Canadian Nuclear Safety Commission

Public hearing

June 26th, 2018

Pickering Recreation Complex
1867 Valley Farm Road
Pickering, Ontario

Commission Members present

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

Secretary:

Mr. Marc Leblanc

General Counsel:

Ms Lisa Thiele

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Commission canadienne de sûreté nucléaire

Audience publique

Le 26 juin 2018

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

Commissaires présents

M. Michael Binder
Mme Rumina Velshi
D’ Sandor Demeter
Mme Kathy Penney
M. Timothy Berube
M. Marcel Lacroix

Secrétaire:

M. Marc Leblanc

Avocate générale :

Mme Lisa Thiele
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Opening Remarks</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMD 18-H6.76/18-H6.76A</td>
<td>6</td>
</tr>
<tr>
<td>CMD 18-H6.23</td>
<td>31</td>
</tr>
<tr>
<td>CMD 18-H6.141</td>
<td>63</td>
</tr>
<tr>
<td>CMD 18-H6.74</td>
<td>91</td>
</tr>
<tr>
<td>CMD 18-H6.57/18-H6.57A/18-H6.57B</td>
<td>113</td>
</tr>
<tr>
<td>CMD 18-H6.24/18-H6.24A</td>
<td>177</td>
</tr>
<tr>
<td>CMD 18-H6.41</td>
<td>221</td>
</tr>
<tr>
<td>CMD 18-H6.35/18-H6.35B</td>
<td>230</td>
</tr>
<tr>
<td>CMD 18-H6.28</td>
<td>256</td>
</tr>
<tr>
<td>CMD 18-H6.64</td>
<td>291</td>
</tr>
</tbody>
</table>

Oral presentation by the Canadian Association of Physicians for the Environment

Oral presentation by the Canadian Association of Nuclear Host Communities and the Municipality of Clarington

Oral Presentation by Mohawks of the Bay of Quinte

Oral presentation by the Honourable Erin O'Toole

Oral presentation by the Canadian Environmental Law Association

Oral presentation by Anna Tilman

Oral presentation by the Canadian Nuclear Laboratories

Oral presentation by Jerry Cuttler

Oral presentation by Dan Rudka

Oral presentation by the Provincial Council of Women of Ontario
### TABLE OF CONTENTS

|CMD 18-H6.79/18-H6.79A| 312 |
|CMD 18-H6.55/18-H6.55A| 338 |
|CMD 18-H6.40| 388 |
|CMD 18-H6.100| 399 |
|CMD 18-H6.102| 400 |
|CMD 18-H6.103| 400 |
|CMD 18-H6.104| 400 |
|CMD 18-H6.105| 400 |
|CMD 18-H6.106| 401 |
|CMD 18-H6.107| 401 |
|CMD 18-H6.108| 402 |
|CMD 18-H6.110| 402 |

Oral presentation by the North American Young Generation in Nuclear, Durham Chapter

Oral presentation by Northwatch

Oral presentation by the Canadian Nuclear Society

Written submission from William Shore

Written submission from Maimuna Hafiz

Written submission from Sonit Nangia

Written submission from Harald Simon

Written submission from James Ronald

Written submission from Joe Dickson, MPP, Ajax-Pickering

Written submission from Bruce Power

Written submission from The Wildlife Habitat Council

Written submission from The Greater Oshawa Chamber of Commerce
### TABLE OF CONTENTS

