live here as well. I was also

pleased to hear around the identification of the best practice from OSART. It is something that's admirable and I'm glad it was mentioned today in terms of distribution of KI.

And moving on now to your question, you know, the emergency practices. Several items were mentioned, the relationships with emergency services and the radios. It really speaks to our earlier discussion around the effectiveness of the emergency plan. Specifically I'm going to ask Mr. Scott Burns to talk about our relationship with the region in terms of that.

And in terms of implementing the new PNERP, that is a priority for us. Many items were mentioned, and I am certain we will work through each of them, but from my perspective the first and foremost priority here is the emergency response plan and to ensure that the public is safe in the unlikely event of an accident at Pickering.

Scott...?

MR. BURNS: Scott Burns, for the record. I will be quick.

As Mr. Cubitt mentioned, we have enjoyed a longstanding strong relationship with the Region of Durham on many fronts. We do have Memorandums of Understanding that we agree on and provide financial support to the

region for the EP programs and the distribution of KI. So we have two separate ones, one with the Emergency Management Office and one with the Health Office.

Just to expand a little bit on that in terms of the relationship, we also have Memorandums of Understanding with the Police Service of jurisdiction, the regional police service and the fire service as well for Pickering and provide support there.

The radio system was mentioned by Mr. Cubitt and Mr. Lockwood. That has been an excellent partnership and we have seen the benefits of that interoperability in communication.

THE PRESIDENT: Ms Penney...?

MEMBER PENNEY: Thank you for your presentation. You mentioned in a couple of places in your presentation that you want, the region wants to be recognized as a stakeholder and involved in the EA/impact assessment process for decommissioning. So my question to you on that is what does that look like for your full involvement and what kinds of issues would you want discussed?

MR. CUBITT: Through you, Dr. Binder, I will refer the question to one of our staff that are more specialized in the EA process.

MS DRIMMIE: My name is Christine Drimmie,

for the record.

In regard to the EA process, we participated in the EA that was done for the new nuclear development at Darlington and it was a very extensive process, it took a lot of staff effort, and the areas that are of interest to us extend from the kind of transportation infrastructure that's needed to support, you know, that large kind of ongoing process right through to the economic impacts, the social impacts on our community, and any emissions and health impacts that would be happening from the demolition of the plant, for example, emergency planning during the various kinds of movement of materials that would be happening, which speaks to sort of the NWMO transportation planning that we are interested in. So it is a very -- the region provides a very extensive number of services, as you will see in the back of our submission, and just about any area that is mentioned in one of those services we would have concerns about how that looks over the next 50 years.

THE PRESIDENT: Thank you.

Question? Ms Velshi...?

MEMBER VELSHI: So a question to OPG. Durham Region has said they need additional resources to implement PNERP and so you talked about your MOUs, but what is your response to their request?

MR. BURNS: Scott Burns, for the record.

The response to that is we have already started discussions on that, so we are in discussions with the Durham Emergency Management Office. Steve Lesiuta, who is with me here, is our Director of Emergency Preparedness and Emergency Management, and Warren Leonard, the head of their Durham Emergency Management Office, have a strong relationship and have already started those discussions.

MEMBER VELSHI: Thank you.

So, Durham Region, I am looking towards you to say, hey, things are moving and hopefully this will get resolved to mutual satisfaction.

MR. CUBITT: Based on my understanding that is the case, but I will have Warren Leonard, who is here with us today, be able to confirm that for you.

MR. LEONARD: Thank you. Warren Leonard, for the record, from the Region of Durham.

So we have to put the context on this, which is for decades we have been looking at 10 kilometres. A lot of decisions have been made on that line in the sand, so to speak, that surround our operation centres, our reception centres, those operational things on the ground. Last December when the new PNERP came out -- and there was input given to the planning basis discussion prior to that in the summer, but when the PNERP was actually released in

December, followed up by a May release of the implementing plan for Pickering, now we have a contingency planning zone. And while this has gone out 10 more kilometres in the radius, we all know from our basic trigonometry that that has quadrupled the area. Notwithstanding the water area, the land area is quite a bit.

So we have had discussions that have started about this, but it is very recent. The implementing plan has been out a matter of weeks. So we have some thoughts around this, but it is going to take a fair bit of effort to look beyond the 20-kilometre zone for locating some of these areas, or some of these operation centres, because it seems to us that it doesn't make sense to locate places where you are going to send anybody who is being evacuated into an area that could also be evacuated. So we are looking beyond that.

The thing to understand about Durham Region is that our lakeshore municipalities where we are right now is our urban area. Our northern municipalities are very rural. The number of resources as you move away from the lake in terms of arenas and community centres decreases sharply. So the work involved in identifying those, getting those centres up and operational, because they are not currently in play, we have located all of our response efforts in what is currently outside the

10-kilometre zone. That's where the funding expectation is at the planning side of this, getting people and resources in to do the frontline work.

We also think, however, that given the resources and the capacity that we have as a regional municipality, that in the unlikely event that we are going to need this there are other municipalities beyond our borders that need to be engaged. One of our recommendations was that more municipalities be designated under the PNERP. That didn't take place, but we have had every assurance from the province that in the event of an emergency if we need additional resources we can ask for them through them and we have already heard that they have capabilities through the authority in the legislation that they can tap into all the provincial resources and we have every expectation that we would be doing that.

THE PRESIDENT: So which -- how much of the 50 ingestion zone is part of Durham?

MR. LEONARD: If you take the 50-kilometre ingestion zone, there is a very, very small part at the very upper reaches around Bolsover and Sunderland that is not included. It's the entire -- it's our entire region.

THE PRESIDENT: Okay. Because you mentioned the contingency, you didn't mention the 50K zone. So I'm trying to understand -- this is what we have been

struggling with. I don't know if you have been listening now to this --

MR. LEONARD: Yes.

THE PRESIDENT: -- for the last three, four days, I can't keep count, about trying to get an understanding of what is the actual plan in place. So what I hear from you is it's still a work in progress.

MR. LEONARD: It's a work in progress based on two things: one, our sites have been set on the 10 kilometres for such a very long time; but, two, this plan is very recent, it's just out.

THE PRESIDENT: Okay. So what's your estimated time to come up with a detailed plan of action?

MR. LEONARD: Typically the province has -- it's not specified, but typically the province has allowed us a year after their plan comes out for us to get our plan up to speed. Now of course, being economical with our resources, we have one plan for both plants. The Darlington implementing plan has not yet been released, so our timeline is going to be one year from when that's out.

THE PRESIDENT: So for staff, what is a reasonable time horizon to expect all of this to be in place with gory details?

MR. FRAPPIER: Gerry Frappier, for the record. I would ask Mr. Richard Tennant to comment on what

we would be expecting with respect to PNERP implementation.

MR. TENNANT: Richard Tennant, for the record.

With the discussions that we have had at EMCC on the release of implementation plans, as Mr. Leonard said, the province gives one year for conformity and we feel that's reasonable. Mr. Ramzi Jammal said we can update the Commission.

THE PRESIDENT: So are you planning to update the Commission in every -- on an annual basis through the regulatory oversight?

MR. TENNANT: That is correct.

THE PRESIDENT: Okay. Thank you.

I interrupted somebody. Go ahead.

MEMBER VELSHI: When is the Darlington implementation plan expected to be released by the province?

MR. LEONARD: Warren Leonard, for the record.

You would have to ask the province that one.

MEMBER VELSHI: Does staff know?

THE PRESIDENT: Office of the Fire Marshal -- they are still with us here -- any idea as to when the Darlington plan is going to be out?

--- Pause

MR. MORTON: Mike Morton, for the record, with the Office of the Fire Marshal and Emergency Management.

Updates to the Darlington implementation plan are underway at this time. And that will be presented to the new government once it's formed.

THE PRESIDENT: It's required to go through the new government?

MR. MORTON: Mike Morton, for the record. Yes, that's correct. Each of the implementing plans reviewed --

THE PRESIDENT: And you're still [indiscernible - speaking at the same time] --

MR. MORTON: -- by cabinet.

THE PRESIDENT: -- one here? That's a leading question.

MR. MORTON: Yeah. We will be submitting the plan for the government's consideration, once formed.

THE PRESIDENT: Go ahead.

MR. LEONARD: Warren Leonard, for the record.

And I'd like to point out that when we're talking about a one-year time frame for putting our plan together on what we're going to do, there is still down the

road work involved at a centre basis, let's say, where we're talking about, you know, I call it left-turn, right-turn planning. Where do the cars go? What are the lanes? Where do the people go? Which door? Where are the signs? All of that will still be yet to come.

THE PRESIDENT: Our observation of the last -- at least my observation over the last 10 years, debts that get measured, gets done. That's why we focusing about when is a good time for us to get engaged as to progress on those plans.

MR. LEONARD: Warren Leonard, for the record.

I agree. And now we're back full circle to the funding request.

THE PRESIDENT: Well, I know you attribute a lot of power for us over the Ontario government. So we'll have to take this under advisement. But we only deal with the OPG, as they're licensees. So there's limited amount that we can do. But I think we haven't exhausted everything on this.

So OPG, are you still comfortable within the year to have some really lots of progress made at least on Pickering?

MR. BURNS: Scott Burns, for the record.
We're comfortable with the timeline

internally for OPG's component. Our plan is to have our updates finalized by this time next year. I have to respect the region's timeline. We don't have any authority to influence or direct that. And we have a strong relationship with the province as well, and they're happy with that.

I should say that although we're talking about updates to the plan, we have a strong program in place and community can be assured that we can safely respond to any emergency.

THE PRESIDENT: Thank you.

Mr. Berube?

MR. BERUBE: First of all, thanks for your presentation. As President Binder has admitted, some of this is out of our scope and we can't help you with some of it.

But what I find interesting in this is that I'm sitting here with two groups of people. You have a 50-year plan. You have a 50-year plan. You're in their backyard, more or less. And for some reason or another, you're coming to us with a bunch of requests that really -- have you talked to them about it? Where's the communication between these two things? Because as far as I can see, you both have issues to address over the next 50 years. Could you explain that to me? I'm a little

perplexed, considering that really the issue is that you're supposed to cooperate to get things done like the PNERP to take care of the people within your region, that kind of thing.

MR. LEONARD: Warren Leonard, for the record.

I can speak to our emergency planning responsibility with OPG, because that's more immediate. The longer term 50-year plan is a little out of my scope, because I am, of course, concerned with something that could happen at any moment -- looking down the road, of course, but you know, the larger issues of planning and the transportation and the waste management, that's a little out of my scope.

THE PRESIDENT: Okay, so let me jump in. So you make explicit ask about being compensated for hosting the waste. I know this is not the first time I hear that thing. I know you made that suggestion to the Ontario government. So I don't know what we can do about that.

Staff, you have any idea? I'm not sure that anything we can do about that. Maybe OPG can help us on that score, whether if the Ontario government decides not to compensate you and deal with your property taxes, I'm not sure we can ask for that.

MR. FRAPPIER: Gerry Frappier, for the record.

So first I would point out that certainly a lot of the interactions between the OPG, the licensee, and the regional governments and that are a requirement on them as part of the licence as was pointed out by Mr. Tennant.

I think the other thing that we've talked a little bit about, but we're certainly going to be coming back more over the next year or two, is that we do have a requirement on OPG to explain to us some of the details through their -- the SOP that's going to be delivered, as we've talked about a little bit before, in December of next year.

And so from those perspectives, we're certainly going to have window into whether there is issues or not. We also interact with the provincial emergency management planning group, as we've also talked about. So we'll certainly have a good handle on the immediate sort of concerns.

I think with that, I think Mr. Jammal would like to also add something.

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

I don't have much to add for Mr. Frappier,

but I want to clarify with respect to your question. Are you asking do we have anything to do as CNSC between the host community and WMO for waste?

THE PRESIDENT: They're asking to be compensated for being a host for the waste. Maybe it's a good time to ask some of our lawyers whether they have any view on -- there was a recommendation from the regional municipality --

MR. JAMMAL: As the chief regulatory operations officer, we have no authority on a business agreement between a host community and a proponent. Let me put it this way. We will engage with respect to the siting and the geographical suitability of the location, but what happens between the proponent and the host community, that is an agreement between both parties.

MR. LOCKWOOD: Randy Lockwood, for the record.

Several items here. I would like to speak to a few of them, and I would ask Lise Morton later to speak to the waste.

First and foremost, as I spoke through this hearing, to us, our social licence, the ability to operate in our community, I've said it many times, the trust, respect, and confidence is paramount to us.

Item one for me is the safety of the

public. So it goes without saying, I'll restate again, implementations, the differentials to move from the existing plan to the new PNERP is of paramount priority to me. And we'll work with the province to get that done as quick as possible.

Number of items, though. Decommissioning. Decommissioning, we've had discussions with the region and we'll continue to have discussions with the region. We made very clear our overall strategy for what to do with the site. I've stated that here a couple of times. We tend to have a 10-year licence, end commercial operations 2024, and then safely shut down the units, remove the fuel, and remove the water, and place the units in safe storage. That preliminary decommissioning plan has been outlined to several parties and several stakeholders, and we'll continue to do that. And it's posted on our OPG website.

The repurposing. We've started discussions a number of years ago. Repurposing of the site in the longer term. It's still, I accept, quite a ways off. We touched a little bit on that during these hearings. We started that work back in 2015. It'll have to resume and it'll have to continue, because I'm certain that it will evolve with time.

Also staff was mentioned. We've discussed that several times during this hearing. I fully understand

that, the impact on the community. First and foremost in my mind is the effect of closing -- ending commercial operations for Pickering, closing down the plant on our staff and their families. Of course we're going to continue dialogue with the region and so they ensure they understand our staffing plan and where we intend to go, and the associated timelines. But as we've heard this week, we do have -- my first priority here is I have to deal with staff and the associated collective agreements. All through that process, I need to keep the region up to speed on where we're going. That I understand. And we'll commit to continue to do that.

As well, I have to balance to the ratepayers of Ontario.

So there's several things to balance. First and foremost is staff and their families and abiding by the collective agreements. It's also with the region, understanding the impact of the end of commercial operations of the Pickering station on the region and working with them and making sure that they understand our timeline as we move forward. And also the impact on the ratepayers with the end of commercial operations of Pickering.

So I will commit. There's no doubt in our mind. We will commit to continued ongoing relations and

communications with the region to lessen the impact of the eventual closure of the Pickering station.

THE PRESIDENT: Okay, I --

MR. LOCKWOOD: I'm going to -- may I ask, though, the one last topic we did not talk about is waste. And I would like Lise Morton to reiterate where we are going with waste.

MS MORTON: Lise Morton, for the record.

So as Mr. Lockwood said, we do have a long-term plan for wastes, and I think we need to be very clear about that.

So I'll separate out the streams. And I know the region is aware of this and certainly meets with NWMO routinely.

So with respect to the fuel, of course, the long-term strategy is to move the fuel to the NWMO's APM DGR. NWMO has published their timeline on their websites with by 2023 site selection being complete, 2028 licensing applications being submitted, and in-service dates of 2040 to 2045.

So while I certainly don't want to presuppose approvals of EAs and I certainly don't want to speak on behalf of the NWMO, they do remain on track with those timelines, and so therefore we are certainly using that as our planning basis.

In terms of low and intermediate level waste, of course, I believe most know that we're -- that waste is destined for the DGR for low and intermediate level waste. And I think we simply need to respect that that federal EA is in progress.

Lastly, as I said, we certainly do take the relationship with the region very seriously. We do meet regularly with the Durham Nuclear Health Committee as well, and in particular have some presentations on waste. I believe the last one was a couple of months ago.

MR. LOCKWOOD: Randy Lockwood, for the record.

The last point, I overlooked it, President Binder, was taxation. As the Commission can appreciate, we pay taxes, we do not set taxes.

THE PRESIDENT: Okay.

I have a very specific legal question. I don't know the answer. I'd like somebody to give me the answer. There's now a PDP, an approved PDP. There's financial guarantees that are associated with the PDP. Are any of those financial funds available for early planning of decommissioning, things like that? I think that's what was on the table. Don't ad lib. Get me a legal opinion on this, please.

MR. FRAPPIER: Gerry Frappier, for the

record.

Perhaps first I'd see if somebody in Ottawa has got those details.

In particular, I'd ask Karine Glenn if she has some comments on that.

MS GLENN: Karine Glenn, for the record. Can you hear me?

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

MS GLENN: I'm the Director of the Waste and Decommissioning Division. I'll speak to the PDP and the financial guarantee.

As part of the PDP, OPG lays out the plan and a credible cost estimate that goes along with that, along with their timeline. The financial guarantee that is in place is completely separate from their operating funds and cannot be accessed for activities other than for their decommissionings. Once they begin decommissioning activities, they would need to request permission from the CNSC in order to be able to access those funds, and they can only be accessed for decommissioning activities, so as they engage down the actual decommissioning activities, they could then begin to access those funds, but only for those activities, and as I mentioned, they could not do so without the prior approval of the Commission.

THE PRESIDENT: Keeping on-site dry storage for the next 50 years, is that part of decommissioning?

MS GLENN: Karine Glenn, for the record. That's actually part of their operations. Long-term waste management is considered as part of their overall cost estimates, so the entire cost, from the time that they are into storage with surveillance and all costs associated with that for the management of the fuel until it goes to disposal are incorporated in the overall financial guarantee.

THE PRESIDENT: Okay. I'll leave it at this for now.

Questions? Ms Penney.

MEMBER PENNEY: Hopefully, you will be able to pull this slide up, it's in your presentation, the "Planned Future of PNGS", so if we could get that pulled up, it's on page 7, a very good communication tool. I'm going to ask you a couple of questions about it, and I also want to fact-check it with OPG.

It lays out for us 50 years into the future, along different categories, the structures and whether they'll be operated or not, the jobs at Pickering, the used fuel bundles, and then the intermediate and low-level waste. I guess my question number one is, the

intermediate and low-level waste, is there any meaning to the number of trucks and the number of hammers there in terms of volumes? It's clearly going along the path that at some point there will be a DGR at Kincardine, and the NWMO solution will be available, but is there any meaning to the number of trucks? That's my first question.

Then there's a question for OPG around the number of jobs. Are these your numbers for the number of jobs?

I'll start with you.

MR. CUBITT: Garry Cubitt, for the record.

I'm going to defer a further answer to Christine Drimmie, who is with me today, but I just want to pick up on your question about trucks, just to give this a sense of context for you.

Let's assume that the Pickering Nuclear Generating Station closes with 781,000 spent bundles of fuel. The Nuclear Waste Management Organization transportation planning documents indicate that each truck that would transport storage packaging is designed to hold 192 used fuel bundles. That means there would be 4,067 transport containers to move away from the Pickering plant just in used fuel. Only one storage container can be transported per truck, so the Nuclear Waste Management Organization has told potential host communities that waste

would be transported to the new deep ground repository at a rate of one or two trucks per day. If 14 trucks per week were sent from the Pickering Nuclear Generating Station to the used fuel repository without any disruption every day of the week, they would complete the removal by 2049 in accordance with the plan. In other words, it would take 11.1 years of transport trucks every day just to move the bundles. I hope that gives you a sense of the trucks.

Now, I'll defer over to Christine.

MS DRIMMIE: The 11 years actually is if they only moved one truck per day.

Sorry. Christine Drimmie, for the record.

In terms of the meaning of the graphics, it is meant to be representational, it's not exact. However, we did look into the number of waste management buildings that are to be at Pickering in the next decade or so and tried to represent them there.

The job numbers are taken from OPG reports and press releases, and from the Ontario Chamber of Commerce report that was done for OPG in terms of the employment related to the continued operation of Pickering.

The used fuel bundles, again it's representational but it's based on the NWMO anticipation, the figures they provide, about what would be at the plant by the time 2024 rolled around if the lifetime is extended.

The trucks in the low and intermediate-level waste line are mostly symbolic. We have trucks now moving with low and intermediate-level waste regularly. In the 2050 to the 2060 timeframe, we're anticipating that there would be more trucks because there will be debris and rubble to remove, assuming that is being removed to another place.

One of the concerns for us, and why we show the Kincardine DGR expansion in 2060, is that from reading the documents related to Kincardine, our understanding is that the current proposition for a DGR in Kincardine is for 200,000 cubic metres, I believe, and that is to take waste that currently exists in the western waste management facility, that's my understanding, and that it isn't actually going to be taking waste that would be produced, low and intermediate-level waste that would be produced from the refurbishment at Darlington or from the demolition of this plant.

The additional expansion of that DGR at Kincardine will have to be determined sometime in the future. It seems to be in the 2036 to 2039 timeframe that they might actually get around to doing the expansion of that facility. I'm not certain how long building that additional expansion of the facility would require, then there's just the time to remove all the waste, so that's

why we have sort of nothing in the 2060 to 2066 timeframe. We're assuming that the waste will be there, but given the sorts of delays that occurred in getting the existing proposed facility approved, we feel that there's some risk in that date.

MEMBER PENNEY: A question around the property taxes. Again, it's outside our mandate, as the President has said, but you've got question marks beyond 2024. Presumably, there's still a facility there and it would be paying something, regardless of whether it's operating or not, or am I wrong in my assumption?

MS PINCOMBE: Nicole Pincombe, for the record.

Yes, there's some uncertainty as to the amount of property taxes that would be forthcoming to both the region and the local municipality of Pickering once decommissioning starts. There's very specific legislation that speaks to how property taxes are calculated for the various components of the property, and the generating station. Once decommissioning starts, we're not clear in terms of what that will mean in terms of the revenue stream for the region and for the City of Pickering.