| CMD 18-H6.111 | Written submission from Jacquelynn Tanner | 403 |
| CMD 18-H6.112 | Written submission from The Ajax-Pickering Toastmasters Club | 403 |
| CMD 18-H6.113 | Written submission from James Scarrow | 403 |
| CMD 18-H6.114 | Written submission from Boyd Reimer | 404 |
| CMD 18-H6.115 | Written submission from Énergie NB Power | 404 |
| CMD 18-H6.116 | Written submission from B.C. Instruments | 404 |
| CMD 18-H6.117 | Written submission from Natasha Vaney | 404 |
| CMD 18-H6.118 | Written submission from Don and Heather Ross | 405 |
| CMD 18-H6.119 | Written submission from Jasmine Bruce | 405 |
| CMD 18-H6.120 | Written submission from Sherry Brown | 405 |
| CMD 18-H6.121 | Written submission from Bertie D’souza | 406 |
| CMD 18-H6.122 | Written submission from Janine Carter | 406 |
| CMD 18-H6.123 | Written submission from Fernanda Sierra | 406 |
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CMD 18-H6.124</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written submission from Katie Weston</td>
<td>406</td>
</tr>
<tr>
<td>CMD 18-H6.125</td>
<td></td>
</tr>
<tr>
<td>Written submission from Cameco Corporation</td>
<td>407</td>
</tr>
<tr>
<td>CMD 18-H6.126</td>
<td></td>
</tr>
<tr>
<td>Written submission from the Ontario Federation of Anglers and Hunters</td>
<td>408</td>
</tr>
<tr>
<td>CMD 18-H6.127</td>
<td></td>
</tr>
<tr>
<td>Written submission from Mackenzie Floyd</td>
<td>408</td>
</tr>
<tr>
<td>CMD 18-H6.128</td>
<td></td>
</tr>
<tr>
<td>Written submission from I-Ping Wong</td>
<td>409</td>
</tr>
<tr>
<td>CMD 18-H6.129</td>
<td></td>
</tr>
<tr>
<td>Written submission from University of Ontario Institute of Technology</td>
<td>409</td>
</tr>
<tr>
<td>CMD 18-H6.130</td>
<td></td>
</tr>
<tr>
<td>Written submission from Rena Ginsberg</td>
<td>412</td>
</tr>
<tr>
<td>CMD 18-H6.131</td>
<td></td>
</tr>
<tr>
<td>Written submission from Arielle Lefang</td>
<td>412</td>
</tr>
<tr>
<td>CMD 18-H6.132</td>
<td></td>
</tr>
<tr>
<td>Written submission from Doug Rylett</td>
<td>412</td>
</tr>
<tr>
<td>CMD 18-H6.133</td>
<td></td>
</tr>
<tr>
<td>Written submission from Elaine Munro</td>
<td>412</td>
</tr>
<tr>
<td>CMD 18-H6.134</td>
<td></td>
</tr>
<tr>
<td>Written submission from Cathy Tafler</td>
<td>413</td>
</tr>
<tr>
<td>CMD 18-H6.135</td>
<td></td>
</tr>
<tr>
<td>Written submission from Roger J. Short</td>
<td>414</td>
</tr>
<tr>
<td>CMD 18-H6.137</td>
<td></td>
</tr>
<tr>
<td>Written Submission from Tracy MacCharles, MPP, Pickering-Scarborough East</td>
<td>414</td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS

| CMD 18-H6.138 | Written submission from Lingzhi Xia | 414 |
| CMD 18-H6.139 | Written submission from Brotech Precision CNC Inc. | 414 |
| CMD 18-H6.140 | Written submission from Plug’n Drive | 415 |
| CMD 18-H6.142 | Written submission from Steps for Life, Durham Region | 415 |
| CMD 18-H6.143 | Written submission from Pickering Rouge Canoe Club | 415 |
| CMD 18-H6.144 | Written submission from Ontario Shores Centre for Mental Health Sciences and the Ontario Shores Foundation for Mental Health | 416 |
| CMD 18-H6.145 | Written submission from the Abilities Centre | 416 |
| CMD 18-H6.146 | Written submission from Earth Rangers. | 416 |
| CMD 18-H6.147 | Written submission from Big Brothers Big Sisters of South-West Durham and Northumberland | 417 |
| CMD 18-H6.148 | Written submission from PineRidge Arts Council | 417 |
| CMD 18-H6.149 | Written submission from the St. Paul’s on-the-Hill Community Food Bank | 417 |
## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CMD 18-H6.150</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written submission by Community Care Durham</td>
<td>418</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CMD 18-H6.151</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written submission from Kelly Clune</td>
<td>418</td>
</tr>
</tbody>
</table>
--- Upon commencing the public hearing on Tuesday,
June 26, 2018 at 8:30 a.m. / L'audience publique
débute le mardi 26 juin 2018 à 08 h 30

Opening Remarks

M. LEBLANC : Bonjour, good morning,
Mesdames et Messieurs. 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 exists
are. They are at the back of the room, there are two doors
there. Bathrooms are located near the main entrance in the
lobby. There are also bathrooms here in the main room.

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

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.

Transcripts will be available on the Commission website in about two weeks.

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 directeur 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 the webcast and via teleconference.

Mon nom est Michael Binder, je suis le président de la Commission canadienne de sûreté nucléaire. And for those who are not here with us today, I will begin by introducing the Members of the Commission.
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 have now heard from Marc Leblanc, our Secretary. We also have with us Ms Lisa Thiele, Senior General Counsel to the Commission.

Marc...?

**MR. LEBLANC:** So yesterday we heard the presentations by OPG, CNSC staff, five intervenors made oral presentations and several written submissions were addressed.

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

Time allowing at the end of the day, we will be addressing several of the written submissions.

We have in attendance, available for questions from the Commission, representatives from Environment and Climate Change Canada; Fisheries and Oceans Canada; the Office of the Fire Marshal and Emergency
Management; and the Ministry of Transport.

Representatives from the Ontario Ministry of Natural Resources and Forestry will be joining us later this morning.

Available by teleconference is a representative from Health Canada.

Mr. Buchanan, can you hear us?

MR. BUCHANAN: I can hear you.

MR. LEBLANC: Thank you, Mr. Buchanan.

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 if you have any questions pertaining to logistics, the timing of presentations, et cetera.

We expect to break for lunch from 12:30 to 1:30 and for dinner from 5:30 to 6:30 this evening. There will be short health breaks in mid-morning and in the afternoon.

Mr. President...?

THE PRESIDENT: Thank you, Marc.

So yesterday I opened the proceeding with some remarks which I would like to summarize today.

The Commission is a quasi-judicial administrative tribunal and consequently it is independent from any political, government or private sector influence.
In fact, each Commission Member is independent of one another and also independent of the CNSC staff. It is the Commission Members who will render a decision based on all the evidence presented in the context of this hearing process.

The Commission, as an administrative tribunal, does not have the statutory authority and will not consider questions that are of a political nature and it is the Ontario provincial government that must address concerns that relate to fundamental energy policy questions. If Ontario decides that nuclear remains part of the energy mix, the role of the CNSC is to ensure it is safe.

The CNSC has no economic mandate and will not base its decision on the economic impact of a facility. It is the health, safety and security of the public and the protection of the environment that guides our decisions.

As was stated earlier, the Commission is an administrative tribunal. It is willing to conduct this hearing in the affected community and to provide a forum where members of the public can express their views on the matter at hand.

As the Commission wishes to hear the more than 80 oral presentations and ask as many questions as it deems necessary on these, we ask that everyone respect the
10-minute time allocation and the decorum of a Tribunal setting and assist with the orderly, civil and respectful conduct of this hearing. The Commission will not tolerate inappropriate behaviour and will take measures necessary to ensure the orderly conduct of this proceeding in the same way it does for all other proceedings it conducts in Ottawa and in the communities.

So with this introduction I would like to start with the first presentation, which is by the Canadian Association of Physicians for the Environment, as outlined in CMDs 18-H6.76 and 18-H6.76A.

I understand that Dr. Vakil will make the presentation. Please proceed.

CMD 18-H6.76/18-H6.76A

Oral presentation by the

Canadian Association of Physicians for the Environment

DR. VAKIL: Can you hear?

THE PRESIDENT: Go ahead.

DR. VAKIL: Can you hear me?

THE PRESIDENT: Yes, we can.

DR. VAKIL: Yes, okay.

Well, thank you very much for the opportunity to make this presentation. My name is Cathy
Vakil, I am a family doctor in Kingston and I am an Assistant Professor in the Department of Family Medicine at Queen's University. I am representing the Canadian Association of Physicians for the Environment, which is a group of health professionals, including physicians and citizens who are concerned about the health effects of environmental degradation and environmental toxins. Next slide, please.

So our recommendation is that the CNSC not grant OPG a licence to continue operation of Pickering nuclear power plant for 10 years and that the Provincial Nuclear Emergency Response Plan should be updated to address a Fukushima-level accident in keeping with international best practices.

Before I continue on my presentation I would just like to add that CAPE supports several requests for ruling that were submitted recently. The first one is from Durham Nuclear Awareness, Greenpeace, and Canadian Environmental Law Association that OPG be mandated to establish a nuclear emergency preparedness awareness campaign in the GTA; the second is from Northwatch, Canadian Environmental Law Association, and Greenpeace that OPG's closure plans for Pickering nuclear station are subject to environmental assessment; and the third one is from Canadian Environmental Law Association and Greenpeace
to remove the wording from OPG's licence giving CNSC staff the power to allow Pickering to operate past 2024 without a public hearing.

So I would like to continue with my presentation. Next slide, please.

Generally there are a lot of health problems with the nuclear energy industry. I am not going to go through these in detail, I just want to concentrate on the last two, which is a significant and real risk of accident and address some problems with a Provincial Nuclear Emergency Response Plan. Next slide, please.

So I just have a list of the issues that I'm going to talk about.

The first one, and probably the most important, is that the emergency response plan that we have in Ontario does not address a Fukushima-level accident, which should be an INES Level 7, it addresses about an INES Level 5, which is several fold, manyfold less severe. And until it does address -- it has an appropriate planning basis, our emergency response plan will be inadequate.

The second issue is the intentional lack of detail in the planning because a serious accident is considered unlikely. I think preparedness should also depend on the severity of the consequences of an accident. Because of the high population around our reactors here,
and we are the only country that has put our reactors in the most densely populated area of the country, there will be severe consequences in the event of a severe nuclear accident. There are 4 1/2 million people who live within 50 kilometres of Pickering and Darlington stations, half a million within 20 kilometres of Darlington, 1.3 million within 20 kilometres of Pickering. Half of Ontarians and one in six Canadians live within 60 kilometres of Pickering and Darlington. So in the event of a severe nuclear accident, the health consequences could be catastrophic and I think the public expectation is that our emergency response plan will address this, which it does not.

The next thing is the estimates of the probability of a severe accident do not align with actual frequency seen worldwide. Throughout the emergency response plan they continued to say how unlikely a serious accident is. However, we have had a significant nuclear accident every 10 years worldwide. Our reactors are old, they are multi-unit and they have shared containment, and all these things make the risk of accident higher.