MEMBER PENNEY: Thank you.

OPG, are the job numbers correct?

MR. LOCKWOOD: Randy Lockwood, for the

record.

Looking at the slide, and for the benefit of the Commission, I can confirm that the top line, moving across from left to right, is our plan, as we've outlined previously in the hearings, and as well, the job numbers. I think we can confirm the used fuel bundles as well. The first two lines definitely come from our PDP. It's totally available to the public.

MEMBER PENNEY: The only correction I would say is, at the top, at the very top, it says that continued operations go to 2024, and what you've actually asked for is a licence that takes you out to 2028, so that's one correction for your slide. What we understand from OPG is they're not asking for decommissioning as part of this licensing hearing, their safe storage is considered part of operations, so that's just a correction for your slide.

MR. LOCKWOOD: Randy Lockwood, for the record.

For the Commissioner's benefit, I think the region already acknowledged -- if you look above the dates, it clearly shows the requested operating licence period. We're looking for the continued operations ending in 2024 and then moving out to decommissioning.

MEMBER PENNEY: Right, but then it calls

2024 to 2028 decommissioning, where you've been very clear that you're not decommissioning until 2028.

MR. LOCKWOOD: Good point, point accepted.

THE PRESIDENT: Okay. Question?

Any more questions?

Okay. You have the final comments.

MR. CUBITT: It's Garry Cubitt, for the record. We would just like one more time to thank you for the opportunity for presenting the Region of Durham's perspective, concerns and point of view and extend to you, again, our appreciation, Dr. Binder for your leadership, your support of the Region over the years and the very best wishes as you go forward in your next stage of life.

THE PRESIDENT: Thank you. Thank you very much.

I'd like now to move to the next presentation which is by the Ajax-Pickering Board of Trade as outlined in CMD 18-H6.25 and H6.25A.

I understand that Ms Ashton will make the presentation. Any time you're ready.

CMD 18-H6.25/18-H6.25A

Oral presentation by the

Ajax-Pickering Board of Trade

MS ASHTON: Good afternoon, Mr. President. Thank you very much for allowing me to present before you today.

My name is Christine Ashton, for the record. I am the Volunteer President of the Ajax-Pickering Board of Trade and an almost 10-year resident of Pickering living within two kilometres of the nuclear site.

So, I'm going to be quite brief today. I understand we're a little bit pressed for time and getting close to lunch.

So, just to give you a bit of background. The Ajax-Pickering Board of Trade has over 700 members and we represent the business community in both Pickering and Ajax. Our members are from diverse sectors and are very incisive, but the majority of our members are small businesses within the Region.

We look to ensuring that we are doing things for business and creating a must join organization, and we do that through education, connection opportunities, networking events and advocacy.

We wanted to come here today to speak in

support of Pickering Nuclear. First of all, we have seen over the years their commitment to safety and we've seen that, for example, in February we recently attended sort of a walk-through and a tour of the facilities and part of that tour really allowed us to see the safety measures that they have in place to ensure not only the safety of their own workers, but also the community and the province as a whole.

So, from the checks and scans and everything that we had to go through, you really got a sense of how safe and secure the site really is.

We were also one of the agencies that participated in December's emergency preparedness exercise where they dealt with a pretend loss of coolant to see how the OPG would respond and how we as a community would respond. And part of that was dealing with the communication efforts that would incur in terms of ensuring that everyone got the message as to what needed to be done.

And part of that two-day event also allowed for focus groups where we discussed our feedback, questions and concerns so that OPG could take those into consideration in making sure that they had a great emergency preparedness plan.

We're also thrilled to have OPG be a very active member and volunteer with the Board of Trade and

that includes being recognized through our eco-business certification process. So, we have a three-level certification process and OPG has achieved the highest level which requires that not only are they aware of the environmental impact of their business, but they take positive steps to ensuring that they are reducing their environmental impact and supporting the environment.

We also are proud to have OPG in the community because of the fact that they are such an important player on the economic side. So, in Durham Region alone we know that they create 4,500 jobs and that's just for Durham Region. When you go beyond that, obviously, the number goes much higher.

And then, finally, I wanted to address our partnership directly with OPG. So, as I mentioned, OPG is a very active member and volunteer with the Board of Trade. That includes acting as an annual title sponsor. They allow us to use their facilities to host events at, and I can say that even those events reaffirm their concern for safety because they always begin with, first they explaining what would happen if something were to happen.

And then, they also act as a representative on our Council and our Government Relations Committee.

I also just wanted to take a brief moment

to mention on sort of a personal note, as a resident of Pickering who resides so closely to the Pickering power plant, I literally wake up every morning and go to sleep with it in my eyesight.

That I know that there's been concerns raised today about whether or not individuals are aware of what would occur in an emergency, whether or not we're receiving our KIs, if we're told about them. And I can tell you that I got the package in 2015, in 2017 I got that further emergency preparedness package which provided you a place to store your KIs and also informed you if you don't have your KIs, where you can go to get it.

Every school year my kids get the letter to take home which we have to sign off on confirming that we are okay with them being given their KIs. When I registered the kids for daycare, I also got that form as well.

We get newsletters, emailers, lots of communications, and not just in terms of emergency and safety, but also in terms of all the great things that OPG is doing for our community from, in the summer they do their Tuesdays on the trails and my kids love that stuff, March break they have the March Break Madness.

So, I can tell you as a resident that I really see the strong relationship that OPG has had with

the community, not only in terms of safety and emergency response, but also in terms of being a great advocate for environment, science, health and awareness.

Thank you very much.

THE PRESIDENT: Thank you. Well, you live in the zone and we all know that you're looked after, that's not the zone we're questioning about.

I have a real question for you. Why are you a volunteer, can't they afford to pay you?

--- Laughter / Rires

MS ASHTON: We do have paid staff, but we also are made up of a group of volunteers who believe that it is important to advocate and ensure business success in the community.

THE PRESIDENT: Thank you.

Question?

Thank you. Thank you for your presentation.

MS ASHTON: Thank you.

THE PRESIDENT: Okay. I guess -- I am told we are stopping here and we're coming back at 1:30. One thirty, that's right, 1:30.

--- Upon recessing at 12:44 p.m. /

Suspension à 12 h 44

--- Upon resuming at 1:32 p.m. /

Reprise à 13 h 32

THE PRESIDENT: Okay. We are ready to proceed. The next presentation is by the North American Young Generation in Nuclear (NAYGN) - Canada, as outlined in CMD 18-H6.32.

I understand that Mr. Mairinger will make the presentation.

Over to you.

CMD 18-H6.32

**Oral presentation by the
North American Young Generation in Nuclear
(NAYGN) - Canada**

MR. MAIRINGER: Matthew Mairinger, for the record.

I would like to start by thanking the Canadian Nuclear Safety Commission for providing an opportunity to speak about the Pickering Nuclear Generating Station's licence renewal.

I have five years of experience working at Ontario Power Generation at both the Pickering and Darlington sites. I have worked in Project Controls, Minor

Modifications, Reactor Safety and Performance Engineering, and now I work in Performance Improvement at Pickering as a senior advisor in Stakeholder Relations.

I am a board member on the CNA board directors and I am a Society of United Professionals delegate on the steering committee for the Society of United Professionals, Young Professionals Network.

I earned my Bachelor of Engineering degree in Nuclear Engineering from UOIT and am a professional engineer in the province of Ontario. I currently live in Ajax less than 10 kilometres from the Pickering site.

I am here representing North America Young Generation in Nuclear as the Durham chapter president and as part of the corps as the Canadian Affairs Chair.

NAYGN is an association of young professionals and students passionate about the nuclear industry and is focused on professional development, public relations, networking, and community outreach. There are over 120 chapters across North America, with 11 chapters right here in Canada.

NAYGN was just recently presented with a Top Industry Practice Award honouring the organization for its impact and leadership in the nuclear industry.

Through my experience in the nuclear industry I am amazed at how open, transparent and

collaborative the industry is. Through organizations such as WANO, INPO, and COG, information about issues throughout the nuclear industry and across the globe are shared in an open manner so that all stations and employees can learn, and take corrective action if necessary. Unlike other industries where issues and improvements are kept secret to maintain a competitive advantage, the nuclear industry operates as a global community and adamantly tries to ensure other stations operate as effectively as possible.

For young professionals in nuclear this open and collaborative approach works well, as our generation has been brought up in a globally-connected environment. This global connectedness was never clearer than after Fukushima Daiichi event. Even though this was a completely different reactor design and was operated on a different continent, and experienced a tsunami, which would be quite strange to see in Lake Ontario, I saw how OPG completely reanalyzed their safety analysis and implemented millions of dollars in upgrades and projects to protect the station from beyond design basis events.

I saw several post-Fukushima modifications installed onsite at OPG and I worked on an industry best practices guideline for external flooding protection with EPRI. This approach to openly share experiences and lessons learned has allowed the nuclear

industry to exponentially advance in terms of safety and human performance improvements and is one of the underlying factors of why I have so much faith in the future of nuclear.

It is unfortunate that every year there are almost 1,000 workplace deaths and almost 250,000 claims accepted for lost time due to work-related injuries or diseases in Canada. Young workers are a group particularly at risk due to a number of factors such as lack of experience, hesitation about refusing work, and generally having a higher risk tolerance.

Ontario Power Generation, however, has robust and comprehensive safety programs in place to protect young workers. This includes computer-based training, qualification requirements before work can be performed, and ensuring that we have a mentor at the company.

In the engineering new-grad program, these new workers participate in rotations at both sites in various departments and do one month shift rotation before they go to their home base location. These experiences allow for a greater breadth of experience and allow for a transition period from school to work. Beyond this, Ontario Power Generation has an excellent nuclear safety culture. This includes reviewing the nuclear safety trait

of the week before the start of meetings, having an environment open to raising concerns in which all employees can document deficiencies via station condition records, to focusing on safety at the lowest level by enforcing that all staff hold handrails while traversing stairs.

In addition to this, the company there is also the Society of United Professionals and the Power Workers unions which are part of the joint health and safety team and are another defender of protecting young workers from workplace injuries. With such comprehensive programs in place, and by safety being reiterated at all levels within the company, young workers have the privilege of working for a company in which safety is the top priority and young workers are not subjected to precarious work.

The extension of the Pickering plant is not just a local issue. It is essential to maintain Ontario as a world leader in clean energy generation. The continued operation of Pickering is important to young nuclear professionals across the province. As the chapter lead from the NAYGN Bruce chapter puts it:

"The continued operation of Pickering will ensure baseload power is available to the province as Bruce and Darlington undergo refurbishment.

By continuing the operation of Pickering, Ontarians will continue to have reliable, low-cost, low-emissions power." (As read)

With the refurbishment of Darlington and Bruce there needs to be a dependable, base load generator to ensure uninterrupted services such as hospitals and other essential services. Ontario has such a stable grid that brownouts and blackouts are unusual and as a result most of us are not prepared and not willing to tolerate of power interruptions.

As a millennial I realize how dependant I am on electricity when a power outage occurs. The Wi-Fi goes down and as soon as the phone battery dies and can't be recharged, I can't even think where to look to check for updates. Twitter, unfortunately, does not run on candlelight.

While wind and solar are beneficial additions to the grid, with capacity factors around 30 percent and having variable production based on external factors, this means that with the closure of nuclear, Ontario will be forced to utilize fossil fuels to fill in the baseload generation gap. This is apparent in Germany where nuclear is being phased out and they are investing heavily in renewables. Even with heavy economic investment

in renewables, Germany consumed 80 percent of fossil fuels and only 13 percent renewables in 2017, while the cost of electricity was the highest in Europe.

The lifecycle greenhouse gas emissions from nuclear are far less than fossil fuel sources and comparable with wind and solar. Nuclear power is also the most efficient means of electricity in terms of land use, producing almost 30 times more power per square kilometer than wind.

The NAYGN Chalk River chapter stated that they support the Pickering Licence Renewal because, "it will support the generation of affordable low-carbon electricity in Ontario and will deliver on national policy objectives and international commitment for non-fossil fuel electricity generation. The licence renewal will be a key driver of Ontario's future prosperity and economy."

Ontario has made great strides in terms of phasing out coal and it is essential to keep this trend going by extending Pickering and not having natural gas fill the void.

From the Pickering facility, the public dose resulting from operation has consistently been well below the regulatory limit. From 2013 to 2016 the maximum

effective dose to a member of the public occurred in 2016 and has a dose equivalent to eating 15 bananas. There is a widespread misunderstanding about radiation in the public, and more education and training is needed.

In the 2017 NAYGN Career Survey, in which members from across North America were surveyed, 36 percent of respondents stated that their peers and family impression of nuclear changed to more supportive since they started working in the nuclear industry and 60 percent were already consistently supportive. These high levels of support, and high increased levels of support, demonstrate the powerful alteration in outlook towards nuclear power once more is learned and discussed about the topic.

Frequently, when the word "radiation" is raised, it invokes fear in the public. This is a shame as radiation is used in smoke detectors to save lives; nuclear procedures and materials are used in the medical sector to diagnose, monitor and treat a wide variety of issues; carbon dating has helped us learn more about our past and electron beam radiation is used to remove toxic pollutants in industries such as coal-fired plants.

Radiation is a naturally occurring process all around us, from radionuclides in the soil to cosmic radiation from the sun. Besides Pickering utilizing this amazing energy source to produce electricity, OPG and Bruce

Power have been working with Nordion to supply more than 50 percent of the world's Cobalt-60, which is used to sterilize medical equipment and food products. Therefore, the Pickering plant is essential not just as an electricity generator, but also as a producer of life-saving medical isotopes.

Ontario Power Generation is a model company in terms of giving back to the community. Pickering Nuclear supports over 140 grassroots communities, including charitable and non-profit initiatives annually. I've been to many of these community events around Pickering in which OPG was listed as a sponsor and these events have made significant impacts on creating a positive impact in the region.

Without the Pickering station I strongly believe that the overall quality of life in Durham region would decrease, not only due to thousands of lost jobs but also due to the lack of community-funded events and non-profit initiatives.

In summary, I believe OPG represents an ideal opportunity for young professionals to have access to safe, dependable, rewarding careers. I believe OPG represents the ideal model of an outstanding corporate citizen. I believe the Pickering plant can continue to deliver low cost, clean, dependable energy across Ontario

safely.

On behalf of the North American Young Generation in Nuclear organization, I strongly support the continued operation of the Pickering Nuclear Generating Station and the renewal of their power reactor operating licence.

Thank you.

THE PRESIDENT: Thank you.

Questions? Go ahead, Ms Penney.

MEMBER PENNEY: Thank you for that. I have to ask you about the book. You didn't mention it.

MR. MAIRINGER: Yeah, I was hoping you would so I left this out.

So a couple of years ago, North American Young Generation in Nuclear, in partnership with Duke Energy, developed this children's book, specifically geared to grade one and two students. It brings Marie and her dog Einstein through an adventure to discover that nuclear power isn't as scary as it is.

So it's another way to reach out to the public, especially at the younger generation as well. It's actually available on Amazon and we're making the second revision right now. It's called "Marie's Electric Adventure".

MEMBER PENNEY: Fabulous, "Marie's

Electric Adventure" for anyone who has small children.

THE PRESIDENT: So do you go to school and distribute this and show them or take a Geiger with you and explain to them what the action is about?

MR. MAIRINGER: So we're working with the CNS right now, because I know you guys delivered 15 Geiger counters to them. So we're working in joint conjunction with the CNS.

In the States they are very open with their schools, so they get invited to speak about this. We would love to go to schools and right now we're working on an initiative to work with groups such as scientists and schools, and reaching out to local schools in the community to deliver this, but for right now what we do is we give some of these away at conferences. They're available for just the cost of producing them on Amazon right now, \$5.75, I believe it is.

MEMBER PENNEY: I did have a real question.

What you said about young workers is absolutely true. So I wanted you to just elaborate a tiny bit about how OPG keeps the young workers, new workers onsite, safe, because it's fascinating.

MR. MAIRINGER: So I think it all starts with the safety culture. Right when you get into the

company they're not rushing you to do work. They treat training and safety as a top priority. So that's reiterated at the start of meetings. As I said, even the smallest things such as holding handrails, not talking on the phone while walking, these low level events prevent the higher hazards from happening.

It's an extensive program in the engineering new grad program where they'll take you through rotations. They'll assign you a mentor. We have groups such as NAYGN that is happy to provide mentorship opportunities.

I know to be authorized as a shift supervisor that's like a five-year program. So just the whole culture, the training program, all these barriers in place where they treat it -- unlike other industries where they might rush into the job or be in a rush to get some work out of you, OPG really wants to train you, make sure you're comfortable with the job, and that you feel safe before you take on any work.

MEMBER PENNEY: Do you wear a different coloured hard hat?

MR. MAIRINGER: I'll let OPG take this one, but they have a "New to Nuclear" sign that they actually stick on your hard hat, if they want to expand on that.

THE PRESIDENT: Okay, thank you. Thank you for your presentation.

The next presentation is by the Pickering Nuclear Generating Station Community Advisory Council, as outlined in CMDs 18-H6.22 and 18-H6.22A.

I understand that Mr. John Vincett will begin this presentation.

CMD 18-H6.22/18-H6.22A

**Oral presentation by the
Pickering Nuclear Generating Station Community
Advisory Council**

MR. VINCETT: Mr. Chairman and Members of the Commission, for the record my name is John Vincett.

I am the facilitator of the Community Advisory Council to the Pickering Nuclear Generating Station.

I am joined here today by five members of the council, or the CAC, as the group is often described: Mr. Ralph Sutton, a retired company director with experience in the energy sector who has lived in Pickering for 33 years; Mr. Zachary Moshonas, an environmental technologist employed in the private sector and a resident of Whitby; Ms Anna-Lisa Tersigni, a Durham college student

in the Department of Environmental Studies and a resident of Whitby; Mr. Bill Houston, a retired information technology management consultant living in Ajax, a geologist by training with a background also in physics, and Mr. Tim Kellar, a certified financial planner with a client base across the Durham region, serviced from an office in Pickering. Mr. Kellar is a resident of Courtice.

At the end of this brief presentation, council members will be happy to answer any questions the Commission members may have.

MR. SUTTON: For the record, my name is Ralph Sutton. The CAC supports this application for renewal of the Pickering Nuclear Generating Station operating licence for a 10-year term, 2018 to 2028, which would cover extension of services to 2024 as well as the transition to the post-shutdown phase.

A core vehicle for the OPG dialogue with the community since 1999, the CAC assists the station in identifying and responding effectively to the concerns of the community. The group is made up of citizens, representatives of community organizations, members of local government staff and agencies who examine a wide range of issues associated with OPG in Durham Region and at the corporate level.

Most members report back to one or more

constituencies. The CAC meets eight to 10 times a year, interacting with senior management from the plant, for an annual total of about 30 hours per year. Meetings are open to the public and the media, minutes are posted on the OPG website and available through public library internet connections.

Over the years OPG managers have provided comprehensive details to the Council on the operations of Pickering Nuclear, including updates on the changes made to apply to lessons learned from the events of the Fukushima in 2011.

OPG operations have already meet very robust safety standards before 2011. The company undertook additional actions based on a review of these events.

A few of these actions of Pickering were a development of an action plan to improve nuclear emergency preparedness and emergency drills to respond to such an accident, and a placement of dykes around standby generators, fuel-forwarding pumps, and the installation of auxiliary back-up equipment on site available to be deployed within minutes.

MR. MOSHONAS: For the record, my name is Zachary Moshonas. With regards to fitness for service, in recent months we have heard all about the extensive testing of equipment as well as major investments in maintaining

and improving the plant to ensure fitness for service to 2024.

Key plant components, major reactor components, steam turbines, and main output generators now have lifecycle management plans. All other important plant components have also been assessed to make sure that maintenance plans are in place to ensure safe and reliable operation to 2024.

We have also been reassured to hear that the most recent periodic safety review of Pickering Nuclear conducted by OPG and accepted by CNSC Staff confirms that the plant conforms to new plant requirements to the extent practicable.

In late 2017 we learned that as the station continued its strong safety performance it also achieved its best operational performance over the last three years, putting it on par with the industry best.

Additional recent agenda items include: an OPG presentation on an operational safety inspection of Pickering Nuclear in 2016 under the auspices of the International Atomic Energy Agency, which found that the plant had strengthened safety in recent year; the results of environmental monitoring programs at the Pickering and Darlington stations; an overview of security at the Pickering site; nuclear waste management updates on the

Pickering Waste Management Facility; Provincial Nuclear Emergency Response Plan; and, the Pickering emergency response capability, as well as a tour of the reserve emergency back-up equipment to understand the scope of the equipment and its readiness to be mobilized.

MS TERSIGNI: For the record, my name is Anna-lisa Tersigni. Pickering Nuclear has also involved council members as participants and observers in annual stakeholder information sessions and in major emergency drills in 2014 and 2017.

With each of these topics we have been impressed with the level of detail undertaken in OPG staff analysis and the chain of logic that supports their decision making. OPG experts on plant safety and performance have always been ready to attend meetings and answer any and all questions from the CAC.

The material presented to us clearly shows the thoroughness in OPG's planning. It leaves us confident in the ability of OPG to manage the proposed life extension project for the Pickering power station and their ability during the proposed licence period to move successfully into a safe storage mode.

Why are we confident that Pickering Nuclear will maintain best performance to 2024? We realize that the amount of information placed before the Commission

during licence hearings is extensive and detailed.