The last thing on this slide is the issue of population effect. Through the emergency response plan it continues to say that the doses in the event of an accident would be extremely small. However, when you have a large population, which we do around our reactors, even a
small increase in risk will translate to a significant number of illnesses and deaths. Next slide, please.

There is also an innate conflict of interest. The technical information used to derive the emergency response plan comes from OPG and CNSC, both who are strong supporters of the nuclear industry, and I think that our emergency response plan should be free from industry influence.

The next one, and this is important because I think that Ontarians deserve to have an emergency response plan that meets international best practices, and I will use Switzerland as an example, which uses an INES Level 7 accident as its planning basis, uses different accident scenarios and weather patterns and has established detailed protective measures for each scenario and its evacuation zone is 50 kilometres, compared to our 10 kilometres. And in Ontario the health risk of an accident is far, far, far greater than it would ever be in Switzerland because of our high population. And again, I think Ontarians expect and deserve to have an emergency response plan that meets international best practices.

In terms of potassium iodide distribution, we would agree with the Durham and City of Toronto to request the pre-distribution beyond 10 kilometres. It is now available up to 50 kilometres. However, most people
who live in that area do not even know that they have access to KI. There has been basically no advertising for this or public education. At the end of 2015 the Toronto Star ran an article about this and within five days there were 11,000 orders. This shows that the public is concerned about an accident, but they are largely unaware of anything available to them due to lack of public education. We believe that KI should be pre-distributed and stockpiled in schools, daycare centres, hospitals, all workplaces to ensure a high percentage consumption as soon as possible after any exposure from a release as the KI lasts 24 hours but it loses efficacy within the first few hours of use, so it needs to be ingested as soon as possible when the person is exposed. And Bruce Power actually pre-distributes KI to schools, all schools within 50 kilometres, as do other jurisdictions in the world. CAPE also supports the Toronto District School Board's request that KI be stockpiled in schools within 50 kilometres and there are Canadian studies that have shown that children beyond 10 kilometres may need protection. Next slide.

Or actually, one more thing on that slide. Also, when you look at the emergency response plan there is some really unrealistic assumptions made about how an evacuation, et cetera, would unfold. It assumes there will
be no release before 24 hours, that there would be 100 percent evacuation from the primary zone, 10 kilometres, 100 percent ingestion of KI in the primary zone and 100 percent sheltering outside of that. All these things may well not occur and there is no scenario that would account for this. They also assume there is a complete communication to the public as to what to do, there won't be any traffic jams, there will be predictable weather patterns, and all these things are really unrealistic, especially considering the huge population that may need to be evacuated and the congestion that there already is along the 401 there. And keep in mind that Fukushima only had 150,000 people evacuated compared to the possibly millions that would need to be evacuated here in Ontario. Next slide.

Importantly, there is no addressing the possibility of drinking water contamination. Lake Ontario is drinking water for 9 million Canadians and Americans, including 50 percent of all Ontarians. In Fukushima, 80 percent of the radionuclides went out into the Pacific Ocean. Here they would go out into Lake Ontario and would possibly contaminate the entire lake and everything downstream. This is not discussed in the emergency response plan and this is a significant omission when you are talking about people's health.
Just a word about the healthcare preparedness and public education. Within 30 kilometres of Pickering there are 22 hospitals and 7400 beds, there are 82 retirement homes with 9400 beds. Possibly all these people will need to be evacuated into hospitals in the GTA and elsewhere and it needs to be absolutely sure that these hospitals have the room and the staff to accommodate these extra patients and there would be ambulances, et cetera, ready for transfer. Emergency room staff, paramedics and first responders all need to be practised in decontamination methods, they need to know how to treat acute radiation exposure, they need to be doing regular exercises and drills, and there should be audits on this to make sure they are all well prepared. There should be public education in the entire GTA for everybody and this should be taught in schools.

And lastly, just the zoning should be based on rigorous science and with best practices and acceptable safety margins to address uncertainty. Right now the 20-kilometre radius for the secondary zone is completely arbitrary, they just doubled the 10-kilometre, and this just isn't acceptable for our emergency response plan. Next slide.

So in conclusion, the request for OPG to extend the operating licence of Pickering Nuclear Power
Plant for 10 years should be denied until an adequate Provincial Nuclear Emergency Response Plan is in place that addresses the unique situation in Pickering and that is in keeping with international best practices. Thank you.

**THE PRESIDENT:** Thank you.

I think it's a good time to call the Office of the Fire Marshal to come forward and maybe address some of the issues being raised.

--- Pause

**MR. MORTON:** Good morning. My name is Michael Morton, for the record. I am the Director of Emergency Management with the Office of the Fire Marshal and Emergency Management.

I am joined to my right by Mr. Jonathan Stone, who is our Manager of Planning and Exercises within our organization; on my left I have Kathy Bleyer, who is our Senior Nuclear Emergency Planner; and behind me to the left is Lorie Whitcombe, who is our Senior Scientific Officer.

We are also joined today by representatives from the Ministry of Transportation and the Ministry of Environment and Climate Change, who can speak to issues specific to their portfolio, and we have access by phone throughout these hearings to a number of experts across the Ontario government.
What I would suggest, if it suits the Commission, is I could give just a very brief context to the Provincial Nuclear Emergency Response Plan. This will follow up on our very detailed presentation to the regular meeting of the CNSC which occurred on April 4th and that presentation is available on the CNSC website. It provides a lot of very specific context as to the changes made for the 2017 Provincial Nuclear Emergency Response Plan.

But just for those that did not hear that report and as a little general context I will start with just a few minutes of background on emergency management in Ontario and our PNERP and then we will get to some of the specific items that have been raised by the intervenors.

So first of all, within Ontario we have a very robust emergency management system. This is developed in accordance with international and national best practices such as the Canadian Standards Association Z1600, which outlines best practice for emergency management in general.

Our programs are carried out under the authority of Ontario's *Emergency Management and Civil Protection Act*. This Act requires all municipalities in Ontario as well as all ministries of the provincial government to have in-depth emergency management programs. These are further enhanced by Regulation 380/04, which
outlines specifics not just for emergency management but for continuity of government operations. Our organization works with all 444 municipalities in Ontario and all of our provincial ministries to provide oversight and to ensure that their programs are indeed consistent with the Act and its supporting regulation.

With reference to nuclear emergency management, the Act requires under section 8 that we develop a plan for emergencies at nuclear facilities within Ontario as well as those that could have effects on Ontario in general. This is a Cabinet-level plan. So the Government of Ontario, through the Cabinet, reviews and approves this plan.

And in addition to that, under Order in Council, our organization, our Ministry is provided the lead for all other nuclear and radiological emergencies. So we have, under Ontario law, the lead for offsite emergency management and offsite emergency response for any sort of nuclear or radiological emergency.

So consistent with the Act and our Order in Council duties, we have developed the Provincial Nuclear Emergency Response Plan. The PNERP is supported by over 20 other provincial, federal and municipal plans, and these are listed in the PNERP itself and all of these plans are publicly available.
We developed the PNERP in a very consultative manner. We first do that through what we call our Nuclear Emergency Management Coordinating Committee. This is an organization of over 30 stakeholder organizations at all levels of government as well as representatives of the nuclear operators within Ontario, and they are supported through an extensive staff structure within the Ontario government, the federal government and municipal governments. Within our organization we have numerous full-time staff that do this all day every day, and there are similar emergency management structures within designated ministries across the government who focus on specific procedures and processes related to nuclear emergency management. We work very closely as well with our partners at the CNSC, within Health Canada, who is the federal planning lead for the federal nuclear response plan, and we also work with Environment Canada and other federal departments that would have areas of jurisdiction related to nuclear emergency management.

The Provincial Nuclear Emergency Response Plan was last updated and approved by Cabinet in November of 2017. So we are operating under a very recent plan and there was a very robust process to develop that plan. It started in 2014 and the first steps to that were to look at what we call the planning basis. This is essentially the
scenarios that the plan addresses. Of note is what we
would consider the worst-case scenario, if you will. We
did a lot of study in order to define this. We worked very
closely with CNSC and Health Canada to define what would be
a credible large-scale event and that worst-case scenario
looks at a total station blackout that would have no
operator intervention for 12 hours. That's an extremely
unlikely scenario, but it would indeed be consistent with
the International Nuclear Event Scale, or the INES, Level 7
event.

This is detailed in the planning basis
type that we published in advance of updating the PNERP.
That was posted for a 75-day period and we received a
number of public comments on that to which we have
responded. So that consultation, which was both the
planning basis, including this worst-case accident
scenario, as well as our proposed changes to the plan, that
process received about 1600 public comments.

Our Minister appointed an international
external advisory group independent of government to review
all of those 1600 comments and the advisory group came back
with a very detailed report. It included 15
recommendations and those recommendations fell into
essentially two categories. Things that could be addressed
in the 2017 PNERP, things that were primarily textual or
structural changes to the plan focused around ensuring that we have a regular review cycle mandated in the plan, which we now do, that we provide more clarity and more easily accessible language within the plan, samples and scenarios of how an accident would be responded to. All of those enhancements have been made and are reflected in the 2017 plan. So that addressed a number of the recommendations of the advisory group.

Other recommendations are dependent on a technical study that the advisory group recommended. And while the group supported the accident scenario and supported the intervention levels and the measures within the PNERP as well as our planning zones, they asked that we carry out a very detailed technical study that would look at particular weather and geographical effects on dosage rates that would occur around any of our nuclear facilities within Ontario as well as around the Fermi 2 plant in Michigan which could potentially have impacts on the Amherstburg, Essex County area of Southwestern Ontario. So that study is underway.