At the same time, despite the voluminous number of studies conducted by OPG in reference to the CNSC to demonstrate the improving performance of the Pickering station we are aware that there is a view in the public domain that it is not credible for an older station to achieve the kind of success claimed by OPG.

We have created a graphic as our attempt to explain why this claim has been shown to us to be fully credible.

MR. HOUSTON: For the record, my name is Bill Houston. Five factors come together to explain how Pickering Nuclear today performs better than it ever has, and to ensure that that level of performance is maintained to the last day of operation in 2024.

Research, key factor; innovation; applied learning; operating experience, coordination and teamwork. Research and innovation have enabled renewal of plant performance. Research, innovation, operating experience and coordination and teamwork have led to improved design and the use of improved materials. Analysis of the applied learning and operating experience has led to improved performance.

Research and operating experience have contributed to an augmented knowledge base. Various

combinations drawn from the key factors have led to improved design, improved materials, and an enhanced internal review process.

There has been a productive interplay between international and industry information sharing and applied learning, operating experience, and coordination at Pickering Nuclear.

Various combinations drawn from the key factors have enabled refined technical systems and enriched management systems, and have led to upgraded maintenance effectiveness. Enhanced effectiveness of the regulatory process, greater clarity, precision, and transparency have also played a critical role in improving performance at Pickering Nuclear.

We have looked at how each of five factors; research, innovation, applied learning, operating experience, and coordination and teamwork, along with the improved effectiveness of the regulatory process have produced a comprehensive range of positive results at Pickering Nuclear. No one factor could do the job, but all working together they mutually reinforce each other to produce and maintain performance excellence.

MR. KELLAR: For the record, my name is Tim Kellar. The CAC is pleased to enclose with our submission our latest report to the community.

We believe we have an obligation to inform the public in the region about what we have learned regarding the Pickering Nuclear safety, performance, and plans for the future.

At our request, OPG enclosed our independent report with the spring issue of their newsletter, Neighbours, which was distributed in March to 100,000 homes in Durham Region and East Toronto. In our view, OPG has made a compelling case for the continuance of Pickering Nuclear service to 2024.

We hope that, given the station's excellent and improving record, the CNSC agrees. Ultimately, we rely on the CNSC to do a technical analysis of OPG's claims for the plant's fitness for service to 2024.

We hope that the Commission takes the transparency of the station in its relationship with the community into their consideration as it reviews OPG's application.

We'll be pleased to address any questions from the Commission Members. Thank you.

THE PRESIDENT: Thank you. Thank you for the presentation. Questions? Ms Velshi.

MEMBER VELSHI: Thank you for the presentation. Besides your report to the community, how do

you communicate with your constituents? If you can share the kinds of concerns and comments that they bring to your attention about Pickering?

MR. VINCETT: For the record, my name is John Vincett. There are a number of mechanisms through which our committee members go back to their respective constituencies. One, is that many of our members are actually members of other groups, and so they would report to various groups as part of their meeting process. We also have representation from bodies of government, like the Town of Ajax, City of Pickering, and the Region of Durham. So there were those kinds of mechanisms.

It was the view of the Council, this council, that we should do a better job of communicating with the public and, consequently, we put quite a bit of effort into creating a regular community newsletter.

We recognized, once that was created, that there were not that many being distributed, and so we petitioned OPG, why don't you put it into your Neighbours publication, because that meets a lot of other places. But 100,000 copies are distributed in Toronto and Durham Region.

But there's other means. For example, going out to council meetings. One of our members accompanied OPG to a council meeting. I'd ask Mr. Bill

Houston, if he'd comment on that please?

MR. HOUSTON: Yes. Bill Houston, for the record. I went to a presentation at the Town of Ajax on the licence renewal, OPG was requesting the support of the Town of Ajax for the licence renewal. They were well-received and it was a public forum in which that request took place.

MR. VINCETT: There have also been other interactions with the community, and I'd ask Mr. Moshonas if he would speak about the interaction with classrooms in the re-distribution?

MR. MOSHONAS: Zachary Moshonas, for the record. When I started with the CAC I was actually a student at Durham College. Our classroom, when we'd have topics regarding nuclear issues or regulatory process, I would always try and share my experience with the CAC, and topics that would come up during meetings and presentations from OPG staff or other members of the public or things like that.

So it really created a conversation in the classroom and it would allow me to dive deeper and learn a bit more from other people's questions as well.

MR. VINCETT: And I suppose just to finalize this question, the meeting is actually open if people would like to attend. We do get attendees and

sometimes that's a source of new members. People come and they are interested and they become new members. But there is also a series of minutes that are filed and they are online, so there are quite a few opportunities for people to learn about the Commission.

THE PRESIDENT: So at a typical meeting, how many people actually from the public show up? And I don't know if you have been listening for the last four days, there is a lot of expression of concern about emergency management. Did it come up and was there a lot of interest in giving you advice about what to say and what not to say? I am trying to understand the participation rate of the public.

MR. VINCETT: Well, just to start out, there are 20 members of the Council, the CAC, there are four alternate members. We have a couple of continuing visiting people that come in fairly regularly and we have occasional visitors external to that. Sometimes we have people from the media come and write something if it is a particularly interesting topic. The topic of public communication comes up very regularly, as you can imagine. Maybe I would ask Bill Houston if he would like to speak about the whole process of how we gave advice to OPG, who said we need to communicate with more people, what kinds of advice did we give.

MR. HOUSTON: Bill Houston, for the record.

OPG is well represented, as you can imagine, at the CAC and are constantly asking us for feedback on how they can communicate better and who -- other people we might talk to about what's going on. With specific reference to maintenance and the ongoing maintenance of the plant, we have received very detailed presentations by OPG on how they are managing that, how they are prioritizing the maintenance events, how they are coordinating that with the other work that has to be part of the ongoing operations of the plant. So we feel very comfortable that they are right on top of the maintenance management activities of the plant.

THE PRESIDENT: What I'm specifically interested in is emergency planning, did that come up as an issue?

MR. HOUSTON: Yes, it did very specifically come up and I think probably the reason that John asked me to comment -- Bill Houston again, for the record -- is that I volunteered to act as a participant in the drill that was held in December where we actually participated in a simulation of exercising the emergency plan and there were recommendations that came out of that in terms of communication coordination, trying to eliminate

some communication bottlenecks in terms of release of information, and that was taken up by OPG.

MR. VINCETT: Maybe I could just add to that. At a May meeting we had a presentation from the Ontario Fire Marshal's Office, along with some folks from OPG who are responsible for that area, and we had a very, I think, useful discussion, probably about an hour. The thought was expressed by the Council that it is fairly recently put together and it will be of interest to the Council as to what is going on with Durham Region and how they interpret it and how they plan to roll out. So that will certainly be an agenda item for the fall.

THE PRESIDENT: Thank you.

Dr. Lacroix...?

MEMBER LACROIX: Yes. I do have an observation. For someone who is not in the nuclear bubble, if I attend a meeting and you guys talk about emergency plan, that's good, but that's bad publicity. So how can you cope with the fact that you have to inform people with emergency planning on one hand, and on the other hand you sort of promote nuclear power?

MR. VINCETT: Well, perhaps -- John Vincett, for the record.

Our terms of reference basically place us in a position to advise OPG. We don't take responsibility

to communicate for OPG, but OPG comes to us and says: This is what we have to communicate. Do you have some suggestions as to how we can do that more effectively? An example would be, we recommended a couple of years ago that community meetings be held, an opportunity for people to come and speak to OPG management in much the way Council members do who spend, you know, 30 hours a year with OPG management, and OPG did put that process in place and has repeated it a few times. There have been discussions back from OPG, saying we think this worked, we think that worked, what do you think, and Council has given its thoughts on that. Council's specific concern is about how do we make sure that people in the community have an opportunity to understand what the Council is doing and that has led to the report to the community. We probably should do that more often.

THE PRESIDENT: Thank you.

Questions? Ms Penney...?

MEMBER PENNEY: Thanks. This is a question -- thank you very much, I am really pleased to see that there is a Council like yours. A question for OPG. In terms of the feedback that you get, we have gotten a little bit of an indication, but what is the formal process for taking on board what you hear from your Advisory Council and how is it processed internal? What is the

governance?

MR. LOCKWOOD: Randy Lockwood, for the record.

I very much value the input from the Community Advisory Committee, as they will attest. I will give you several examples.

We had visited as a group the emergency mitigating equipment as outlined and it was made very clear to me, I got very good feedback that as a company we should be promoting this more in the public, that -- and I don't want to put words in their mouth, but if the public was aware of the amount of preparation you have sitting in these storage areas that they would change their mind rather quickly around nuclear power. With that in mind, that was a key factor to us producing the defence in depth video that was attached to part of our CMD, and in fact that is one of the key reasons for driving that. It became really clear to me.

And in addition, I did play that. The first group that we played that for, albeit it was not that long ago, was for the Community Advisory Committee, because I wanted to know feedback from them, does this work or not, is this enough and does it give you the right type of information. That is a specific example.

I would also like to make mention that I

thought very much about the suggestion that President Binder provided me the other night and I would like to expand on that. In fact, I have thought a lot about it and would like to wait for this group and I will tell you why. Because I very much value what the Community Advisory Group, information they give me in terms of how will the public receive this, is this enough information, do they want more, et cetera, et cetera. So I have been thinking a lot about that because we post a lot of information on our website. The goal really was operational reports to give the -- and as well release data and doses. And the goal really was to give a person, a member of the general public an idea, are we safe doing what we say, confident that we are safely and reliably operating Pickering. And in addition to that, we posted, as I said during the hearing here, all kinds of additional information with the idea that we would be as open and transparent as we could and I think we have been industry-leading.

I am leading to the suggestion the other night that definitely we will release the groundwater data. I think that was your suggestion. But what I would ask of the Commission is, I would go back to the Community Advisory Committee and say, how best -- what format to put that in as opposed to reams of data that doesn't mean anything necessarily to the public. Because I would like

to make the Commission aware that I often get feedback from the public, that if you put all kinds of technical things on here I can't understand and you are just trying to put all kinds of technical information on and not making it in a form that I can understand. So I will commit to I definitely will do that, but I will go back to the Community Advisory Committee and have them give me guidance in terms of what should that format look like.

I hope I answered your question.

MEMBER PENNEY: Yes. Does anyone from OPG sit on the CAC? No? Yes, thank you.

MR. VINCETT: John Vincett, for the record.

I would say not intentionally. I say that in the sense that currently we do have a student from Durham College who is on an assignment, a summer job assignment at OPG. We have had in the past students from the university, the UOIT who have gone to do summer assignments or maybe, you know, lengthy work assignments with OPG. But no, there is nobody who is an OPG employee who is on the Council.

MEMBER PENNEY: The question is, is who do -- you report to OPG, you provide your minutes to them. Who in OPG do you report to or provide the minutes to?

MR. VINCETT: Okay. John Vincett, for the

record.

The Manager of Public Affairs is the manager of the process for us.

MR. LOCKWOOD: Randy Lockwood, for the record. I wouldn't miss a meeting.

THE PRESIDENT: Okay. Thank you. So thank you. Thank you very much. Any last comments? We always give the intervenor the last word.

MR. VINCETT: John Vincett, for the record.

We worked long and hard on our diagram and we were --

THE PRESIDENT: It's very nice.

MR. VINCETT: -- thinking that you folks would like to ask some questions about that. We're kind of relieved that you didn't --

--- Laughter / Rires

MR. VINCETT: -- but it did recognize -- what we did was distil about nine months of information from OPG which we thought was just an enormous vast quantity of information that wasn't manageable for us. So we worked through. So one of the key elements of that is the source of our diagram.

THE PRESIDENT: I think you should animate it and put it on your website.

--- Laughter / Rires

THE PRESIDENT: Okay. Thank you.

I would like to move on to the next presentation by Mr. Bertrand, as outlined in CMDs 18-H6.72 and 6.72A.

Monsieur Bertrand, vous avez la parole.

--- Pause

CMD 18-H6.72/18-H6.72A

Oral presentation by Louis Bertrand

MR. BERTRAND: Mr. Chairman, Members of the Commission, staff and participants, good afternoon.

Before I begin, I acknowledge that we are in the traditional lands of the Mississaugas of Scugog Island and I hope that these proceedings are being held in the spirit of sharing our knowledge and values.

Monsieur le Président, Membres de la Commission, fonctionnaires et participants, bonjour. Je fais la présentation orale en anglais, mais je répondrai, dans la mesure du possible, les questions qui me seront posées en français.

I am a professional engineer and my background is in electrical engineering with a focus on microcontrollers and firmware development. I have designed

analog and digital circuits and written software in C and Assembler on various microcontroller architectures. I also spent part of my career in information technology, in turn as a system administrator, disaster recovery planner, security consultant and applications developer. I currently teach firmware development in the Electronics Engineering Technology and Biomedical Engineering Technology programs at Durham College.

The focus of my intervention is on the aging digital control computer equipment at the Pickering Nuclear Generating Station.

Computers and software cannot be treated as just another component. The failure modes are radically different. I do not believe that the conventional probabilistic risk assessment methodology can reliably account for computer-related failures.

At the outset my main request to the Commission is to take concrete steps to ensure that new software, as well as maintenance of existing software, is developed following a well-defined and sound process.

First, let me situate my talk.

In past presentations to this Commission, as well as CEAA/CNSC joint panels, I have spoken about cybersecurity. However, today's presentation is different. Today I am speaking about software safety. Safety is not

the same as security. They are related but distinct properties of a system.

As the financial prospectus says, past performance is no guarantee of future result. The fact that the software system has operated correctly so far does not automatically imply that it will continue to do so. In my written submission I refer to the concept of software rot, as if the software bits are decaying, well, bit by bit, even though the program is intact. What in fact is happening is that the environment in which that program operates changes while the program itself does not.

That the operating environment changes seems inevitable to me as the Pickering reactors and the instrumentation and control systems around them age beyond their best before date. The replacement instruments behave the same way as the original. Is the calibration the same? Are there different conversion factors, different nonlinearities?

So how is risk assessed? Now I turn to the area of probabilistic risk assessment as a context to discuss software safety. You will note that my slides mention probabilistic safety assessment, but it really is an assessment of risk. I will continue mentioning PRA, not PSA, in my talk.

To my understanding, a full PRA tries to

address every chain of events potentially resulting in an accident and produces enough three-ring binders to fill a bookshelf or enough PDF files to fill a stack of DVDs. The main value of the PRA, again to my understanding, is evaluating the relative probability of an accidental event chain in order to assign a priority to mitigation measures, in other words, to decide which measures will give the best safety improvements.

My misgivings about the use of PRA is informed by critiques of the analysis that cast doubt on the ability for humans to fully understand the workings of complex technological systems. Perrault makes the deceptively simple yet profound -- and here quoting Downer -- that "since large-scale accidents in commercial aviation or nuclear reactors occur on a regular basis, they must be accepted as normal." In other words, the billions of interactions in a complex system offer the nonzero probability of that billion-to-one accident occurring.

It's the old joke. Here is our man Jeff looking for a coin. Where did you lose it? Over there. Why are you looking over here? Because the light is better.

--- Laughter / Rires

MR. BERTRAND: The ability of PRA hinges on the ability to foresee all circumstances or operating

states of a very complex system and correctly identify the initiating events and their consequences. PRA necessarily makes assumptions that accident chains are causal, linear and occur individually. In other words, if we can put a number to this risk, we derive some comfort and confidence. But where does that number come from? Can we be sure that all of the effects have been accounted for? Are the estimates of the individual event probabilities correct? And more relevant to my intervention, how can we determine the probability of a failure of the instrumentation and control software?

The attractiveness of software is its ability to build a specific-purpose machine on general-purpose hardware. But please keep in mind that software is abstract, completely determined by the mind of its creators. Also, computer-based controls are fragile. I refer you to the incident on June 22nd that was discussed Monday in the regular meeting of this Commission where an operator pressed the wrong button on the process control computer and caused operations to come to a halt.

The idea of a random failure of software, the same way that a valve or a pipe can fail randomly, is simply not realistic. Bits don't wear out.

I have noticed that there is generally a blind spot in Ontario professional engineering about the

risks associated with transferring functionality from electromechanical devices to computer-based systems. I recall a feature article in the November/December 2016 issue of the PEO magazine, "Engineering Dimensions". It was on safety, but it was all about mines, chemical plants, carnival rides, not software.

The source of software failure can be traced to the work of its designers, either in the requirements, specifications, implementation, testing, verification and validation. In other words, a software failure should be thought of as one or more errors in its development.

Here I would like to illustrate the mechanism for a case where the software will fail to execute. Sorry. So where was the failure in here? You will notice that the bolt is correctly installed and that the hole is drilled to line up exactly with the bolt and that the user is operating both the bolt and the door according to the instructions.

Here we need to look at system theory. System theory models the interactions between components, first at the lowest levels, then progressively higher levels of abstraction. In other words, parts fit together into subassemblies, which in turn work as assemblies and subsystems that eventually form the entire system.

System theory tells us that systems in which disturbances in one part of the system have direct consequences on other parts of the system are defined as tightly coupled and that tightly coupled systems are more vulnerable to disturbances, cascading events or feedback loops. These nonlinear interactions are difficult to model with PRA.

Here I would like to illustrate the mechanism for a case where the software will fail to execute correctly. It's a very simple example. The flow of control is the path taken by the execution of the code on the left side, if I may, with the --
--- Pause

MR. BERTRAND: I guess the pointer isn't working for me.

THE PRESIDENT: A software issue.

MR. BERTRAND: Always.

Okay. So here I believe you can see. So the code on the left is represented by the flowchart diagram on the right. The invaluable X is input, we make a decision based on the value of X and if the question is answered as true we execute A, otherwise we would execute B, but not both procedures at once. So that's the simple example. The code is in pseudocode, it's not in any specific programming language. The next time through a new

value of X may cause a different path through that code.

Now I'm going to double the complexity here. There are two -- there are four pads for a control flow and it depends on X and Y. So after making a decision on X, the software has to make a decision on Y in both branches, and we could execute A, B, C or D depending on the values of X and Y.

So here's the scenario. Suppose procedure C has an error and then furthermore, suppose that in all previous executions of this code fragment only procedures A, B and D were executed. As conditions change, for whatever reason, aging, new procedures, replaced component, it's possible that a new value of Y will cause procedure C to be executed. At this point the error manifests itself as an incorrect computation evidenced by incorrect outputs which potentially can result in unsafe operation.

You can think of software as a series of paths through a minefield. If the system is carefully designed, the mines are sparsely distributed and most paths through the minefield are perfectly safe. However, there are paths that will inevitably lead to a landmine.

I am running short of time, otherwise I would give an example of a software-triggered accident at Bruce No. 4 in January 1990. This is for the record, Ontario Hydro SER 90-003. I can come back to it in the

questions, if you like.

I ask the indulgence of the Chair, I have a couple of more pages, if that's okay? Thank you.

So how do we ensure correct software? There are several CNSC and CSA guidance documents and development process activities, but they are very short on details. In an IAEA technical report, that's TRS-384, Verification and Validation of Software Related to Nuclear Power Plant Instrumentation and Control, 1999, Appendix 3 summarizes work in several countries participating in a survey of best practices. The Canadian section describes in high-level terms the efforts for Pickering, Darlington and Wolseong in South Korea.

Just to give an idea to the Commission of what I mean by software development process, I am using an illustration from TRS-384 of the so-called V-Model. It is widely used in the software industry, but it is only one of many approaches.

If you look at the top-to-bottom access, and hopefully the mouse will do it for me, there we go, we go from the highest level to the most detail at the bottom, and the progression of the development goes from left to right in order of time.

As we go down one branch with the V, we go from requirements to specifications to coding at the very

bottom, and then at each stage there are two work products, one is the further refined work product, the other one is a test to see that when we come back up the right branch of the V we test at each stage at higher and higher levels of integration. This is a well-known model.

In parallel with this there are also activities to identify hazards and mitigation measures, as well as defect tracking and disposition. Embedded within that we have peer reviews and unit testing in the process.

There are many points in this next slide, but the summary is that the digital instrumentation and control systems are aging even though there have been many modernization initiatives. My concerns are that the software in use may eventually meet a sequence of input conditions that will trigger an accident or that newly-developed software has not been vetted to the same standards as when there was a keen interest in proving the correctness of the entirely computer-based Darlington shutdown systems SDS1 and SDS2.

In support of my concerns about software engineering expertise, I reference Slide 4 of the presentation by Paul Sedran, in CMD 18-H6.20, describing the fragmentation of fuel channel assessors. If the expertise on something as fundamental to CANDU operation as fuel channels was fragmented, what could we say about the

expertise in software engineering?

Finally, I would like to suggest that the Commission ask OPG Pickering to document its software modifications, in particular to review its software development process. According to *CSA Standard N290.14*, vendors of safety-critical digital hardware and software to the nuclear industry must be qualified by inspecting the software development process of those vendors. If OPG requires transparency from its vendors, I think that it's only fair that the Commission, and we members of the public, require the same of OPG. My recommendation is that the Commission require the applicant, as a condition of licensing, to submit the third-party technical review of their development process, sharing the findings with the public by this time next year, and to itemize and publish on a yearly basis the modifications made to the digital control software, along with evidence of the software engineering process that went into the development, verification and validation process steps followed.

Finally, I would like to support the calls by other intervenors to shut down the Pickering Nuclear Generating Station at the earliest opportunity, and to deny the request for a 10-year extension of the operating licence.

I'm also supporting a request for a ruling

by CELA, Greenpeace, Northwatch, and Durham Nuclear Awareness to improve the emergency planning and awareness in the 50-kilometre ingestion planning zone.