We have committed to act on all 15 of the recommendations, including that study. We expect the study to be complete by the end of the year and at that time we will look at those results, we will compare them to the work that has been done modelling to date, look at the
measures that are within the 2017 PNERP and, if indicated by the study, recommend options for any potential further enhancements to the PNERP.

But we do want to stress, and particularly given the concerns raised by the intervenor, similar concerns to what were raised during our public advisory period, that we do look at INES Level 7 emergency, we do look at multi-reactor scenarios, and there has been considerable review of those scenarios not just by the provincial government but by the independent advisory and by the CNSC staff, who have reinforced in CNSC documents their acceptance and agreement of those scenarios, as has Health Canada, and the applicability of the measures within the PNERP.

So there are many other aspects of this that we could speak to, but I will take a pause there and perhaps Members of the Commission would like to focus on certain aspects of this.

THE PRESIDENT: Yes. I think we should now focus on some specific questions associated with what the intervenor has raised. Who wants to go first? Ms Velshi...?

MEMBER VELSHI: Thank you. So I will start with the INES 7 rating and, as you have seen, it is one that not everyone agrees with how you have concluded
that the PNERP is based on an INES Level 7. So maybe I will start with staff. Is there a lot of subjectivity involved with what an INES rating is and, secondly, you know, how does one actually get kind of to check that this actually is an INES 7 rating of planning basis?

**MR. FRAPPIER:** Gerry Frappier, for the record.

So I think it's very important to start off with that the INES levels are not a planning tool, they are not designed to be a planning tool. They are not a decision-making tool, they were never intended to be a decision-making tool. It's a communication tool. The intent of the INES levels is that after an accident people could do a relatively objective assessment of the accident so that then you could have some understanding of how big an event it was, in particular when talking to the public and when talking to international colleagues. So the concept of making an accident scenario based on INES, that doesn't make any sense if you understand what INES is.

I think what most people are making reference to when they talk about that is the amount of radioactive material that is released. And so if what the intervenor means by an INES level 7 is to have a certain amount of a release, it's not so clear to me that that's the best way to determine what an appropriate emergency
plan is.

We would much rather be looking at it from what are the accident scenarios; what are the potentials; are we ready for what is likely to happen or what could happen -- I shouldn't say "likely," because -- but by what you could imagine would happen, and base your planning around that. And that's what the province has done. We've worked with them to try to create some scenarios that will result in as big a release as we could possibly see.

So certainly, all the planning that's been done would include as much response, if you like, as one could envision for any of these beyond-design-based accidents.

The actual exercise that just went through, just to give a bit of a feel for it, so the actual exercise that was just done at Pickering, the Unified Response, we have the responsibility in the CNSC to undertake the INES determination.

And again, because the INES process is all geared for after the accident, then it's a bit problematic in exercises, because of course the accident ended when day 2 ended, because that was when the scenario and the whole planning of the emergency exercise was over. In reality, that accident would have continued. So depending on how you want to play out that, what would have happened over
the next few days after the scenario's end, you can have that Exercise Unified Control -- I think I got that wrong, but the exercise that was just done at Pickering, you could have it as an INES level 5, 6, or 7. And that's what our analysis said. You basically would have to have seen how the mitigation things go.

What I think is important, though, is as far as decision-making on the part of the Province in particular, but also ourselves and OPG, the decisions were all made as if it was going to be INES level 7 or anything else. Because again, the Province doesn't wait for an INES determination, and it wouldn't be appropriate for them to do that. They're looking at what is the situation, what is the prognosis looking forward.

And so I think the INES level is a bit of a red herring in this, if that's a term that's allowed to be used. But it's because it's not really intended for planning.

So if what is being meant is we want a release that's bigger than we think out of any potential scenario is credible, we've already pushed the limits on that, and we've had in particular the SARP study that was done that really looked at a much, much larger release than any credible accident scenario.

MEMBER VELSHI: Thank you. So maybe the
Office of the Fire Marshal and Emergency Management should stop using that our planning basis is based on an INES 7, because if it's not a planning tool, let's not perpetuate this misrepresentation.

But did your independent international technical advisory committee say that the planning basis is indeed the worst possible scenario for planning? And should that not give enough reassurance to the members of the public?

**MR. MORTON:** What I'm going to do at this point -- it's Mike Morton, for the record.

I'm going to turn over to Kathy Bleyer in just a moment. Kathy authored the discussion paper, including a very extensive review of literature, as well as carrying out consultations with a number of different stakeholders initially in the development of that paper, working with the CNSC and Health Canada, but then through the process of the independent external advisory, and now within our external technical review that is being carried out in detail throughout this year. A number of variables were considered in the development of that. And again, we want to stress that this is based on the CANDU technology and the reactors that are operated here in Ontario.

So I'll turn it over to Kathy just to talk a little bit about her process in developing that and some
of the things that influence that consideration.

**MS BLEYER:** So it's Kathy Bleyer, for the record. I'm a senior planning officer with the Office of the Fire Marshal and Emergency Management.

When we went about the planning basis review, we brought together a group of stakeholders. So we worked very closely with CNSC staff and with Health Canada first, in the first order, to determine what would be the accident scenario that we would look at. Mr. Frappier, I believe, mentioned the SARP scenario, and we did undertake a detailed assessment of that SARP scenario. We looked at it based on the CNSC health consequence study that was undertaken and basically looked at the doses that would result from that scenario. So we included that in our discussion paper.

But we then decided with our stakeholders to look at an accident that was even more severe than that. It took us a while to land on that accident scenario, but basically it was taken from the Darlington probabilistic risk assessment, which was done in 2011, I believe. So it pre-dated the EMEs, the mitigating equipment that was installed based on the Fukushima recommendations made by CNSC.

So the scenario that we looked at basically involved extended station blackout with no
operator intervention for 12 hours. The accident, I believe, was called the RC1 accident. It did involve three emissions, but all of us agreed that to expect that there would be no operator intervention throughout the whole scenario was really, really unlikely. So the consideration was just based on the first emission, the first radioactive emission, which occurred 11 or 12 hours after the accident occurred.

So that accident scenario was taken, and it was modelled by Health Canada. And they did Gaussian modelling, Lagrangian modelling. They could speak much better to how they undertook the modelling. And so based on the dose assessments from that, we considered what the geographical extent of the planning zones should be.

So it was an extremely unlikely accident, and the dose assessments from the modelling informed our decisions for the planning zones.

THE PRESIDENT: I understand, Dr. Vakil, that you have to leave in about five minutes. So I want you to have the last word.

But before we do this, I really would like a yes or no answer from CNSC, Health Canada on PNERP. Are you satisfied that your planning basis is good for your current PNERP plan?

DR. VAKIL: Are you asking me?
THE PRESIDENT: I'm asking -- I would like Health Canada. Health Canada is online. Why don't we start with Health Canada, staff, and then Office of the Fire --

MR. BUCHANAN: Yeah, so President Binder, this is Kevin Buchanan from Health Canada, for the record. My answer to your question is yes.

THE PRESIDENT: Okay. Staff?

MR. FRAPPIER: Sorry about that. Gerry Frappier, for the record.

Certainly staff believes that it's adequate. And I would also point out that the dose calculations, as was just mentioned, is equivalent to what there was at the Fukushima accident. And so that's why we see the equivalency there.

THE PRESIDENT: Office of the Fire Marshal?

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

We are very satisfied with the planning basis. As my colleague Kathy Bleyer has indicated, this was a lengthy and detailed process, involving federal and provincial officials. It has been advised by an international advisory group that is external to government. And to go even beyond that, we're currently
conducting even further detailed local technical studies. So we are very satisfied that our scenario, although very, very unlikely, is indeed a worst-case scenario.

MEMBER VELSHI: I just want to confirm, so your international technical advisory committee also said that the planning basis is appropriate?

MR. MORTON: That's correct. They reviewed all 1,600 of the public comments. They affirmed our scenario as well as our planning zones, but have recommended a detailed localized study to ensure that all of our actions and intervention levels are indeed appropriate.

THE PRESIDENT: Dr. Vakil, I know you raised a few other issues which will be discussed today and throughout the next three days, so if you can join us later on or tune in. But you have the last word, if you really have to leave now.

DR. VAKIL: Yeah. I would just like to say that as a member of the public, and I know I speak for many, many, many members of the public, it really doesn't make sense to me that other jurisdictions -- and I would give the example of Switzerland -- but many other jurisdictions have done -- have created emergency response plans that are far more stringent and far more detailed with much larger radiuses for things like evacuation,
sheltering, and KI predistribution based on a severe accident.

And it doesn't make sense to me that they will come up with these much more stringent guidelines than we do, especially considering the severity of the consequences in terms of health here with a severe accident. And I think a lot of the members of the public would be in a bit of a quandary as to why our guidelines are so much less -- so much more lax considering the risks here are far, far greater.

And that's all I have to say. Thank you.

**THE PRESIDENT:** Okay, thank you.

We will continue now without this intervenor, I guess, if there is some outstanding questions. Because later on, we will revisit this again.

So Dr. Demeter, you want to ask this question?

**MEMBER DEMETER:** No, the intervenor on slide 3, first bullet, talked about "ongoing chronic releases causing illness in people living close by." Since you'll be talking to the local medical officer of health about health status surveys and epidemiology and databases, I just didn't know the reference for this bullet with this intervenor that would help inform my question.