Thank you for the opportunity to address this Commission. I welcome your questions.

THE PRESIDENT: Thank you.

I'd like to start with maybe OPG telling us about the way you deal with software, and then from staff, what is the regulatory requirement.

MR. GREGORIS: Steve Gregoris, for the record.

As part of our commitment, fitness for service was one of our clear commitments, ensuring fitness for service of our system structures and components today and out to 2024.

One of the things I'd like to point out and we haven't had a chance to mention is this diagram here. It's in Addendum 1 of our CMD. It outlines the comprehensive equipment reliability process that we have in place. It talks about a lot of the different programs and processes that go into ensuring our equipment is reliable, it's in good condition, it's upgraded when appropriate, and design changes are done and they're done in a systematic fashion.

With that, I'm going to ask Jason Wight to

lead the conversation specific to our computer systems.

MR. WIGHT: Jason Wight, Director of Engineering for Pickering Nuclear.

I've got four points to make, and then I'll pass it off to Mike Benjamin, who will talk a bit about our software management program.

With regard to the periodic safety review, there's been a lot of discussion on how much work has been done with the periodic safety review: 500,000 components, 1,000 component condition assessments, over two years of work. In that assessment, it's both looking at the current standards and codes for Pickering, applying the new standards and codes, as well as electronics and software. That is encompassed as part of the periodic safety review, and that's important to note.

Another piece of information that's also very important to note, documentation aside, Pickering Nuclear, in 2017, performed 13,608 safety system tests. Zero missed. That's 13,608 safety system tests. These tests include software and electronics, which helps with the justification and confirm reliability and availability of our safety systems. That's very important to note as well.

There was a comment made with regard to the engineering change control process for the modification

of software. Our modification process is very large. It's about 800 pages. It's very extensive, with third-party reviews. It's also audited. It's evaluated by INPO and WANO. We have frequent audits from the CNSC, and internal audits as well, and it's benchmarked among the industry. Although the specifics about design of software is of course we're operating a nuclear power station so that's ours, the process itself is very robust.

We have something else as well that hasn't really been talked about, and that's the monitoring and diagnostic centre. We have the ability to perform advanced pattern recognition, so looking at electronics as they slowly degrade in age and be able to proactively replace these electronics in a fashion so it doesn't actually impact the operation of the power station, and that's very important to note as well. This is something about innovation. This is using technology for Pickering that we really haven't talked about but that's very important to note, and we are leading the industry in this fashion.

I'll pass this off to Mike to talk a bit about our software programs.

MR. BENJAMIN: Mike Benjamin, Senior Manager, Cyber Security, for the record.

OPG has extensive experience and expertise managing its cyber-assets securely, safely, and reliably as

part of plant operations.

The development process for software is fully compliant with *CSA N290.14*. We are subject to CNSC Type II inspections. We recently had an audit from our OPG's nuclear oversight organization. That audit did include staff from another nuclear utility, knowledgeable staff. The results of that audit was our controls are effective.

All changes to the digital control software are considered whenever we make changes to instrumentation, to plant equipment, sensors and detectors, as well as computer hardware, so when a change is evaluated it falls under engineering change control. Engineering change control has all the gates to look at security, it looks at reliability, it looks at maintainability, and we make those changes under a full ECC process, which is fully compliant with *CSA N286*, a continuous improvement process.

The nuclear aging management program itself has been updated. The procedure has been updated to align with the requirements of CNSC REGDOC-2.6.3 on aging management. We produce regular condition assessment reports with recommended actions, and they are tracked as part of health reporting, so system engineers, as part of the performance monitoring procedures, produce health reports. Those health reports and condition assessment

reports are updated on a regular basis, and they contain the actions required to make sure that the component health maintains its health as the plant ages.

THE PRESIDENT: Staff?

MR. FRAPPIER: Gerry Frappier, for the record.

We do have programs and compliance programs to oversee computer software. I would point out that of course what we're mostly interested in is what could it do that would have a negative impact on safety, so whether there's production issues and operational issues, that's a broader question. The question particularly that we're looking at is, is the software qualified, and as was mentioned with the discussion on PSA and a deterministic safety analysis, what sort of things could go wrong if the software does go wrong?

I'd ask Mr. Eric Lemoine to explain our compliance program.

M. LEMOINE : Bon après-midi. Mon nom est Éric Lemoine, je suis le directeur du Système d'analyse des systèmes. Je comprends très bien le français, mais je vais continuer en anglais pour m'assurer que je ne fasse pas d'erreur technique, à cause qu'il y a beaucoup de mots techniques dans ma réponse.

The CNSC staff monitor the reliability of

process control computers through multiple ways. One way is through the review of REGDOC-3.1.1 event reports. We also look at system and component health reports, and annual reliability reports.

In addition, CNSC staff have reviewed and evaluated Pickering's DCC -- this is the digital control computers, the process control computers -- condition assessments in 2008 and 2016, keep in mind that's looking at the hardware side, and we had no issues with OPG's approach.

CNSC, we performed software maintenance inspections in the past. There were no safety significant issues that were found from that inspection, and there's another software maintenance inspection planned for this fiscal year.

In that software maintenance inspection, the criteria that we look at are compliance to *CSA N286*, in particular, the engineering change control process. We also look at *CSA N290.14*. *CSA N290.14* is the qualification of digital hardware and software for use in instrumentation and control applications for nuclear power plants. We also look at *RD/GD-210*, which is the maintenance programs for nuclear power plants. That's the compliance verification criteria that we use.

There are other standards that we also

look at as well, such as IEEE 12207, which is a systems and software engineering software lifecycle process, plus other IEEEs, and also we look at what are called CANDU computer system engineering centre of excellence standards which are referenced in the CSA in 290.14.

These were standards that were developed in the 90s as part of the -- to support the STS-1, STS-2 Darlington work. And one thing that's interesting is that these standards as well are very robust, very thorough and they're available for free on the CSA's website.

THE PRESIDENT: So, I recall from my days in the telecommunication business, this is a known phenomenon. We have had nightmare about the software failure in particularly every industry from telecommunication to aviation, to you name it.

But my interest is, you know by now I always ask the same question. So, if there's a Doomsday scenario and the worst case scenario happen, software fail, will you be able to shut down the machine safely?

MR. FRAPPIER: Gerry Frappier, for the record. Certainly -- so, that's now in the realm perhaps more of the probabilistic safety assessments that were done and the deterministic safety assessments that were done, and we can certainly get into some of the details there.

But the short answer would be, the primary

safety systems are all failsafe, so if something does go wrong the unit will shut down as opposed to stay operating.

And so, we're very confident about the effect of software has been taken into account in the safety analyses. But if you want, I can get a little bit more details on how that's done.

THE PRESIDENT: That's fine with me.

Any...? Ms Velshi?

MEMBER VELSHI: Quick question to OPG and then to the intervenor.

So, when you did your periodic safety review, does the IIP address significant gaps that were identified in this area?

MR. WIGHT: Jason Wight, Director of Engineering. There were no significant gaps in the areas of software.

MEMBER VELSHI: Thank you. Mr. Bertrand, you mentioned an event that occurred at the Bruce in this area. Maybe you can give us a bit more detail, and then maybe staff can comment on, what kind of a trend is it on software issues resulting in maybe increased safety risk.

MR. BERTRAND: Thank you for the question, Ms Velshi.

Yes, this is an event at Bruce 4, January 23rd, 1990 around 3:00 in the morning and it's, for the

record, Ontario Hydro report SER-90.003. And I thank the Secretariat for digging up the old AECB documents on very short notice. Thank you very much.

A sudden displacement -- I'm going to quote directly:

"A sudden displacement of the east fueling machine bridge with the machine locked onto channel C-08 caused a large heat transport leak which forced a unit to shut down and cool down using AIM procedures."

(As read)

And I'm not sure what the acronym stands for.

Basically the east bridge dropped about 40 cm for no apparent reason and, of course, caused a leak from the channel and it was leaking 1.4, and the unit here is mega grams per hour, it's not tonnes, it's just a very weird unit.

Anyway, in the follow-up report from March 21st of the same year, 1990, what happened is that an error message was generated and that error message, because of an independent event, a motor overheated apparently, so this error message was generated by the sub routine; however, the main program, instead of calling the sub routine with a

jump to sub routine instruction, on a jump to sub routine instruction the idea -- you'll excuse the hand waving here -- but you have your main program coming along and it calls the sub routine it has to know where to come back to after finishing that sub routine, returning from that sub routine.

The call was made by an unconditional jump instruction which meant that that return address was not stored in the processor's register. So, what happened is that the program continued executing at a random place in memory which, for some reason, the unexpected effect of that was to release the motor and the platform started dropping and under its own weight caused a problem.

So, the idea here is that a very simple mistake, right, in the instruction is a jump instead of JSR in most micro controllers, caused a very unexpected event to happen, right.

And that's the whole idea of software is its unpredictability of the failures, the failure effects. And that's basically where I'm coming from is that once you hit one of those land mines you don't know what the effect is going to be.

And I do appreciate the failsafes, but please recognize that these systems are very fragile.

THE PRESIDENT: Yeah, but tell us the end

of the story. So, what happened? Did it shut down? Did some --

MR. BERTRAND: Oh yes. There was a shutdown. The operators noticed that there was a leak in the D2O reserves and apparently through the periscope were observing that there was a lot of steam coming out and executed an orderly shutdown.

THE PRESIDENT: So, from our perspective, you know, we have nightmares about things going wrong, but we want to make sure that no matter what goes wrong, there's a provision to make sure that it doesn't become a serious incident.

MR. BERTRAND: As far as I know there was no safety -- everything was contained, but from the operational point of view of Ontario Hydro at the time, that was a loss of revenue.

So, obviously, other than the fact that it's a spectacular failure if you have steam coming out of the reactor, also there's a loss of revenue. So, for these reasons it really needs to be addressed.

MR. FRAPPIER: Gerry Frappier, for the --

THE PRESIDENT: Mr. Berube?

MR. FRAPPIER: Sorry, because I want to make a point here that I think is really important is to understand how we deal, in general, with software.

So, the example being given here -- we can get into some more detail if you want -- but is a good example of how we do the analysis.

So, Mr. Bertrand is explaining the software cause of a certain problem. That would not be how we would have analyzed it. We would have looked at, this is, we're talking about the fueling machine being on the reactor face, what are the things that can go wrong, whether it's because of mechanical, pneumatic, operator error and you basically have, it can be locked on, it can be loose and therefore having steam and water leakage, it could be such that it's partially off and there's fuel in it, fuel out of it.

So, all of those are design-based situations that have to be analyzed in the deterministic safety analysis and in the probabilistic safety analysis to show, as you were saying, sir, what are the safety consequences of that. And if there is a significant safety consequence, then you must design in something that's going to solve that problem or at least make it so that it's not a safety concern.

Whether it's caused by software or whether it's caused by human error or mechanical failure, we don't really care, we just want to make sure that whatever it was you have it such that it's not of a safety concern.

THE PRESIDENT: Mr. Berube?

MEMBER BERUBE: This question is for OPG. Are you doing any, at this point in time, active development for DCS code call at this point? Are you actually changing your DCS coding at all, or are you just in maintenance mode?

MR. BENJAMIN: Mike Benjamin, for the record. There are routine changes, as we've said, to the control computers with changes in sensors and that, but it's mainly -- but we are mainly in a maintenance mode. So, it's ongoing maintenance. As upgrades happen to the plant, the control computers will be modified under ECC.

THE PRESIDENT: Okay.

Question? Dr. Demeter?

MEMBER DEMETER: This is a quick question. In my business we have a lot of equipment with software and because the equipment is Health Canada certified, changing the software is not trivial because the vendor has to go back and get everything re-certified. So, we end up with a lot of equipment that has aging software because we're waiting for updates from the vendor because of regulatory oversight and cost.

Is that the same in your industry that a lot of your equipment has software that is tied to a larger certification process so that it's more difficult to

update? Is there an aging issue with regards that way, or is it a different game with your industry?

MR. WIGHT: Jason Wight, Director of Engineering, for the record.

So, there is -- for special safety system software it's very robust, we've got checks and balances and it's timely.

In many other circumstances, we do like a failure mode spec analysis based on the software and the required updates for revision. We have quite a significant technical staff, software staff, DCC group that -- actually in-house expertise. So, we can make a lot of the modifications, for example, for DCC in-house which allows us the timely updates. But it's a varied situation.

MEMBER DEMETER: Okay. My example, when I moved to Winnipeg in 2002, we were running a machine on a 486 computer because that was the only computer available for that machine. It worked, but...

Thank you.

THE PRESIDENT: Okay. Thank you.

Any final thought?

MR. BERTRAND: Louis Bertrand, for the record. Once again, I ask the Commission to deny the 10-year licence and, instead, work to permanently shut down the Pickering reactors and transition to the

decommissioning phase.

Failing that, I ask that the Commission as a condition of licensing require an independent formal technical study of the software development process to modifications to the safety shutdown systems as well as the digital control software, with the results of the evaluation to be made public.

And the final, final word, President Binder, best wishes for a long and happy retirement, and Ms Velshi, congratulations on your appointment.

Thank you.

THE PRESIDENT: Thank you.

The next presentation is by the Ontario Chamber of Commerce as outlined in CMD 18-H6.30. I understand Mr. Rossi will make the presentation.

CMD 18-H6.30

**Oral presentation by the
Ontario Chamber of Commerce**

MR. ROSSI: Thank you, Mr. President and honoured Commissioners, ladies and gentlemen.

My name is Rocco Rossi and I am the President and CEO of the Ontario Chamber of Commerce.

On behalf of the OCC and our 135 chambers

and boards of trade and over 60,000 businesses, thank you for the opportunity to present our recommendations as part of our support of the Ontario Power Generation's 10-year licence application for the Pickering Nuclear Generating Station.

You will have heard from two of our members today, the Toronto Region Board of Trade, the Ajax-Pickering Board of Trade, and you also have two written submissions from Whitby and Oshawa. You will see unanimity on behalf of the Chamber movement in support of this renewal.

That said I want to thank the Canadian Nuclear Safety Commission for their diligence in conducting a comprehensive and robust review process. I think we always have to be upping our game, always holding people accountable. Particularly when it comes to nuclear industry, it's essential to ensure that there is never any compromise to safety or to the environment.

The OCC is committed to working with the CNSC and the federal government to ensure Canada remains a leader in nuclear expertise, innovation, and that the nuclear sector continues to be a key economic driver.

As Ontario's business advocate, the OCC is the independent, non-partisan voice of business. We are committed to working with the government

to promote economic growth and prosperity in the province of Ontario and across Canada.

The OCC has long recognized the importance of the nuclear industry to our province's economy, particularly the critical role that OPG and the Pickering station play as fundamental drivers in our economy.

Nuclear power represents a clean, reliable source of energy for Ontarians, while also being an integral part of that economy. We believe the continued investment in the nuclear industry not only supports direct and indirect job creation but also in building a dependable and cost-effective energy system. This is of critical importance to Ontario which has successfully eliminated coal from its energy mix.

Our recommendations draw from an extensive advocacy work from our 135 chambers and boards of trade across Ontario, along with original data and research from our 60,000 members. Our network has advocated for an affordable, reliable, clean and innovative energy system that supports Ontario businesses. That resolution process highlights the need to take advantage of Ontario's nuclear expertise to support both our economy and the global transition to a low carbon future. I'm here as the voice of those chambers supporting those calls with this submission.

The OCC has a strong, long-standing relationship and partnership with the OPG. We work together to support our shared vision of a prosperous Ontario. Our work together has boosted both business and public confidence in Ontario's nuclear industry. A leading example of this is our membership's broad support of the Pickering station. A recent report, "Pickering continued operations and impact analysis on Ontario's economy" supported by the Canadian Centre of Economic Analysis contains original quantitative analysis detailing the economic impact of continued operations of the Pickering station to 2024.

As you know, the nuclear industry is a major driver of Ontario's economy. It's made up of over 180 companies. It employs about 60,000 people per year. The nuclear industry plays an integral role in medicine and research and innovation and generates more than \$6 billion annually on a GDP basis.

With that, I'd like to begin to highlight the economic benefits of the continued operations of the station. Currently, Pickering powers 1.5 million homes and provides 14 percent of Ontario's generation capacity. The continued operations of this plant will provide the province with much needed cost-effective electricity while Darlington and Bruce Powers units are refurbished between

2022 and 2024.

Reducing electricity prices is a top priority for our members. We know that the price of electricity directly influences the province's ability to attract and retain businesses, as well as foster economic growth. Lower electricity prices contribute to the province's competitive advantage. With the cost of doing business in the province on the rise, continued investment in nuclear power will help to alleviate some of the input cost concerns currently affecting Ontario businesses.

The nuclear industry further creates jobs across its high-tech supply chain, while contributing to local research and innovation initiatives. This includes supporting those afore-mentioned 180 companies within the nuclear supply chain, many of which are sources of high-tech jobs from a diverse range of large to smaller firms.

Our recent report found that the continued operations of Pickering will contribute over \$12.3 billion to Ontario's GDP over the period. It will also support 7,590 full-time equivalent jobs per year, arising from direct employment at the Pickering plant, indirect employment at suppliers and induce spending from wages earned by all individuals across all industries. Supporting the nuclear industry is essential to creating

that prosperous province that we all want.

We are also lending our support to OPG due to their strong commitment to safety and the environment. We have heard some criticism of the design and the reliance on radiation containment systems, characterizing the plant as being unsafe or outdated. However, Pickering's impeccable safety track record speaks for itself. This is demonstrated in the CNSC awarding Pickering with its highest achievable rating standards in both 2015 and 2016.

The World Association of Nuclear Operators has also twice over recognized Pickering's exemplary safety performance. Pickering's all-injury rate was zero until September 2017 and they ended the year at a rate of .06 which is in line with the industry's best.

The station exceeded its generation target for the year as a result of completing two outages ahead of schedule, as well as exceeding its maintenance backlog targets. Two units also achieved record runs in between those scheduled outages. Pickering station is continually finding ways to improve their performance.

To identify opportunities to further enhance plant safety, Pickering most recently completed a Periodic Safety Review in accordance with CNSC's regulations and international standards. This review looked at plant operation today in comparison to the latest

codes and standards. The review concluded that Pickering is safe today and, with the proposed enhancements it will become even safer.

The safety and security of the Pickering station is overseen by multiple external oversight bodies, which continue to reinforce its strong safety rating.

Healthy communities help Ontario businesses thrive and a critical component of OPG's demonstrated commitment to safety extends beyond the walls of Pickering station and into the communities that surround the plant. Our local chambers across the Durham region attest to the open, transparent and regular communications by OPG providing the opportunity for two-way dialogue on plant operations.

The OCC is also aware of the environmental and climate change benefits attributable to the Pickering plant. Nuclear energy is one of the cleanest technologies available when we consider the entire power generation life cycle from construction to mining to operation and decommissioning.

Nuclear power also helped facilitate Ontario's transition to a low carbon energy mix with 60 percent of Ontario's electricity supply coming from carbon-free nuclear energy. With a global shift away from greenhouse gas emitting fuels, nuclear energy is an

integral part in meeting the energy and air quality needs of the province as well as providing for the province's larger low carbon future. It is estimated that the continued operation of Pickering station will reduce greenhouse gas emissions in Ontario by an estimated 17 million tonnes, which is the equivalent of taking around 3.4 million cars off the road each year.

In conclusion, the Chamber and its network of 135 chambers and boards of trades strongly recommends the 10-year licence continuance for the Pickering plant.

Pleased to take any questions you may have.

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

MEMBER VELSHI: Thank you for your submission. I was looking at your policy resolutions and under nuclear one of your recommendations -- and this is dated April 28, 2018 -- is "provide greater certainty and clarity to the nuclear regulatory review process". Can you elaborate on that and what were you getting at?

MR. ROSSI: Again, we don't believe anyone should ever get a blank cheque and that's why it is important to have these regular hearings in going through renewal processes. As I said, we are delighted and we congratulate the Commission for doing so, and ensuring that

these issues are aired and the latest standards are applied, going forward.

MEMBER VELSHI: Okay, because as I read it that's not quite how I read it, because it says "certainty and clarity to the nuclear regulatory review process".

MR. ROSSI: I was at the AGM and heard the debate and that was the context of that commentary.

THE PRESIDENT: Question? Question? That's very clear then. Thank you. Thank you for your presentation.

MR. ROSSI: If I may -- one final word if I may, Mr. President.

When I presented with respect to the Bruce hearings you asked the question, well, isn't there debate within the business community and within the Chamber with respect to nuclear energy? And just to be absolutely clear and to reiterate, there is no question we have members, individual companies and individuals within the network where this is debated. But through our resolution process we have the votes of 135 chambers, which 100 percent support this.

So on a vast majority basis within each individual chamber and then with unanimity across the entire chamber network you have a very strong voice from the business community speaking on this issue.

THE PRESIDENT: Thank you. Thank you for your presentation.

I'd like to move now to the next presentation, which is by Durham Nuclear Awareness, as outlined in CMD 18-H6.56 and 18-H6.56A.

I understand that Ms McNeill will make the presentation.

CMD 18-H6.56/18-H6.56A

Oral presentation by Durham Nuclear Awareness

MS McNEILL: Yes, and I'm not using the PowerPoint actually, I'm not using the slide presentation.

Good afternoon. I'm Janet McNeill, Coordinator of Durham Nuclear Awareness, and this is Dr. Paul Seccaspina, Oraclepoll Founder and President.

Firstly, I need to say that DNA is grateful to have received CNSC participant funding to do our polling, to solicit public opinion on nuclear emergency plans in a 20-km radius around Pickering.

Also, we endorse the request for rulings that have been submitted by DNA, CELA, Greenpeace and Northwatch.

I also draw attention to the disclaimer that we sent with our supplementary submission. Our

participation needs to be understood in the context of that disclaimer.

I've been a community activist for more than 30 years now. I've worked on quite a few issues and fell into nuke work more or less by accident, not by design. I guess you could say it was a beyond-design-basis accident.

I've been working on nuke since 2010, but a CNSC watcher since 2006. I've intervened at about 10 hearings now and watched or attended who knows how many after all these years, since 2006.

I live in Toronto now. I lived in Durham Region for many years, it's where I raised my kids, pretty oblivious to the existence of the two very large nuclear stations here. I have to say that there is much obliviousness among the populations both of Durham Region and Toronto.

It is not safe to assume that all the new and potential residents in coming years choose the region with full knowledge about the two large nuclear stations, as MP Erin O'Toole claimed in his remarks on Tuesday. Not everyone is even aware these stations are here.

DNA history, the Durham Nuclear Awareness group formed in 1986 post-Chernobyl accident, and has been calling for better nuclear emergency plans ever since.

I've been involved with the group since 2012.

I wanted to make a quick comment about this hearing. The fact that some people did not intervene either because they've kind of given up on taking part since they see that it may fall into that category of insanity; doing the same thing over and over, and expecting different results. So some people have fallen away. Also, the original location out in Courtice was very inconvenient for many people, so we're not going to know how many people chose not to intervene because of that.

I want to point out a few things of note that I've learned over the years. I've learned of the existence of the May 1959 International Atomic Energy Agency deal with the WHO, World Health Organization, in which the two organizations agreed to work closely. Quoting from that agreement:

"Whenever either organization proposes to initiate a program or activity on a subject in which the other organization has or may have a substantial interest, the first party shall consult the other with a view to adjusting the matter by mutual agreement." (As read)

Kind of makes clear how public health

agencies don't study or say too much about the impacts of radioactivity on human health.

Knowing of this deal also helps make clear that cover-ups and collusion among various agencies in the nuclear industry has existed for 60 years now.

Another thing of note, the whistleblower letter from CNSC Staff in 2016 stating that, "CNSC Tribunal Members are not always provided with all the information they need in order to be able to render decisions." Scary.

The Officer of the Auditor General of Canada report in 2016 that cast a negative light on CNSC inspections of nuclear facilities, "likening the situation to planes taking off improperly inspected."

A CNSC staffer questioned about these two matters at a Durham Nuclear Health Committee in, I believe it was early 2017, was quite impolite in the remarks he made about the CNSC Tribunal. I think you'd be shocked at what he said. Everyone seems to be missing the important point that if you, the Tribunal Members, are not provided with all the facts you really cannot make informed decisions, can you?

The Ontario Auditor General's report in late 2017 as regard to provincial emergency management. I quoted some key points from this in the DNA submission about lack of staffing, retired nuclear personnel in the

office, and who emergency exercises are really for, et cetera.

Population; the population density around the Pickering station is already too high, yet intensification is being stepped up.

Hearings; licences are never turned down, kind of seems like the hearings are pure theatre, really.

Tritium; sometimes I think tritium is the real elephant in the room.

I'm frequently reminded of this quotation, "It is difficult to get a man to understand something when his salary depends upon his not understanding it," this was Upton Sinclair.

Regarding emergency planning, to repeat myself, DNA has been at this for a period of over 30 years now. The only change we've seen really is KI pills in the 10-km zone.

I sent in with my written submission the CNSC information letter that was sent out four days after the K announcement from CNSC, which was sent out at 4:00 p.m. on the Friday of Thanksgiving weekend 2014. That letter the four days after was about the benefits of a much wider distribution radius, 30 miles or 48 km, that was being described by some independent researchers. Yet, our pre-distribution here in Southern Ontario is 10 km. Ten

kilometres is 6 miles. The U.S. is also in a bad way vis à vis emergency planning zones, but at least there it's 10 miles, not 6. How did we ever get stuck on this 10 km business? I'm curious about that, but it seems rather arbitrary.

Our submission talks about learnings from the Three Mile Island accident, and the it can't happen here myth. Thirty-two years since Chernobyl, 39 since Three Mile Island. Seems like nothing but talk has transpired in all these decades. Lots and lots and lots of talk, but almost no action.

Could there be a serious accident here? Of course there could, everyone knows that. Though, a CNSC staffer said at the Pickering hold point hearing in May 2014, "As the Commission probably recalls, we had this discussion many times in the past," he was referring to risk of a serious accident. Resuming the quote, "So using the exactly same argument to the CANDU fleet, we can say the risk is zero because there was never a significant accident in the CANDU fleet."

That really didn't sound like very good science to me; we can never have an accident with the CANDU fleet, because we never had an accident yet?

I am a very untechnical person, and I'm the first one to admit that. I'm definitively not a rocket

scientist. But I do recognize unscientific remarks when I hear them. That remark from that CNSC staffer spoke to me not just about reliability or honesty, but about trust. How can we trust either OPG or CNSC when this kind of remark is made by an organization that claims to be scientific?

How can we trust the WHO or any United Nations agency when we know a deal was made way back in the late 1950s?

Moving to our recent polling results, we see that 93 per cent of those surveyed want plans for a Fukushima-scale accident, an INES-7 accident like the one in Japan in 2011 that caused the evacuation of 150,000 people, many of whom are still displaced seven years later. That has led to many cases of thyroid cancer among children, among a myriad of other impacts that possibly most people in this room have not heard about or maybe don't even want to hear about.

Long-range health impacts will be numerous, wide-ranging and multi-generational, as has been the case, as is the case with the Chernobyl disaster of 1986. You don't have to trust me on that, there's lots of data.

Regarding the recent polling results, it isn't just that 93 per cent want emergency plans for a

serious nuclear accident, they also overwhelmingly want details about such things as: sheltering in place; whom to contact in an emergency, they're talking about phone numbers; practical information; location of emergency reception centres; information about alerting systems; how to self-decontaminate; information about KI pills; maps with evacuation routes. Also, tellingly, 87 per cent support KI pill delivery beyond 10 km.

Paul Seccaspina from Oraclepoll will be happy to answer any of your questions about the polling results.

As stated in our written submission, Ontario Power Generation claimed at the Day 1 hearing that they had:

"Worked hard to reach out and communicate with the public about emergency preparedness. Based on polling results, we are confident that the general public knows what to do in the extremely unlikely event of a nuclear emergency." (As read)

Clearly, this in direct contradiction to the results of our recent polling. I hope you have some questions to ask us about that.

Thank you.

THE PRESIDENT: Thank you. Questions? Ms Penney.

MEMBER PENNEY: Thank you for that. I'm assuming you brought your expert so that he could tell us a tiny bit, not 20 minutes, but a tiny bit about the poll. Yes, please.

MR. SECCASPINA: Sure. How detailed would you like me to get? I can go through the whole process. Could --

MEMBER PENNEY: Three minutes.

MR. SECCASPINA: -- go here for an hour. Three minutes? Okay, I can do that.

Thousand person sample, dual sample frame landline, cell phone. The sample frame was people within a 20-km radius of the station. Results were segregated within 3 km and within 20, demographic breakouts.

A lot of data there, there's a whole lot of data, everything from perceptions of a crisis, a problem, a disaster, right through to concerns. So low level of concern. Consequently, low level of preparedness and low level of willingness to take -- there's a high willingness to take action, but low level of concern. So low concern, low preparation.

We got into specifics on this as to what people do want. So they do want information, as Janet

mentioned, and we got into the specifics as to everything from shelter and KI pills. We focused on KI pills. We got into communication in here as well as, you know, awareness of initiatives, receipt of information in the mail. Interesting stuff there. I mean, you know, you are looking at 48 percent of people that said, yeah, I got something in the mail, but when they were asked to explain what it was, 55 percent couldn't. Either they couldn't, didn't read it, put it aside. Then the other responses are right across the board.

So there is an issue there with respect to, yes, low concern, low level of preparedness, and without having that main motivator to get into the information, people just aren't reading it. They want to get information, the delivery mechanism that they are getting points to the fact that there needs to be some improvement in that area.

MEMBER PENNEY: What would they --

MR. SECCASPINA: That's three minutes, I think.

MEMBER PENNEY: How would people prefer to be communicated with?

MR. SECCASPINA: When you are looking at this information -- we do a lot of municipal work, we do a lot of stuff around testing, you know, how messages can be

delivered. I mean when you look at this whole data set here there are variances geographically. Under 3 kilometres, 3 kilometres out, under 35 years old, higher income earners, there are variances. So younger respondents are saying, yes we are more concerned, yes we are going to be more prepared, higher income earners as well, people with families. When you are looking at the delivery mechanism, it's coming back down to digital, right. And it's not just an under 35 thing anymore. It's not 1997 when we started polling when we could say, yes, websites are definitely an under 50, under 40, under 30 thing. So it's across the board. The problem is that we can have this information on a website, but if there is no motivator to get people to go to the website, there is no motivator to get people to read through that document that's coming in the mail. We went through this in this last provincial election, upside down, I mean you know, you can get the information out there, are people going to get engaged, do they want to get into the specifics? So there is that gap right in there to get people to take that next leap of faith.

MEMBER PENNEY: Thank you.

THE PRESIDENT: Question? Ms Velshi...?

MEMBER VELSHI: So tell me the difference between the 3 kilometres and --

MR. SECCASPINA: Sure.

MEMBER VELSHI: -- from 3 to 20, about the level of awareness because, you know, for the 10-kilometre zone a lot of effort has been expended in that area.

MR. SECCASPINA: Right. So the awareness or the accident concern, I mean so the overall concern of an accident is 26 percent. So 3 kilometre radius, 45 percent concern level.

MEMBER VELSHI: What about awareness?

MR. SECCASPINA: And those farther away -- oh, awareness.

MEMBER VELSHI: I'm sorry, awareness and being ready to respond.

MR. SECCASPINA: Oh, okay, we can go into that one. Detailed emergency plan. So level of awareness 31 percent overall. This is gender split here throughout this as well. Under 3 kilometres 36 percent, farther away 29 percent. So we can go across all of these indicators and you are going to see either a 10-point spread, in some cases a 20-point spread, in some cases even farther. So it's across the board. So in that one, we are getting that divide just on that one.

THE PRESIDENT: But isn't it probably on any issue you get to the general public in terms of if there is no impetus to act --

MR. SECCASPINA: Of course.

THE PRESIDENT: -- you know, why would they care about it?

MR. SECCASPINA: That's it exactly.

THE PRESIDENT: So it's nothing kind of unusual.

MR. SECCASPINA: Not at all. Not at all.

THE PRESIDENT: Right.

MR. SECCASPINA: I think this is the third time I have been presenting and I mean the results are consistent. And I mean you can pick not only this issue, you can pick any issue across the board.

THE PRESIDENT: Yes.

MEMBER VELSHI: But the results are inconsistent with what OPG's polling data has shown, is it not? Maybe you can comment on that, particularly for the 3-kilometre zone results that we have heard.

MR. BURNS: Scott Burns, for the record.

There are some differences, we recognize that. As we have mentioned earlier on, we are committed to a better understanding. I think the information that we have seen here and what we have heard helps to inform OPG and opportunities for learning and improving on our strategy. The differences I think are probably variables in the way the polling was conducted. I wouldn't be able

to speak to the details or the background on that necessarily. I did note that in the intervenors that there was the note about 81 percent have the KI pills at their residence, so that was probably the most consistent piece with ours, and the supporting of receiving their message and information online through social media was very similar.

MR. GREGORIS: Steve Gregoris, for the record. Commissioner Velshi, if I can just add.

So, you know, we have seen polls that have different results. I think what's important is that we understand we don't have full public understanding, support or awareness. We are aware of that. We are also committed to continue to engage and be transparent, and with that we will continue to educate, we will continue to listen and we will continue to improve.

THE PRESIDENT: Dr. Demeter...?

MEMBER DEMETER: Thank you. Were you here earlier -- to the intervenor, sorry, thank you for your presentation. Were you here earlier when Durham Health presented with the Medical Officer of Health and Epidemiologist?

MS McNEILL: I actually inadvertently missed part of their presentation. I totally did not mean to. I was outside charging my computer and I was supposed

to come back in.

MEMBER DEMETER: Sure.

MS McNEILL: I do go to Durham Nuclear Health Committee meetings all the time, so I am in the habit of running into Dr. Kyle and hearing from -- and I attend a lot of regional Council meetings in Durham Region, too.

MEMBER DEMETER: That's good. On page 2 of your Intervention you said, we are concerned about -- and the first bullet is cancer rates in the Durham Region. And they clearly identified and discussed cancer rates, fetal/maternal issues. And your bullet further down is genetic damage to human beings and biota. Understanding that the published dose to the public is about 1/1000 or less of natural background, so one, I want to -- do you have other data regarding cancer rates that are not part of the Cancer Registry and Durham County Health Status reports?

MS McNEILL: You know what, I don't have a lot of health data at my fingertips because we don't focus on that. I would like to focus more on health, but we find that people -- it's hard to engage on health. It's hard to deal with the CNSC on health, too.

One of the things I have noticed with the nuclear industry, for one thing I don't have any -- I don't

feel that UNSCEAR is a credible agency. I have mentioned why that is. I don't trust the UN agencies because of that deal that happened in 1959 between the IAEA and the WHO. And I have read the critiques of some of the UNSCEAR data on Chernobyl for example from international -- I'm not sure if I'm going to get the words right on this, the acronym is IPPNW, International something or other Physicians Against Nuclear War.

I don't trust UNSCEAR data and I don't always trust studies that I read because one of the things that I find the nuclear industry will do when they are discussing data -- and I wish I had at hand a study from Durham Region where there was an elevated cancer rate among teenagers and then in the next breath it was, well we know it wasn't related to nuclear. And it's the same thing with the CICC. The CICC study is always being criticized. There were cancer clusters, but it wasn't anything to do with radiation. Well, how can you trust that? So --

MEMBER DEMETER: I guess I have to bring it back down to locally. Do you trust the Ontario Cancer Registry and your local health officials who are monitoring this all the time?

MS McNEILL: Not really.

MEMBER DEMETER: Okay. So we will leave that.

THE PRESIDENT: So Dr. Kyle is also part of this global conspiracy?

MS McNEILL: I'm not saying he's part of a global conspiracy, but --

THE PRESIDENT: So why wouldn't you trust him?

MS McNEILL: It's going to get a little personal if we go into that. I don't really need to do that.

MEMBER DEMETER: So the one piece of --

THE PRESIDENT: He's gone.

MEMBER DEMETER: The one piece of advice I have to a lot of intervenors who brought up the --

MS McNEILL: I can explain that actually. It's not a tremendously terrible thing. About 25 years ago when I -- I wasn't working on nuclear issues at that point, I was working on water issues and waste, and I went to visit Dr. Kyle with a fellow activist and he said that the biggest environmental issue as far as he was concerned was cigarette smoking and I just thought, we are not on the same page about the things that are, you know, problems. I mean of course cigarette smoking is a terrible problem, but I don't think of it as an environmental problem exactly.

MEMBER DEMETER: So I think one of the observations I'm making, a lot of intervenors have raised

issues of communication of KI to the 50-kilometre zone and after it was discussed about the order on the Toronto webpage, I found that within 30 seconds and did a test order, so it works. But I would ask intervenors who have real concerns about the 50 kilometres and access through the mail and ordering, perhaps let your community and your constituents know. Be part of the solution in communicating the issue of how to obtain KI pills to 50 kilometres if that's your concern, because --

MS McNEILL: I live in the Beaches area of Toronto. I am surrounded by millions of people. I don't have any means by which to run a PR campaign to let them know about this.

MEMBER DEMETER: This is a much broader discussion to all the intervenors who have that concern, because a lot of them have come before us. Not you personally necessarily, I don't know who your constituents are, but I think that's --

MS McNEILL: Well, I don't think it's our responsibility. I think it's the responsibility of the nuclear industry and/or the CNSC or the Health departments to be doing this. You can't -- this happened the last time we did a poll and we presented it at the Darlington hearing. It was kind of tossed in our laps: Well, are you going to go out and kind of walk your talk here? And I'm

like: I make 400 bucks a week doing this work. Like, you know, I'm at the bottom of whatever the food chain is on this. It's not my responsibility to communicate this.

MEMBER DEMETER: I'm not saying it is, I'm just saying it's an opportunity for -- especially Greenpeace for example, they have a lot of constituents, they have a newsletter, if their constituents --

MS McNEILL: Shouldn't it be up to the industry to take responsibility for this? Why should people in the public have to do this?

THE PRESIDENT: Can we please not get into a solution right now. We are just here to collect evidence. Thank you for your intervention here.

Any other particular -- Dr. Lacroix...?

MR. LOCKWOOD: Randy Lockwood, for the record. If I may, President Binder.

I too have heard a lot of information this week. I was quite pleased to hear the Commissioner say that he found the information within 30 seconds. It's one of the first things I did when I took this job, just punched in what to do in a Pickering nuclear emergency and you've got countless webpages.

That aside, I welcome the intervenor for coming forward, and all the previous ones, and I am still thinking about your suggestion of how best to raise

awareness. One of the things is we are definitely -- it has to come in many shapes and forms. That's why we produced the video to make sure people understand the risks from the plant and we have to work that out some way on our website and a number of other websites. And similarly, we have to raise awareness to even further connect the various webpages and enhance these webpages. So we plan and we will commit to improving that. And again, I thank the intervenor.

THE PRESIDENT: Thank you. Okay?

MEMBER LACROIX: Yes, I do have a question.

THE PRESIDENT: Go ahead.

MEMBER LACROIX: Thank you, Mrs. McNeill, for your presentation. On page 16 you list a number of reasons for shutting down Pickering and among these reasons you mention that discerning members of the public do not see the usefulness of staged emergency exercises. What do you suggest as an alternative?

MS McNEILL: I guess the public would be more engaged in the exercises if they were engaged in the exercises, but the exercises are really for all the agencies involved and the Auditor General makes a statement about that which I quoted in our submission as well. The exercises are done for the industry. They are a

requirement for the industry, so, you know, it's a bunch of the agencies talking to one another, I guess to help ensure that if there is an accident not too many things will fall between the cracks.

I personally think gobs of stuff will fall between the cracks if there is an accident and I think some of the discussion here today made that plain. When you talk about KI distribution, it seems as though nobody really knows who is in charge. And it was being said today by OPG, if I'm not mistaken, I was kind of gobsmacked really, but we are talking about delivering KI pills while an accident is taking place. Like that just seems completely absurd to me. And I am aware of what happened with KI pills after the Chernobyl accident and what happened in Japan and I know about the thyroid cancers that are happening in Japan. You have to do this ahead of time. You don't start distributing -- you don't run out to the drugstore to buy Band-Aids, you know what I mean, you keep the Band-Aids in your house. You know what I'm saying, you have to be prepared ahead of time. And I don't -- I think Dr. Binder has said this many times today, you know, you are not really sure what's going on with this whole thing. But I think it -- you know, it is pretty clear that the pills need to be pre-distributed ahead of time, not in the midst of an accident.

MEMBER LACROIX: In this case, would your organization be willing to participate in one of these emergency exercises?

THE PRESIDENT: Just for the record, I think, if memory serves -- staff remind me, and maybe OPG -- there were citizen groups monitoring the exercise. You are right, OPG is required to do this periodically as part of keeping track, but I think an organization of community people were invited to observe and participate. Staff...?

MR. FRAPPIER: Gerry Frappier, for the record.

So yes, OPG can provide some details. And also there were volunteers who participated as casualties and things of that nature. So there is certainly opportunity. But I do agree that what we are really testing is the organizations who do have responsibility for undertaking certain things in an emergency situation, that they can actually do what they say they are going to be doing.

MS McNEILL: Yes. The Auditor General commented that:

"The focus on practice tests for nuclear emergencies is driven by the licensing requirements of the nuclear

power companies. The tests are paid for and organized by these companies and generally focus on their concerns."

This is the Auditor General of Ontario that I'm referring to.

"We noted that the tests mainly concentrate on events occurring inside the nuclear power facility -- the responsibility of these companies; they usually do not extensively test areas outside the nuclear power facility -- the Province's responsibility."

So that's all I'm saying. The tests benefit the industry, they don't particularly benefit the public. That's all I'm saying and, you know, that is backed up by the Auditor General's --

THE PRESIDENT: OPG, go ahead.

MR. BURNS: So a couple of comments there.

I would acknowledge that we did run a focus group in the last two major exercises, where we invite community members in to evaluate our communication with the public throughout the emergency. We learned a lot of valuable lessons through that process and our public

affairs people have taken note of that feedback and it has been incorporated into our after-action report.

I would say that there has been benefit to the public agencies that were involved in Exercise Unified Control and Exercise Unified Response, again, over 30 organizations. We recently published the after-action report for Exercise Unified Control and there was valuable lessons learned not only for OPG but the other organizations involved.

THE PRESIDENT: I see the Office of the Fire Marshal is still here and maybe you want to come in and comment about the kind of true test, if you like, that would cover not only the OPG requirement but the general public requirement?

MR. MORTON: For the record, Mike Morton, Office of the Fire Marshal and Emergency Management. I am joined by Emma Fuchs, who is our Exercise Program Officer. Emma is going to provide some background on our exercise program in general and talk about some of our recent exercises which have involved a wide variety of organizations and have indeed done fairly extensive assessment of offsite response capabilities, including for the severe accident scenario.

Emma...?

MS FUCHS: Hello. Emma Fuchs, for the

record.

So the Office of the Fire Marshal and Emergency Management and the Provincial Emergency Operations Centre in general participate in quite a lot of nuclear and radiological emergency exercises. In particular, we have actually done four full-scale multi-day, multijurisdictional exercises in the past six years, two of which have been with OPG. We also regularly run a lot of notification drills and exercises, about 3 to 4 per month, not just with the facilities here in Ontario but also with our contiguous states in New York and Michigan and Ohio.

We have a lot of good lessons learned from Exercise Unified Control, which has been mentioned and as indicated in that after-action report. For that exercise, again as has been mentioned, there are about 30 or so organizations. A number of different provincial ministries were involved as well as a lot of inoperability learned between the municipality and the different stakeholders there.

THE PRESIDENT: So how does the general public get involved in some of those exercises?

MS FUCHS: Usually the general public would be involved through -- as has been mentioned, through either as volunteers, as for example acting as a

contaminated casualty or as part of focus groups with the communications testing and so on.

THE PRESIDENT: Okay. Any final comments you want to share with us?

MS McNEILL: Yes, for sure. And I also want to quote something quickly from this book about the Fukushima accident that I highly recommend to everybody on the planet basically if you want to get a really good understanding. It is called, "Fukushima: The Story of a Nuclear Disaster" by David Lochbaum, Edwin Lyman, Susan Q. Stranahan and The Union of Concerned Scientists. Very detailed about the progression of the Fukushima accident. And it has a statement about the exercises and it says:

"These exercises only provide an illusion of adequate preparation. As the Fukushima experience painfully demonstrated, rapidly moving people out of harm's way in the midst of a nuclear crisis is exceedingly difficult, yet critical."

So I think that's something people need to keep in mind.

Final remarks-wise, I have learned a lot about emergency preparedness in the last six years. Some of it is incredibly simple and down to earth. There has

been a lot just today indicating the degree to which the left hand is pretty confused about what the right hand is doing. It's sobering. And I remind you that DNA has been calling for better emergency plans for 30 years, since the late 80s, since the Chernobyl accident. We have been saying all this stuff for 30 years.

For sure you have heard a lot about the need for more public education in the 50-kilometre zone. I hope you will rule in favour of the requests from CELA, DNA, Greenpeace and Northwatch. And I hope everyone in this room will be mindful of this quote from the Official Report of the Fukushima Nuclear Accident Independent Investigation Commission:

"The government, the regulators, Tepco management, and the Kantei lacked the preparation and the mindset to efficiently operate an emergency response to an accident of this scope. None [therefore] were effective in preventing or limiting the [consequential] damage."

Lots of great quotes on the DNA website, if you go to our website, about Fukushima and all things nuclear. And climate change and all kinds of other things, too.

THE PRESIDENT: And where to get KI pills, I assume.

MS McNEILL: Pardon me?

THE PRESIDENT: And where to get -- how to get KI pills, I assume.

MS McNEILL: Oh, yes.

THE PRESIDENT: Oh, that's okay. Thank you.

We are going to break now for 15 minutes, which takes us to 10 to 4:00. Thank you.

--- Upon recessing at 3:35 p.m. /

Suspension à 15 h 35

--- Upon resuming at 3:55 p.m. /

Reprise à 15 h 55

THE PRESIDENT: Okay, we are ready to continue with the next presentation.

Oh sorry, you may notice that our senior legal advisor has changed. So let me introduce M. Denis Saumure, who is sitting in for Lisa, who had to go, family obligation. Thank you.

So the next presentation is by the Society of Professional Engineers and Associates, as outlined in CMD 18-H6.109. And I understand that Dr. Ivanco will make

the presentation.

Over to you, sir.

DR. IVANCO: Okay, I have a PowerPoint presentation; I just don't see it here. Let me see if I can call it up. Oh, okay.

--- Pause

THE PRESIDENT: Somebody come in and do the magic.

DR. IVANCO: I don't see it on the hard drive.

THE PRESIDENT: What are you looking for?

MR. LEBLANC: We don't have it.

THE PRESIDENT: I have it.

MR. LEBLANC: Sorry, Dr. Ivanco, we don't have it loaded on the system. So do you have a key with you?

DR. IVANCO: I don't have a memory stick with me. I have it on my laptop, if I can borrow a memory stick.

MR. LEBLANC: I'm not sure --

On l'a ici sur un des écrans. Est-ce qu'on pourrait juste prendre un ordi d'un Membre, puis le brancher? Okay, we'll do that. Thank you.

--- Off record discussion / Discussion officieuse

THE PRESIDENT: I think from the two heads

behind you, I think magic will happen.

--- Off record discussion / Discussion officieuse

DR. IVANCO: Okay, I think I'm ready.

Want me to start?

THE PRESIDENT: Yeah, please.

CMD 18-H6.109

Oral presentation by the

Society of Professional Engineers and Associates

DR. IVANCO: Okay. I'm here representing the Society of Professional Engineers and Associates, of which I am past president.

For those who don't know, we're a union that represents engineers, scientists, technicians, technologists, designers, and skilled trades who work for SNC Lavalin's Nuclear Division. We used to work for Atomic Energy of Canada Limited, and Atomic Energy of Canada was the designer of the Pickering A reactors and the designer of the CANDU 6 reactors around the world. Currently our members design reactors and provide engineering, technical, and procurement support for existing reactors around the world and in Canada, including those at Pickering NGS.

A bit of history. The Pickering units were the first multi-unit electricity-producing nuclear

reactors built in Ontario after Douglas Point and were commissioned between '71 and '73. The first unit to be commissioned, Pickering unit 1, is still in operation following refurbishment.

For many years, the Pickering A units were amongst the very best operating stations in the world. And through the '60s, '70s, and '80s, Ontario's economy was expanding quite rapidly and in need of abundant and cheap electricity. And with the easily available exploitable hydroelectric capacity already developed, this meant building coal or nuclear.

Ontario government at the time chose to build both types of generation, and the nuclear generation built at Pickering, then at Bruce, and later at Darlington replaced on a one-for-one basis generation that would otherwise have been produced by burning coal.

And just to refresh your memories, burning 1 kilogram of coal yields about 1 kilogram of carbon dioxide. And one kilowatt hour of electricity generates about 1 kilogram of carbon dioxide.

So the Pickering nuclear units have produced over 850 terawatt hours of electricity and thus have displaced more than 850 million tonnes of CO₂. Canada's annual emissions from all sources, by comparison, are about 700 million tonnes. Annually, the station

generates more than 20 terawatt hours of carbon-free electricity, which is enough to power about 1.6 million homes, and avoids 20 million tonnes of CO₂ emissions per year.

And in 2017, the Pickering station satisfied about 16 per cent of Ontario's electricity demand. It plays a key role in powering the homes and industries in and around Toronto, where its proximity is important. And in our opinion, when it shuts down, it will leave a gaping hole in Ontario's electricity infrastructure.

The Pickering station has played a key role in reducing Canada's GHG footprint over the years, and it's difficult to imagine a replacement for Pickering that does not also increase Ontario's GHG footprint, although that's not an issue relevant for licence extension.

But to provide 24/7 baseload power is possible in principle if you use a combination of wind power and solar generation, supplemented by natural gas. But this would be the most benign replacement form of generation. But replacing Pickering with, say, a combination of 25 per cent intermittent renewables, supplemented by natural gas -- 75 per cent natural gas, would increase the electricity generation sector's GHG footprint by about 7.5 million tonnes.

And I left this piece of paper over there at the other desk, but while I was sitting waiting for the other talks, I looked at the IESO generator reports. You can google them any time. And to give you an idea of how the system runs, Ontario takes as much electricity as it can get from nuclear, as much as it can get from water, from hydro, and as much as it can get from wind, and then uses natural gas to balance supply and demand.

And if you looked at the generator reports at noon today, nuclear capability was 10,667 megawatts and the generation was 10,663 megawatts, which is a 99.6 per cent capability factor. For hydro, it was producing about 4,200 megawatts of electricity, at about 60 per cent capability factor. Wind power is 4,313 megawatts of capacity, was producing 174 megawatts of electricity at noon today, which is about 4 per cent capacity factor. And the remaining 2,400 megawatts was gas.

So that's how our electricity system works. When there's a lot of wind, it's great. You don't have to burn as much gas. When there's not a lot of wind, like today, you have to burn a heck of a lot of gas.

I won't go into that, because I have a limited amount of time.

The person who gave the talk from the Ontario Chamber of Commerce talked a lot about the impact

of Pickering on the local economy, so I won't go into that.

And I won't go into that.

I'll talk a little bit about the robustness of the design, since we are designers, to give people an idea of what the differences are between our reactors and other ones. They're different from conventional reactors, which have a pressure vessel. Fuel is non-enriched and unused fuel can be handled by hand with no danger. And it has five physical barriers between the radioactive fuel and the environment. And I think people know fuel is in a stable UO_2 matrix. It's covered by a fuel sheath. It's put inside bundles. The bundles are contained inside pressured-containing tubes. The system is contained within an airtight reactor building with four-foot-thick walls. And here in Pickering you also have a big vacuum building should there be an accident.

I mentioned this part about multiplexing, because there is a mention before that CANDUs have had no accidents. The sort of reactors that all -- the accidents that all reactor vendors worry about are loss-of-coolant accidents. There have been some very famous ones. There was the Chernobyl one; there was the Three Mile Island one; there was the Fukushima one. Less well-known is the 1982 loss-of-coolant accident at Pickering, which was pressure tube G16 in unit 2, and it ruptured, resulting in a LOCA.

And most people don't know about it because nothing much happened. The ECC was not even triggered in that accident, and it's because of the nature of the core design. Our core design is multiplexed. Instead of a big pressure vessel, we have a spaghetti-like assortment of pressure tubes and feeder pipes. And in any sort of pressure vessel like that, the thing that tends to break is the weakest link in the chain. And the weakest link in the chain are the individual fuel channels. And that's what broke in 1982 in Pickering A.

But one of the points I would like to make is there are roughly 16,000 of these fuel channels in operation around the world. To my knowledge there's only one has ever failed in service, and that was Pickering 2, unit G16 in Pickering 2 in 1982. And it was using an alloy that hasn't been used in 30 years.

It's worth mentioning at this point -- I won't mention it -- I probably don't mention it in this part here -- the other kinds of accidents that people tend to worry about with pressurized water reactors and boiling water reactors are a main steam line break. If a main steam line breaks in one of those reactors, you got about one second to shut it down, basically, to close off the secondary system. In a CANDU reactor, the operator can go for coffee and come back and shut it down. Our reactors

just behave differently than conventional reactors.

Another big accident people worry about is control rod ejection. You can't get a control rod ejection in a CANDU reactor because the moderator's not pressurized.

So the point I'm trying to make is we have a robust design that certainly, in our opinion, is much safer than other reactors. And when you do have things that happen, transients that do happen, they behave much more slowly in a CANDU reactor because they're great big reactors. A nuclear physicist once described a CANDU reactor compared to other reactors as being like a pussy cat.

I won't -- this is mostly what I've said verbally.

I want to talk about response to Fukushima. And this is talked about in the submissions by both the OPG and the CNSC.

That accident resulted in complete station blackout, which you can't see happening in a CANDU reactor on the Great Lakes. But having said that, all of the CANDU reactors went through and addressed the lessons learned from Fukushima and addressed all of the action items. Even though we think that's over the top, they did it, and I think it's made their level of safety quite a bit greater than they would otherwise be.

Safety performance, there are 14 safety and critical control areas, and if you look at the submissions, OPG has a very good rating with respect to all of those, either fully satisfactory or satisfactory.

Environmental performance I'd like to talk about, because a lot of people have talked about this. The worker dose at Pickering, as stated, is well below regulatory limits. And the dose to the public from operations at Pickering have been in the range of 0.9 to 1.5 microsieverts. And even at the high range, this is one-six hundred and sixty-seventh of the regulatory limits.

To put this in perspective, natural background radiation in this part of the world, because we live in the Canadian Shield, is about 2000 microsieverts. And I want to note that there are places in the world where the natural background dose is as high as 260,000 microsieverts annually, which is more than 173,000 times higher than Pickering, with no apparent negative impacts on health. And that is a location in Iran.

And this is a graph I haven't put up before, but it's radiation dosage to the public in perspective, and where the volume of the cube is proportional to the annual radiation dose in these different areas. So the giant cube is the natural background in Ramsar, Iran. There should be effects from

the amount of radiation that they see, but they don't see it, presumably because there's an adaptive response to it.

The second-biggest box is if you ever go and have an abdominal CT scan done, that's how much radiation you're exposed to in about five minutes. The third-smallest box, that's the natural background in Ontario, a chest X-ray below that, and that tiny little box is the Pickering NGS. That's what you get at the station boundary if you happen to live right outside the fence.

So, yes, there is dose, there is extra radiation because of Pickering, but it is miniscule compared to what we experience by living in Ontario.

Pickering has requested the ability to operate some 295,000-equivalent full-power hours. We certainly endorse this. We also endorse the licence extension request for 10 years.

I want to mention one thing, if I can. In our opinion, Pickering, when it is shut down, will leave a big hole in the electricity-generating infrastructure. This is at a time when, at least under the previous government, there's a move to electrify the transportation sector. As an owner of an electric vehicle, I can tell you that people charge their cars in the middle of the night and if you were to electrify, for example, five percent of the transportation sector, that would increase the baseload

demand by 400 megawatts. If down the road you decided to electrify the entire transportation sector, and I'm just talking about light vehicles, you're going to need 8,000 megawatts more of baseload power.

Right now, unless you either build new reactors or you refurbish existing ones, including things like the Pickering station, you're going to have to go natural gas, and wind turbine, sure, but natural gas, as solar is not going to help you much with charging cars in the middle of the night, so one of the pitches that we would like to make as an engineering organization that designed the initial reactor is that we'd certainly like to see the Ontario government, the new one, revisit the assumptions that were made when they decided to close the Pickering reactor. We not only endorse the 10-year licence extension request, we would certainly call on the government to revisit the assumptions that went into the decision to shut down the reactors in a permanent way.

That's essentially my talk.

THE PRESIDENT: Thank you.

Questions? Let me start, then.

You mentioned in your Slide 9 five percent of light vehicles. What's your educated estimation as to how quickly transportation will be migrating to electricity?

DR. IVANCO: Right now, it's pretty slow. It depends on incentives. It depends on political will. It depends on engagement of the public.

I've had an electric vehicle now for four years, maybe I was one of the first ones to buy one, and I've seen some improvements in infrastructure in charging. I can go more places. Although, having said that, I drove my Jeep Patriot here today because I came from Oakville and I could get here in my electric vehicle, but unless I could charge it in about two hours, I wasn't going to get back, so there are things needed to improve the infrastructure.

There are places, like California, where I think they're getting close to 10 percent, for example, in terms of electric vehicles, but there are huge incentives there to buy vehicles, and there's a lot of grassroots support for doing those kinds of things.

I know that there are ambitious plans, or at least there were, in the long-term energy plan to try and electrify transportation. The whole reason is to try and reduce greenhouse gas emissions. From the electricity-generating sector, the GHG problem has essentially been solved. Our emissions must be about 50 grams per kilowatt hour. To put that into perspective, that's about one-tenth of what Germany's are, and they've invested \$300 billion in renewables. But the real bang for

your buck now is in transportation and home heating, and if you can electrify those you can reduce your greenhouse gas footprint a great deal. Each car you replace with an electrical vehicle saves you five tonnes of CO₂.

THE PRESIDENT: Some of the arguments that are being made now to shut down Pickering is that there's a surplus of energy, but according to you even five percent --

DR. IVANCO: There's a bit of surplus in the middle of the night right now, certainly on cooler nights in the summer or warmer nights in the winter, but if we do electrify the transportation sector that excess will disappear because you naturally tend to charge your vehicle in the middle of the night. Electricity is cheaper and you're not driving it in the middle of the night, so that will go up over time.

The way that the ISO manages load in the middle of the night is a bit of a mystery, but many of you know they pay Bruce Power to blow off steam so they don't make electricity. They spill water and burn gas in the middle of the night. You can check it yourself. Look at the IESO generator reports. There's never less than about 600 or 700 megawatts of electricity being made, generated by gas in Ontario.

THE PRESIDENT: Questions? Mr. Lacroix.

MEMBER LACROIX: Yes, I do have a question.

Thank you very much for your presentation. Coming back to safety, what is the biggest safety challenge that Pickering will face in the next 10 years?

DR. IVANCO: That's a big question. If it runs as an existing station without refurbishment or without being replaced, the lifetime of all reactors is limited by pressure tube elongation, so they're going to run into that barrier, I presume, at around 300,000 full-power hours.

In terms of safety, the Pickering B is a relatively modern CANDU reactor, believe it or not, in terms of safety system design. It has gadolinium nitrate injection. It has the regular shutdown rods that fall through gravity. The Pickering A reactors, I worked on a Pickering A unit for refurbishment many years ago and they still have dump tanks, I believe, and also the shutdown rods. The second one of those, the dump tanks, are not as fast as gadolinium injection, so from that point of view I suppose the Pickering A reactors are somewhat less safe because they don't have a fast-acting secondary shutdown system. Dumping the water from the moderator is not as fast as injecting gadolinium nitrate.

Having said that, in a pressure vessel where you have 400 channels, where it's multiplex like this, what is going to break is generally the weak link in the chain, and that has broken before. It has broken in Pickering A, in Unit 2, and there was no issue particularly, there was no safety issue. There was a huge economic issue because all the reactors had to be re-tubed with zirconium, and it cost a lot of money, but it was not a safety issue. I really don't believe that CANDU reactors have those same safety issues as pressure vessel reactors do.

MEMBER LACROIX: Thank you.

THE PRESIDENT: Actually, I'm looking at your Slide 17, and it's the first time I saw this kind of a very simplistic comparison between the Fukushima event and what would happen if that kind of accident happened with a CANDU. How did you figure out this calculation that it will take a couple of days?

DR. IVANCO: I didn't figure this out. This was done by AECL after their analysis of the Fukushima accident. I guess by then we were Candu Energy, so the safety analysts went through this and calculated that we have probably around 48 hours conservatively if we had a complete station blackout. That assumes core collapse, right, which is essentially what happened in Fukushima. It

assumes all the pressure tubes melt, all the fuel gets dumped out on the floor, the dousing system triggers, the end shields burst, and all the water comes out of those things. If all those horrible things happen in a CANDU reactor, which has never happened before, you have an order of magnitude more water inside the reactor building, and anyone who knows thermodynamics will tell you that water buys you time. It's got a large heat capacity, it takes a lot of energy to boil water, and it buys you about four times as much time as they had certainly at Fukushima to get water to the system. Of course, we also have the benefit of having fresh water nearby. It's hard to imagine you could have two days go by, in a situation like this, without being able to get some colder water inside the reactor building.

THE PRESIDENT: Okay. Thank you.

Any final thoughts?

DR. IVANCO: The only problem that I have is the one I made at the end. Pickering is one of the older licensed nuclear sites, and it's hard to get a greenfield nuclear site. The Province of Ontario, if it continues to try to meet its greenhouse gas emissions goals, it will need more baseload power going forward if it does indeed electrify the transportation sector and home heating sectors, even if it may have a temporary surplus in

that respect now. If you're going to need more baseload power and you don't have nuclear, and the hydroelectric capacity is pretty much exhausted, you're going to end up with a mixture of intermittent renewables, and a spinning reserve of natural gas, and mostly it's going to be the natural gas that's going to provide that, and that's a bit counterproductive if you're looking to reduce a greenhouse gas footprint.

THE PRESIDENT: Thank you.

The next presentation is by the Canadian Coalition for Nuclear Responsibility, as outlined in CMD 18-H6.63.

I understand that Dr. Edwards will make the presentation via teleconference.

Dr. Edwards, can you hear us? Is he on the line? You've got to push a button there somewhere. We can't hear you, Dr. Edwards.

I think what you should do is maybe do another connection.

In the meantime, why don't you set up the next intervenor, just to be ready. There's none. We may have an early dinner here.

Dr. Edwards, can you hear us?

--- Off microphone / Sans microphone

--- Pause

THE PRESIDENT: So, he's not on line now?

He is.

MR. LEBLANC: He was.

--- Pause

THE PRESIDENT: Is that Dr. Edwards? No.

Well, we're going to give you another minute to fix it or else we're going to go for early dinner.

--- Pause

THE PRESIDENT: Are any of the intervenors who were supposed to present after dinner available right now?

I guess not.

--- Off microphone / Sans microphone

--- Pause

MR. BUCHANAN: The line monitor?

THE PRESIDENT: Dr. Edwards, can you hear us?

MR. BUCHANAN: Sorry, this wasn't Dr. Edwards. It sounded as though the line was muted on your end.

THE PRESIDENT: Okay, but can you hear us now?

MR. BUCHANAN: Yeah, I can hear you now, Dr. Binder. Sorry, it's Kevin Buchanan from Health

Canada. I think I'm the only one on the telephone line right now.

THE PRESIDENT: That doesn't help.

--- Laughter / Rires

THE PRESIDENT: But thanks for sharing with us, at least the telecommunication system works somewhere.

So, are you going to -- but are you going to hang up on Health Canada? Well, maybe not.

--- Off microphone / Sans microphone

--- Pause

THE PRESIDENT: Dr. Edwards, can you hear us?

--- Pause

DR. EDWARDS: Hello? Can you hear me?

THE PRESIDENT: Yes, we can.

--- Laughter / Rires

DR. EDWARDS: Oh, my phone was apparently muted, I didn't realize that.

THE PRESIDENT: And you're talking about the most complicated technology on earth.

--- Laughter / Rires

DR. EDWARDS: That's right. We need an emergency backup system.

--- Laughter / Rires

THE PRESIDENT: Okay. We have been waiting for you, so welcome and please proceed with your presentation.

CMD 18-H6.63

**Oral presentation by the
Canadian Coalition for Nuclear Responsibility**

DR. EDWARDS: Thank you very much, President Binder and good wishes on your retirement.

I have been actually involved in the nuclear debate for four and a half times as long as you have I think, because it's since 1975 that I've been involved.

We all know that nuclear power plants are potentially dangerous, it is the nature of the beast. Metaphorically speaking, we have a ferocious lion in a strong cage. From the point of view of public safety, it is important to know how ferocious the lion is and how strong the cage is.

Everyone agrees that if the lion gets out there will be hell to pay. So, extreme precautions must be taken and are taken.

As Alvin Weinberg, one of the pioneers of nuclear energy in the U.S.A., has expressed it, quote:

"The price of nuclear power is eternal vigilance."

Unquote. So, let's talk a bit about the lion and the cage. We'll start with the lion.

In the case of Pickering, the lion is the irradiated nuclear fuel containing hundreds of human made radioactive poisons that were never found in nature before the nuclear age, but are created in the core of the reactor.

Irradiated fuel is so fiercely radioactive that a single fuel bundle freshly discharged from a Pickering reactor would kill any unshielded human being at a distance of one metre in about 20 seconds. And radioactivity cannot be shut off by any method known to science. In fact, immediately after a nuclear reactor has been completely shut down, the radioactivity of the irradiated fuel continues to generate about seven per cent of full power heat. In the case of a Pickering reactor, that's over 100 megawatts of heat.

That heat, the so-called decay heat cannot be shut off. In the absence of adequate cooling, decay heat is more than enough to melt the core of the reactor at a temperature twice as high as the melting point of steel.

If the gases and vapours and ashes from the radioactive core material is disseminated into the

environment, large areas of land may remain uninhabitable for decades or centuries.

Within 30 kilometres of Chernobyl it is expected to be uninhabitable for at least a hundred years largely due to the deposit of radioactive cesium-137 on soil, trees, buildings and other living things.

Using existing technology, no one can change the nature of this beast. Our only option is to ensure that the cage is strong enough to contain this beast under any circumstances.

So, what is the cage that keeps the lion imprisoned? It is a combination primarily of two things, plumbing and containment. Without a proper plumbing system you may not be able to keep the fuel cool enough in an emergency to prevent the irradiated fuel from overheating and even melting, thereby liberating large quantities of radioactive gases and vapours, including a lot of cesium-137 from the fuel.

Under such dire circumstances, it is necessary to contain the radioactive material, not allowing it to escape into the environment, even in the event of severe core damage.

That's where the CNSC comes in. The CNSC has stated very firmly that it will never compromise safety, CNSC will always ensure that the cage is totally

secure. That means that the plumbing system will be the best that it can be and the containment will be absolutely top notch.

Indeed, Ontario's committed to spending tens of billions of dollars to replace the plumbing in 10 nuclear reactors, eight at Bruce and four at Darlington, most of them older than the Pickering reactors. The expense is justified for safety reasons.

Refurbishing a CANDU reactor means replacing thousands of irradiated pressure tubes and calandria tubes inside the cores of the reactors and replacing them with brand new tubes. It's kind of like a heart transplant.

The effort and expense is justified by the fact that the old tubes have become increasingly brittle over time and more likely to break, especially in case of a thermal shock caused by the injection of cold, emergency cooling water into the super-heated fuel channels.

Refurbishment also means replacing thousands of feeder pipes which are directly attached to both ends of the core, because these pipes have become weak and corroded and are not quite up to snuff. The steel walls of some of these feeder pipes have become much thinner and more fragile over time, in some cases only about 60 percent of the wall thickness of new pipes.

So the easiest thing to do for safety sake is to replace them with new pipes.

Refurbishment also involves the replacement of the oil boilers, weighing hundreds of tonnes each, like a kidney transplant. That also addresses the safety concerns because if several of the narrow tubes inside the boilers were to break under stress during a severe nuclear accident, it would establish a clear pathway for radioactivity to go from the crippled core, through the pipes, and reach all the way to the outside environment, a potentially weak link in the containment system. So it is best not to take any chances. Why not just replace the old boilers, also called steam generators? That's what has been done.

So most Ontario reactors are getting a major makeover being brought up to snuff at great expense with new pressure tubes, new calandria tubes, new feeder pipes, new boilers.

In 2012, Quebec decided not to refurbish its only operating nuclear reactor, Gentilly-2 and consequently that reactor has been permanently shut down.

Back to Pickering, OPG decided years ago to save some money and effort by not refurbishing any of the four reactors that go under the Pickering B designation. These four reactors are old. Like the

Gentilly-2 reactor in Quebec, they should be shutdown permanently. Indeed, when OPG decided not to refurbish them that was the stated intention. But now, here they are, asking to run these old reactors into the ground without bothering to bring the cage containing the lion up to state of the art conditions.

As for the two Pickering A reactors, they are of course the oldest power reactors in the province and they too do not represent state of the art safety because they have only one fast shutdown system, while all other CANDU reactors are required to have two independent fast shutdown systems. The necessity for two fast shutdown systems is based on the fact that any loss of coolant accidents caused, for example, by a pipe break, causes a surge of power to occur in the reactor core. Unless this surge is terminated within two seconds, there could be very severe core damage.

Back in 1952 at Chalk River, the NRX reactor destroyed its core because the one shutdown system it had, did not operate properly, so better to have two.

In the CANDU literature, severe core damage implies the pressure tubes and calandria tubes fail, ejecting fuel bundles into the calandria. The sudden pressure inside the calandria will burst the ruptured disks at the top of the calandria, expelling moderator water out

of the core and providing a pathway for radioactive gasses and vapours, including cesium-137 to escape into the containment along with a great deal of explosive hydrogen gas.

Now, inside the core of a CANDU reactor, a Pickering reactor, there is at least 50,000 terabecquerels of cesium-137. According to a study published by CNSC, they expect that the releases into the environment would only be 100 terabecquerels. That's way, way less. That's about a thousand times less than what is available to be released. So that raises a question: Is the containment actually that good?

Every example of a major nuclear accident that I am aware of has always been accompanied by violent hydrogen gas explosions. Is the containment of the Pickering reactor qualified to withstand such powerful explosions as were witnessed at Chalk River in 1952, at Three Mile Island in 1979, and at Fukushima in 2011. This is an important question because any failure of the containment system will allow radioactive gases and cesium-137 to escape and cause widespread radioactive contamination. At Chernobyl it is estimated that some 80,000 terabecquerels of cesium-137 escaped. That's 800 times more than the CNSC study has assumed. And as a result, we have a no-man's land around the crippled

Chernobyl reactor that extends for a radius of 30 kilometres and will remain inhabitable for an expected age of 100 years or so.

Within 30 kilometres of Pickering there are about 2.2 million people living. Can anyone imagine such a region remaining inhabitable for decades or centuries? Well, it all depends on the containment system if there is a severe core damage accident. It's important that this containment system be able to reduce the amount of cesium inside the reactor from several tens of thousands down to only 100 or less. It is not something that we can take a chance on just because OPG wants to cut corners by not providing a second fast shutdown system for the Pickering A reactors, and not replacing the plumbing in the Pickering B reactors.

By the way, it's important to realize that the distribution of iodine pills, the KI pills to the populations around Chernobyl would have done some good, especially for the children preventing thyroid exposures but it would not have prevented the evacuation of the territory and the uninhabitable nature of the region to this very day. That was necessitated by the cesium-137 contamination, not because of the iodine-131 releases. The same thing at Fukushima; the regions closest to the reactor are still uninhabitable seven years later.

Even if the Pickering containment system somehow survives a series of hydrogen gas explosions, does anyone really know how good it is? Has the containment system ever been tested under realistic pressure loadings? In fact, how many times has the containment system at Pickering been actually physically tested? When was the last time it was done, and what was the result?

As a scientist myself who graduated from the University of Toronto in math, physics and chemistry, with a gold medal in mathematics and physics, and subsequently obtained a doctorate from Queen's University, I am disappointed in the CNSC senior staff who have chosen to disseminate what I consider to be biased and scientifically questionable information to the public on the potential releases following a severe core damage accident in a CANDU reactor. This is referring once more to the study which -- pick the number -- 100 terabecquerels of cesium-137 to be released. In the very report published by the CNSC they make it clear that that is the lowest amount of cesium-137 that could even qualify as a severe core accident situation.

So where is the conservatism? It seems to me that one has to take into account a leaky containment which would allow for much greater releases, orders of magnitude more, and in that case it could seriously affect

all of the emergency planning. I mean we are fooling people into thinking that the emergency planning only has to be distribution of pills and possible temporary evacuation, not dealing with the possibility that it could be far worse than that.

If the CNSC decides to allow this ancient reactor complex to keep operating under such conditions it should stop using the slogan: We will never compromise safety.

Given the accepted practice for all other CANDU reactors, which is to either refurbish them or retire them, it is clear that allowing the Pickering B reactors to run under these circumstances and also the Pickering A without the prescribed shutdown systems, is in fact compromising safety by reducing the safety margins that would have existed after refurbishment.

So I am asking the Commissioners to show some courage here in saying that, look, we want the very best containment. We want to replace the plumbing system or we want you to shut the reactors down, because otherwise it is setting a bad example and it's a slippery slope. How far is this going to be pushed?

Thank you.

THE PRESIDENT: Thank you. Questions?

So Dr. Edwards, I don't know if you had a

chance to listen over the last four days for a discussion about the emergency planning by the Office of the Fire Marshal; Health Canada. I guess I want to know how much are you aware of those discussions?

DR. EDWARDS: Well, I have been following the literature. I haven't listened to all of the discussions that have taken place, but it is my understanding that there are no plans in the emergency planning as they had to do in Japan to go from house to house decontaminating the roots and gardens and even decontaminating forested lands. This is a huge undertaking and it means that it severely interferes with normal life for a very long time to go -- to come in the future.

I don't know if that's part of the emergency planning, but I don't believe it is.

THE PRESIDENT: Okay, I just wanted to know -- we don't want to repeat the same kind of a discussion. I just wanted to know where you are in this particular thing.

So who wants to ask? Dr. Demeter...?

MEMBER DEMETER: Thank you for the intervention.

I wanted to ask OPG and, I guess CNSC, if need be. Dr. Edwards on page 6, I guess in a presentation to the Toronto health committee comes up with a scenario of

an explosion in a nuclear power plant that creates vaporization of the water in irradiated fuel bays. Get a sense, is this at all realistic? Is this considered --

DR. EDWARDS: No, I think you misread the document. This was a submission to the Ontario -- sorry -- the Toronto Board of Health who was considering the question of the effects of nuclear weapons. So the hearings were specifically about the effects of nuclear weapons.

And I pointed out just as an example that if a nuclear weapon were to explode anywhere close to the Pickering plant, it would liberate one to two million terabecquerels of cesium-137 from the spent fuel bays which are not under any strong containment such as the reactor itself is.

MEMBER DEMETER: Thanks for that.

DR. EDWARDS: That's what the scenario was.

MEMBER DEMETER: I'll withdraw the --

DR. EDWARDS: Actually that's not a realistic scenario but it does point out that any kind of -- any kind of accident such as a plane crash that would -- or a terrorist attack for that matter that could impact the spent fuel bays at Pickering could release an enormous amount of radioactivity, far more than you would

find from the fallout of all the nuclear test explosions that have been conducted all over the world up to the present time.

MEMBER DEMETER: I'll withdraw the question. Thank you for the clarification.

THE PRESIDENT: Okay.

Mr. Berube...?

MEMBER BERUBE: This is for CNSC. So Dr. Edward just pointed at the containment systems and saying that he doesn't know that they have been tested or that they have been certified. Could you please elaborate on what your findings are and what you've done?

MR. FRAPPIER: Gerry Frappier, for the record.

I'd go to Ottawa and ask Mr. Ken Kirkhope if he could explain a bit on, I guess, the vacuum building in particular that was being discussed?

MR. KIRKHOPE: Yes, hello. This is Ken Kirkhope, Engineering Design Assessment Division.

The Pickering containment systems, vacuum building, is subjected to tests every 10 years, according to CSA N287.7 Standard.

DR. EDWARDS: When was the last time?

MR. KIRKHOPE: I would have to ask OPG to perhaps answer that.

THE PRESIDENT: Go ahead please.

MR. GREGORIS: Steve Gregoris, for the record. I'm going to ask Paulina Herrera to expand on my answer. But I'll start by saying that there are a number of different tests we do on containment, some of those tests are on the reactor buildings themselves at low pressure, and also at higher full design pressure.

We also do a test of the pressure relief duct and the vacuum building every 10 years during a station outage, we call that the vacuum building outage.

All of those tests are required per our regulations and standards. There are very specific criteria around those tests that need to be met, including leak tightness. All of our tests have been well within those safety requirements in each of the tests that have been done.

I'll ask Paulina to expand on that.

MS HERRERA: Paulina Herrera, for the record. So, as Steve has stated, the containment structures at Pickering site, which include the vacuum building, pressure relief duct, and the reactor buildings, are tested periodically in accordance with CSA N287.7.

This pressure test consists of pressurizing the building to their design pressure. With the vacuum building, the last time it was tested was in

2010. The results of these tests are submitted to the CNSC, and they were well below our safety limits for leakage.

In the case of the reactor buildings themselves, we have been conducting them, they're performed on a six-year frequency, with the most recent ones through the units being conducted from 2016 and mostly recently in 2018.

All of these timelines are clearly stated in our Licence Conditions Handbook and our Periodic Inspection Program.

In addition, we do conduct exterior inspections of the reactor buildings themselves on a periodic basis as well to ensure the integrity of the structures, which have been confirmed.

Again, all of this is documented and submitted to the CNSC.

THE PRESIDENT: Thank you.

DR. EDWARDS: Can I ask, what is the design pressure that you test to in the case of the reactor building?

THE PRESIDENT: Go ahead, OPG. Have you got the numbers?

MS HERRERA: Paulina Herrera, for the record. I need to confirm, I think it's 43 kPa. I'll need

to confirm from our reports.

THE PRESIDENT: Okay, thank you.

DR. EDWARDS: Do you know if there have been any tests -- or calculations, even -- of hydrogen gas explosions and what that might do to the pressure boundary, especially of the reactor building itself?

THE PRESIDENT: Go ahead please.

MR. VECCHIARELLI: Jack Vecchiarelli, for the record. Yes, we have assessed this. That's part of the work that we did to address the generic action item 88G02 and is part of our probabilistic safety analysis.

We look at the impact on the containment from a range of potential hydrogen concentrations and the associated burns, and we found that there's lots of margin, containment is very robust and well able to withstand repeated burns as a matter of fact.

So there's no issue with respect to post-accident hydrogen burns in containment.

THE PRESIDENT: Thank you. Questions? Go ahead.

MEMBER BERUBE: Another concern that was brought up by Dr. Edwards was the suitability of a moderator drop tank as basically being a viable shutdown system on Pickering A.

CNSC Staff, could you speak to that first

please?

Dr. Edwards, are you still there?

DR. EDWARDS: Yes, I'm here.

MEMBER BERUBE: Okay.

THE PRESIDENT: Go ahead, Staff.

MR. ELDER: Peter Elder, for the record.

I'm the Vice-President of Technical Support and the Chief Science Officer.

We did touch on this a little bit earlier in the hearings. So the dump tank as the second system is adequate for slow events. Dr. Edwards is correct, that what was the intent of having two independent shutdown systems was to make sure that you had very high confidence of shutdown for fast events.

In the mid-1990s the AECB, at the time, ordered OPG to make improvements to the fast system at Pickering A. So there's a substantial improvement to the design to make sure that it had the same functionality as the two shutdown systems, as two independent shutdown systems.

Since then, this has been reviewed a number of times through the periodic safety review and also through the PSAs, and we have achieved the same intent; that is we have very high confidence that the reactors will be shutdown on any situation.

THE PRESIDENT: Thank you. Questions?

DR. EDWARDS: Sorry, should I -- oh, you're asking the Commissioners?

THE PRESIDENT: No, I'm asking the Commission, anybody. Anybody has any other questions?

DR. EDWARDS: I would like to make a comment on that last answer if I could?

THE PRESIDENT: Go ahead please.

DR. EDWARDS: Yes, I mean, I just think it's, on the face of it, absurd that the one fast shutdown system is equivalent to the two fast shutdowns. Why then are you causing the other reactors to have two fast shutdown systems? Why don't you just get them all to use the really good fast shutdown system that Pickering A has?

There's a very good reason for this, and that is you don't take any chances. Fast shutdown systems do fail or not function perfectly. That can lead to total destruction of the core of a reactor. That's why you have two fast shutdown systems. I think, at the very least, the Commission should not allow those oldest reactors to continue operating.

I think given the reluctance of Ontario Power Generation to do a refurbishment, replacing the plumbing of Pickering B, the Commission should require that and say, look, if you want to continue operating it beyond

what was reasonable and what you previously pledged to do, then refurbish them.

THE PRESIDENT: Okay. Let me try to explain what I understand from Staff. Pickering A was first built with one shutdown, Pickering B was -- and the rest were with two. When the instruction was to improve, they put in an alternative means to a fast shutdown, which is the gadolinium and all that stuff.

Is that my understanding?

DR. EDWARDS: No, that's not right.

THE PRESIDENT: The alternative stuff is as good or is functional as having two shutdowns.

Am I understanding correctly?

MR. FRAPPIER: Gerry Frappier, for the record. Not quite. So Pickering A does not have a gadolinium system. We just went through the periodic safety review where we just went through the analysis. Perhaps I could ask Dr. Al Omar to explain exactly where it's centred around the shutdown system for Pickering A?

DR. OMAR: Al Omar, for the record. Again, Pickering A originally has two systems to assist the shutdown of the reactor. One of them was slow -- or judged slow -- which is the dump tank.

Currently in the PSR, the current PSR, the current two shutdown systems have been assessed and

declared qualified for the events that are analyzed. So we have two shutdown systems now for Pickering A. The only difference is that the extended or enhanced shutdown system, we'll call it shutdown system 2, does not have gadolinium injection, but we added absorber rods, but it satisfied the design function, safety and regulatory requirement as shutdown system 2.

THE PRESIDENT: Okay, thank you. Dr. Edwards, anything else you want to ask?

DR. EDWARDS: Well, it's definitely cutting corners, there's no question about it. I mean, it's an old reactor. You would not require the Bruce reactors, the Darlington reactors, the overseas reactors, you wouldn't require them to have two fast shutdown systems if one was enough.

If you solved the problem for Pickering A so that you have a fast shutdown system based on rods that's totally adequate to the two shutdown systems, then why go to the extra expense of having two shutdown systems in every other CANDU reactor?

I think that we're just banding words here. We're not really talking about the fact that you are, to some degree, shaving the margin off the safety margin, and that could be a huge difference in the event of a violent emergency.

If you have, for example, an earthquake situation which somehow interferes with the descent of the rods into the core, as happened at NRX in 1952, the rods just didn't descend into the core properly, and that's why the core of the reactor was totally destroyed.

So I think we're banding words here. My point is that if the CNSC is really dedicated to never compromising safety, then they shouldn't compromise safety.

THE PRESIDENT: Okay. OPG, you were going to say something about that?

MR. LOCKWOOD: Randy Lockwood, for the record. I'm going to ask Steve Gregoris to -- we spoke about this yesterday, that Pickering A does have two shutdown systems: one, drop rods into the core; and, as well, the second was the dump tank drop the moderator, hence you can't maintain criticality.

Sometime ago it was determined that for some events the dump tank wasn't fast enough. Then there was an extensive enhancement to the system that initiates dropping the rods.

I'll let Steve walk through the enhancements. Steve.

MR. GREGORIS: Steve Gregoris, for the record. So, as Mr. Lockwood said, there are two ways to shutdown the Pickering 1 to 4 reactors. Shutoff rods fall

in core or the moderator dumps. The moderator dump is the deepest insertion of reactivity, because you remove the moderator. There is no way that that reactor can go critical. You know, we talked about benefits and maybe some challenges to that system, that system is an effective system. You know, I want to give that appreciation to the Commission.

When this was reviewed in the mid-1990s to early-2000s, when Pickering 1 to 4 was coming towards return to service, there was a lot of discussion, it included the Staff, it included the Commission, Commission presentations.

To improve the shutdown systems on 1 to 4 there was a shutdown system enhancement done. That increased the number of shutoff rods that originally were designed for those reactors. It also included a set of separate parameters to monitor the different parameters that would require a shutdown; those are neutronic parameters and also process parameters.

So effectively, we have, you know, an additional set of parameters monitoring, we have additional shutoff rods, plus the original two systems and the original parameters that are monitored. With all of that, you know, it was proven that that's equivalent to two fast-acting shutdown systems, and it was proven that the

ability to shutdown the reactor or not shut it down was an incredible event.

DR. EDWARDS: Well, incredible, that's an interesting word. All the accidents that have ever happened in the nuclear field have been incredible.

The point of the matter is, and I repeat, nobody since the early days, like around the time of the Royal Commission on Electric Power Planning, it was by that time fully acknowledged that the moderator dump while, yes, shutting down the reactor, is way too slow. You have to shutdown the reactor within two seconds.

Because in a CANDU reactor you have a problem similar to the one at Chernobyl, which is when you lose the coolant, if you have a loss of coolant accident you're going to get a power surge. If you don't terminate that within two seconds, you're going to have a destroyed core. The core of the reactor's going to be totally destroyed. The moderator dump is absolutely incapable of dealing with that.

So these fast shutdown rods are one system, and you can increase the number of them, but they're not -- that doesn't make it independent.

It was decided early on by the Atomic Energy Control Board in order to make sure that we do not compromise safety, in order to ensure that we live up to

that high standard and the trust that the Canadian public has put upon us, we will insist that there be two fully-independent fast shutdown systems, each one of which could totally shutdown the reactor quickly in less than two seconds.

Because if one of those shutdown systems fails, there's still another one that can do it. You don't have that at Pickering A.

THE PRESIDENT: Okay. Staff, last word on that?

MR. FRAPPIER: Gerry Frappier, for the record. I'd ask Mr. Vali Tavasoli to explain the equivalency of the shutdown systems.

DR. EDWARDS: Is Mr. Frappier -- you're with CNSC, right?

MR. FRAPPIER: That's correct, Dr. Edwards.

DR. EDWARDS: I'm surprised that CNSC is defending OPG on this instead of letting OPG defend itself.

THE PRESIDENT: Okay. I'd like to hear about the regulatory oversight here and the inspection that goes with it.

Who's going to talk to this?

MR. FRAPPIER: Vali Tavasoli is in Ottawa, and should be able to talk to that.

THE PRESIDENT: Okay. Go ahead please, Ottawa.

MR. TAVASOLI: This is Vali Tavasoli, Director of Reactor Physics and Fuel Division at CNSC. There's a couple of things that I'd like to mention. One of them was a statement by our own Staff regarding the enhanced shutdown system being a second shutdown system. This is not true.

One other thing I'd like to add is that, as Dr. Elder said, the moderator dump is effective for more probable slower transients. These transients is because of some of the component failures that Dr. Edwards has brought up himself, like steam generator failure, pressure tube failure, feeder failure.

These are slower transients and for these types of transients which are very probable -- not very probable, more probable than other faster transients, the moderator dump is fully effective.

With respect to the fact that the moderator dump might not be fully effective for faster transients, there might be a residual risk. This residual risk has been taken into account in the PSA studies.

The statement that Mr. Jammal made in the first night about the equivalency of that was based on a risk-informed assessment that the CNSC had done many years

ago. That risk-informed result was that, yes, that on a risk-informed basis the two systems could be considered equivalent.

THE PRESIDENT: Okay. Dr. Edwards, any final thoughts you want to share with us?

DR. EDWARDS: Well, my final thought is that in my 40 years of intervening at CNSC hearings I have found it difficult to understand why the licensee and the CNSC Staff always seem to be saying the same things and supporting each other.

I would expect that in a proper regulatory agency that the Staff of the regulator would be asking tough questions all the time of the licensee, holding the licensee's feet to the fire and insisting that they get adequate answers in the interest of public safety, rather than simply echoing what the licensee is putting forward.

I do ask the Commissioners to consider the fact that we do not have the opportunity to engage in cross-examination. I cross-examined nuclear experts for a period of three months during the Royal Commission on Electric Power Planning, and was able to make a lot of headway, and the Commission came out with a report which sided against many of the claims that were being made by the industry.

In these hearings, these regulatory

hearings, licensing hearings, there's no such opportunity. As a result, you have both the regulator and the licensee coming in with the same story, asking for the same thing of the Commissioners, and the only opposition you really get or the only tough questions you get are from intervenors who are like gadflies, because they only get 10 minutes and then a short period of question and answer.

I believe that there are serious questions here that the Commissioners should examine their conscience about and say, do I really want to give a licence to a plant which is not really up to snuff even by the current practice that is acknowledged for all other CANDU reactors?

THE PRESIDENT: Okay, thank you. Thank you for your intervention.

DR. EDWARDS: Thank you.

THE PRESIDENT: We will now break for dinner. We'll resume at 6:30.

MR. LEBLANC: The reason it is 6:30 is because some intervenors have been told that it would be after 6:30, so we just don't know if they'll be here prior to that.

--- Upon recessing at 5:07 p.m. /

Suspension à 17 h 07

--- Upon resuming at 6:31 p.m. /

Reprise à 18 h 31

THE PRESIDENT: Okay. We are back and ready to proceed with the next presentation, which is by Mr. Ayazi, as outlined in CMD 18-H6.68. Go ahead, please.

CMD 18-H6.68

Oral presentation by Mr. Amir Ayazi

MR. AYAZI: Thank you.

So my name is Amir Ayazi. I am born and raised in Toronto in the GTA. I have lived in the East end for a large percentage of that time, over a decade, and I also attended the University of Toronto Scarborough campus, so I have lived very close to the Pickering plant for a long time.

Now, I have always known about the Pickering power plant because a friend that I grew up within Scarborough moved to Pickering -- his name is Joel Bowan (phonetic) -- and we would always make jokes, like Simpsons-style jokes. He lives right next to the power plant, three-eyed fish and whatnot. So one day a couple of years ago he called me, we were just talking regularly, and the pills had just arrived at his house and we kind of made

a couple of jokes. "What do you mean pills arrived at your house?" And he explained, "In the case of a nuclear catastrophe I'm supposed to take this pill." We just laughed and laughed and laughed. Like, "What? They sent you pills? In a nuclear..." Anyway, it kind of planted a seed of, huh, there is this thing going on here, you know.

It reminded me of an American friend of mine who lived during the Cold War and they were taught in school, as you probably all know, to duck and cover in case the Russians attack. and just silly, silly things. So that's what brings me here, to voice my opinion as a citizen of this great country and say my opinion that there is no such thing as safe nuclear. I know I'm not an expert, just a normal citizen who loves his city, but that's my opinion. I know it's a nuanced issue. The folks over here obviously think it's a safe thing. Well, nothing is 100 percent safe, I understand that, so maybe my standard of safety is a little too high. The oil refineries in Alberta are unsafe, there are people who die on them, but what makes this different is the scope, you know. When a catastrophe happens in Alberta, people die. That's a horrible thing obviously, but the potential for disaster is nowhere, to my knowledge, larger than it is here in Pickering, given that this nuclear power plant is so close to so many people.

Now, earlier, yesterday I heard a lot of good reasons for the continued operation of the nuclear power plant and there are obviously a lot of smart people who are trying to make sure it's very safe and technical and I don't know anything about that, so I'm not going to comment, but the thing that they, to me, really pushed the continued operation, the reason, their argument is 5000 jobs and \$1.5 billion a year. In my opinion, it's simply not worth the risk even if that risk is only one in a million, which it might be even bigger than that because, well, you just can't put a price on the potential for disaster. That, knock on wood, hopefully won't happen. And anyway, I guess I will end there. Even if that risk is only one in a million, it's not worth the risk. Thank you.

THE PRESIDENT: Thank you.

Comments? Questions? Dr. Demeter...?

MEMBER DEMETER: Thank you for your intervention. Did you happen to be here during the discussion on earthquakes and fault lines? Part of your intervention talks a lot about, you know, concerns for earthquakes and stability and there was a relatively long discussion on earthquake potential, size, distance from the plant, the stability of the geology. I don't know if you heard that discussion yesterday -- I don't know if it was yesterday. It has been a blur, but yesterday or the day

before.

MR. AYAZI: I was here yesterday but I did not hear that. I guess you are obviously speaking about the submission that I sent. I had literally 100 different ideas of what to write about to you, because there are so many issues that I care about with this particular thing, so the earthquake was just one of many.

MEMBER DEMETER: Okay. If that is a particular concern, because we had someone I think on teleconference that talked about it, but the transcripts are available and you may want to look at the discussion on that particular facet of your intervention.

THE PRESIDENT: Okay. Thank you. Thank you for your intervention.

The next intervention is by Ms Guecha -- I don't know if I'm pronouncing that properly -- as outlined in CMD 18-H6.71 and H6.71A.

--- Pause

CMD 18-H6.71/18-H6.71A

Oral presentation by Estefany Guecha

MS GUECHA: Good evening, respected Members of the Canadian Nuclear Safety Commission and authorities.

I am Estefany Guecha Sanchez. I am an international student who has many loved ones here, so I made the decision to come to Canada rather than other countries because of the safety that just Canada can provide nowadays. This was my perception of Canada until I knew of the existence of a nuclear plant with the potential capacity to end the life of not hundreds or thousands but millions of people. And worse, that most of the people don't know how to react if something happens. Today I am here to give you my reasons why you should not renew the licence of the Pickering nuclear plant.

So in my presentation I am going to show you three main points: the first one, why the lack of information is a serious problem; the second one, why the risks and costs are too elevated; and the third one, which alternatives you should take into account.

First, the lack of information. OPG says that its staff is trained, they have alarms and adequate equipment to deal with an emergency. I really want to believe that they are ready, but what about the people who might be affected? Here are two scenarios in which people know how to react and the scenario in which the people don't know.

The first one, the scenario where the people know how to react. Surely they can have the KI

pills that are given for free. But here I have a different question. Do these people really know the side effects of these pills? Because while I am not an expert, I know that these pills are not all good. I read before that they have some restrictions and side effects. So the people I have asked don't know much about it. They know that if an alarm sounds they should take the pills and the effect lasts 24 hours. But then what? It is worth mentioning that although people are informed and have the pills, when a nuclear accident occurs there is no guarantee that they will have the pills with them. And it is important that you know that ads that are used to spread about the existence of these pills are not enough, because although I have heard that in Pickering there is some publicity about them, I have never seen this publicity in Toronto.

Now, the second scenario, the scenario in which people don't know how to react. Here I have other questions. What happens with people who don't live in this area, like citizens, international students and tourists, but at the moment of an emergency they are located near the Pickering nuclear plant, either 10 kilometres or 50 kilometres? Here there are different hypothetical situations that could happen: that they don't have the pills, so they will die of radiation without any protection; that they can have access to the pills, but

this implies a risk if they take them without consulting before if their conditions allow them to take the pills, cases such as being pregnant; and they can access the pills and know their limitations, but they ignore their current health status, so they will not be certain whether they can take the pills or not.

In all these scenarios the problem is the lack of information and awareness about how to react and this is a void that continues to exist because during the months I have been here I'm afraid that many are not aware that an old nuclear Pickering plant is very close where they study, where they work and they live. They ignore the existence of this plant. And it's clear that it is a game of probabilities that would not exist in a scenario that you as a Commission decide to not renew the Pickering licence.

The second point, why the scenario without the Pickering nuclear plant is better. Here I'm going to explain to you why the argument of jobs is not enough. When there are economic interests, one of the main arguments of the industry is jobs. I cite this from experience, because in Columbia for years we have tried to ban asbestos. Today we are presenting our eighth Bill in the Congress of the Republic, but this has not been approved because there are economic interests involved.

They have preferred to delay the decision even though they know that asbestos is banned in more than 55 countries and that 320 Colombians die each year because of asbestos exposition. My message here for you is that a responsible government prioritizes the right to live and health of its inhabitants over any economic interests.

Regarding the employment argument, I will explain to you later, there are other better alternatives that involve job creation, but if the priority is the current workers I would like to know if by extending the OPG licence the retirement age of their workers would be extended too. Because we are talking about people that are working in a really high risk. Also, it is important to mention that unemployment is not a big problem here in Canada. According to the last official report, Ontario has the lowest percentage of unemployment in the country.

So my third point, there are other alternatives. This year was the 32nd anniversary of the Chernobyl disaster, the world's biggest nuclear disaster that took place in Ukraine when it was part of the Soviet Union. In my letter I wrote about how the Chernobyl nuclear plant shared several characteristics with the Pickering nuclear plant, such as the viable number of reactors and the age of the facilities. And after that nuclear accident, different countries, being aware of the

risk, have been taking the decision to shut down their nuclear plants. One of them was Germany and they are still working on that because shutting down and nuclear plant requires time and attention. And the sooner this process happens, the better.

The economic benefit of energy production is not an exclusive benefit of the nuclear industry. There are other better ways to generate energy without the risk and possibly cost in human life that an old nuclear plant like Pickering represents.

And the truth is that this nuclear plant is not an essential thing for Canada. According to the government's last report, Canada is the sixth largest energy producer and the fifth largest net exporter in the world. So the necessity of energy is not a reasonable argument to renew the licence of OPG that OPG is asking for.

There is a saying in my country that states: Those who forget their own story are condemned to repeat it. I don't think that it is necessary to wait until a tragedy happens to take measures. I truly believe that it is possible to learn from the mistakes of the past and here and there is an alternative that I want to present to you, because this year in Chernobyl they decided to start a solar farm where the accident of Chernobyl took

place in 1986. I think that after shutting down Pickering, Canada could do the same, and not only generates solar energy, wind power, too. As you know, Canada is already investing in clean energy technology. This kind of green energy is a good alternative, but besides being a more secure energy, it will represent a new resource of jobs and this cannot be ignored.

I would like to be able to develop more my arguments, but the time is short.

So in summary, I have shown you three things: first, why the emergency management is inadequate; second, why the cost of the risks is not reasonable; three, why there are benefits to migrating to other kinds of sources of energy.

Canada has been an example for the world in many aspects for years, but if the licence of this nuclear plant is renewed, the level of importance that this government gives to the security of its citizens will be questionable. And here it is important to say that every year there are more of us who come to Canada temporarily, either for tourism or for academic purposes. Last year there were 494,525 international students, 20 percent more than in 2016. According to the Canada Bureau for International Education, one of the top three reasons why students choose Canada is safety, but if we knew about the

old nuclear plant that continues to operate despite being so close to the population, we could well question how safe we are. A nuclear plant is a time bomb, the time of many is in your hands, so take the better decision, Commissioners, please shut down Pickering.

THE PRESIDENT: Thank you.

Question? Anybody have a question? Go ahead, Dr. Demeter.

MEMBER DEMETER: Thank you very much for your intervention. I think it's important. I'm not sure if Health Canada is still on the line or if someone can speak to the side effects or potential contraindications to KI pills. I think it is important to judge the safety of these pills to the general public. Knowing that there are different recommendations by different countries that are subtly different, I want to make sure to keep this in the Canadian context.

THE PRESIDENT: But I would also like to hear from OPG. I think that with the kit there was instructions about how to take it, who should take it, not everybody should take it, and when to take it. So I would like confirmation, but I hear somebody here wants to talk about the side effects.

DR. ZABLITSKA: Lydia Zablotska, for the record.

I am trained as a physician and also as an epidemiologist and I worked in Chernobyl since 1995 and heard a lot. And I did research in Chernobyl, so I know a lot about use of KI pills after Chernobyl. They were not distributed there in adequate amounts, so that didn't work, but in terms of the efficiency and side effects, we do have adequate data. And so the side effects are really small and they are less than 0.1 percent attributed in the literature. The side effects are very minor, irritation of the stomach. None of the big or really important side effects have been noted in the literature. There have been very big campaigns done in other European countries where they were distributed to more than a million people, in Poland for example, after Chernobyl and there were no really big side effects noted.

THE PRESIDENT: And there was a massive distribution in Japan.

DR. ZABLOTSKA: Yes.

THE PRESIDENT: Okay. So OPG...?

MR. MANLEY: Robin Manley, for the record.

So obviously, Dr. Zablotska knows lots more about that than I do. I would simply say that on the Prepare to be Safe website there is a Q&A that talks about the side effects and obviously we would agree.

THE PRESIDENT: So did you go on the

website to see if there are instructions on this?

MS GUECHA: Yes, I checked the side effects. But my point here is that people don't know about the side effects. Again, it's a problem of the lack of information that the people have.

THE PRESIDENT: Okay. Thank you.

Ms Penney...?

MEMBER PENNEY: Thanks for your intervention. And yes, I love interventions with pictures. A question for you about -- you said that you haven't seen any of the advertisements, you haven't heard and gotten any information. How should OPG and the Ontario government reach out to people your age?

MS GUECHA: How?

MEMBER PENNEY: Yes.

MS GUECHA: There are many ways. I think that nowadays what works more is with advertisement in social media. I think it could be Work Smart, but there are other channels, maybe with campaigns in the universities, in the language schools, because many people come here to study languages. There are a lot of students, international students, many students come here. So many of these students don't know anything about this nuclear plant or what to do if something happens, because they are just going to be here for a couple of months. So it is

important to focus your attention with this kind of population too, because if the citizens don't know how to react, what about the tourists and international students?

THE PRESIDENT: Questions? Anybody?

Okay. Thank you. Thank you for your intervention.

MS GUECHA: Thank you.

THE PRESIDENT: I understand that staff want to update us on something.

MR. FRAPPIER: Gerry Frappier, for the record. Yes, I would like to ask Mr. Jammal to talk a little bit about our plans going forward with respect to emergency preparedness and interactions with the province.

MR. JAMMAL: Thank you, Mr. Frappier. Ramzi Jammal, for the record.

A discussion this afternoon and for the last few days were going a little bit in circles with respect to the question from the Commission in specific on the capability of sensitive populations to obtain potassium iodide or KI pills in the designated ingestion control planning zone and in specific at any time.

What I am proposing to the Commission is we will -- CNSC staff is recommending we establish a working group that encompasses CNSC staff, OPG, the Ministry of Health and the Chief Health Officer, and then

other stakeholders in order to provide the Commission with a plan on the implementation of the requirement of 2.10.1, RD-2.10.1, and that we will be updating you with respect to the progress so that it will be clear to the responsible authority to deliver the KI pills when it is needed and then we will provide the Commission with the answers. And of course the final decision lies with the Commission with respect to direction.

THE PRESIDENT: So you had such a committee, a coordinating committee for the original KI. Are you talking about the same kind of committee or similar committee?

MR. JAMMAL: Ramzi Jammal, for the record. The answer is yes, a similar committee in order to -- with an outcome, with a recommendation for an execution of the strategy that currently exists so we have a detailed implementation plan.

THE PRESIDENT: Go ahead.

MEMBER PENNEY: Question. So do you need to update the Licence Condition Handbook to compel OPG to participate?

MR. JAMMAL: It's Ramzi Jammal, for the record. I do not need to update the LCH to compel OPG. We can order OPG. On a serious note, it will be a -- since I'm providing the Commission this recommendation, so it

will be in the Record of Decision as a direction for us to establish this work group and then we will execute according to your Record of Decision.

As we put in place the terms of reference and the outcome we will provide you the updates via the status report and, at minimum, the regulatory annual report, but we would prefer to provide you more frequent updates on the progress associated with it. So the endpoint is I commit to do it, so we are going to do it, it does not need to be in the LCH, but we can put it in the LCH based on the recommendation coming from the Commission.

THE PRESIDENT: OPG, do you want to make a comment?

MR. LOCKWOOD: Randy Lockwood, for the record.

No need to order, we would be pleased. And in fact, I firmly believe, as I stated earlier today, that in the unlikely event we had to implement such a plan, we could, otherwise we would not be sitting here. But what has become very clear, because I do agree with the earlier comments that we have talked many times in circles and if we have talked in circles that means it's not clear. And from day one I have committed that we will do the right thing and nuclear safety will be top priority no matter what. So it's not a case of ordering, we will lead it.

THE PRESIDENT: Okay. Thank you.

Ms Velshi...?

MEMBER VELSHI: This is really good news, so I commend you for making this happen, Mr. Jammal. You didn't mention the Office of the Fire Marshal and Emergency Management in the Working Group. Are they a member of this?

MR. JAMMAL: Ramzi Jammal, for the record.

It's my mistake. Even though I wrote them down I did not list them, but as part of the terms of reference we will list who the members will be and then we will be updating the Commission based on the progress we are going to make. So that's the problem by naming some and not all the others, but definitely the major stakeholders for the implementation will be engaged.

THE PRESIDENT: I'm sure there are going to be other players like Health Canada, maybe even Transportation, because you talk about logistics, it's going to be complicated. And some of the municipalities, Durham, et cetera.

MR. JAMMAL: Let's start with baby steps first and then we will scope-creep afterwards.

THE PRESIDENT: I am waiting for the first report.

--- Laughter / Rires

MR. JAMMAL: Okay. Thank you.

THE PRESIDENT: Okay.

MEMBER DEMETER: I just wanted to say I truly look forward to the report and the information. Thank you very much.

THE PRESIDENT: So I understand, Marc, you want to update us on the next --

MR. LEBLANC: Yes. We had one remaining intervenor tonight and the train he was taking to Pickering was cancelled. And we have evidence of it, not that we needed it, and so we accepted that Mr. Kalevar present tomorrow morning instead of this evening. So I think he will be here tomorrow in that regard. So this closes the evening.

So to give you a sense of how the day will unfold tomorrow, we only have three interventions. We have the Lake Ontario Waterkeeper, the Registered Nurses' Association and we have Mr. Kalevar that will be presenting. This will be followed by rounds of questions from the Members to OPG and CNSC staff and departments that are still available and we will have some departments available for the Lake Ontario Waterkeeper intervention that deals with several issues.

So good evening, enjoy it. It's rare to have a Commission proceeding that ends that early.

THE PRESIDENT: Yes. So we give you a free evening here. See you tomorrow.

--- Whereupon the hearing adjourned at 6:59 p.m., to resume on Friday, June 29, 2018 at 8:30 a.m. /
L'audience est ajournée à 18 h 59, pour reprendre le vendredi 29 juin 2018 à 8 h 30