**DR. VAKIL:** There have been many studies
worldwide showing increases in particularly childhood leukemia in people living close by to reactors.

**MEMBER DEMETER:** Do you have any Canadian references that we could subject to scrutiny?

**DR. VAKIL:** No, because the Canadian studies are not adequate enough, they're not powered enough to show an increase within five kilometres, which is what other studies have showed elsewhere.

**MEMBER DEMETER:** Okay. I'll follow up with the public health officer.

**THE PRESIDENT:** Were you tuning in when this was discussed yesterday?

**DR. VAKIL:** Are you asking me? No, I wasn't tuning in, and I actually have to go right now, but thank you for your time.

**THE PRESIDENT:** Okay. You may want to read the proceeding of what happened yesterday on this.

Thank you.

I'd like to move on.

To the Office of the Fire Marshal, I hope you stick around here. I'm sure they're going to have many other questions here.

The next presentation is by the Canadian Association of Nuclear Host Communities, and the Municipality of Clarington, as outlined in CMD 18-H6.23.
I understand, Mayor Foster, that you'll lead the presentation. Over to you.

CMD 18-H6.23

Oral presentation by the

Canadian Association of Nuclear Host Communities

and the Municipality of Clarington


MAYOR FOSTER: Thank you.

For the record, I am Adrian Foster, Chair of CANHC, the Canadian Association of Nuclear Host Communities, and the Mayor of the Municipality of Clarington, the host community of the Darlington Nuclear Generating Station.

I am joined on my left with Mayor Dave Ryan, the Mayor of Pickering, the host community for the Pickering Nuclear Generating Station, and to my right Chief Gord Weir, who is our fire chief.

The Canadian Association of Nuclear Host Communities welcomes the opportunity to comment on the various matters relating to OPG's application to renew its nuclear operating licence, and we thank you for this opportunity.

CANHC is an association comprised of the heads of council of municipalities that host major nuclear
facilities in Canada. Our association provides a forum for our members to share knowledge and best practices in our respective experiences in working with the nuclear industry. Most importantly, our association provides support for our members through public hearing participation and liaison with the various government agencies to further our objectives.

CANHC has established an excellent working relationship with OPG, and is familiar with the many facets of its operation at the Pickering Nuclear Generating Station. Our submission is therefore premised on our lengthy observation and familiarity with both OPG as the operator and with the plant itself. We urge the Commission to give our comments its utmost consideration.

First and foremost, our interest in this matter is public safety, including safety of the workers, many of whom are residents of Durham Region, and of course the safety of residents, particularly those living nearby the station. We believe public safety should never be compromised.

OPG, through its many years of operating the Pickering nuclear station since the late 1970s, has demonstrated and continues to exercise its due diligence when it comes to public safety. Its excellent safety record is a matter of public knowledge and is on record
with the Commission. OPG can elaborate on its safety record and the high standards maintained for its operations.

Another aspect of public safety is emergency preparedness, where emergency fire and police services regularly participate with OPG across Durham Region in various exercise drills, evacuation planning, and off-site training at the Wesleyville facility.

Since the start of construction of the Pickering nuclear station in the early 1970s to its ongoing operation, we've been pleased with OPG's exceptional track record for the safe operation of the Pickering station. There is every reason to believe that OPG will continue to uphold its excellent safety record. The Pickering station has been safely operated for more than 40 years.

Following the events in Fukushima, OPG made substantial investments in safety equipment and procedures. In the CNSC's annual nuclear station performance report, we note that the Pickering station continues to meet or better performance expectations in all 14 safety-related areas. This leads us to believe OPG is not only committed to public safety, it has proven to our satisfaction that it has given public safety the utmost attention and top priority in the continuation of the operation of the Pickering station.
Our CANHC communities enjoy the economic benefits of the stable, highly-skilled and safety-conscientious workforce. The continued operation of the Pickering station is essential to sustain employment opportunities, commercial and industrial development, and generate tax revenue to the local governments.

Last but not least, OPG has been an excellent corporate citizen in the local communities, and we welcome the opportunity to Foster that relationship in the coming years through the many sponsorships and employee engagement in various community activities.

In conclusion, CANHC fully supports the OPG application to renew the operating licence for the Pickering station.

Again, I thank you for the opportunity to comment on the application renewal.

**THE PRESIDENT:** Thank you. Questions?

Ms Penny.

**MEMBER PENNEY:** Thank you for that.

Continuing on the same theme of emergency response, perhaps you could, in either one of your roles, elaborate on how you've been involved in the provincial planning process for emergency response.

**MAYOR FOSTER:** I asked the chief to join us for precisely a question such as that.
Chief Weir.

FIRE CHIEF WEIR: For the record, Gord Weir. I'm the Fire Chief for the Municipality of Clarington.

We've been involved regularly with OPG and with the OFMEM in the planning. Myself and my counter in Pickering, we're involved with the CSA N1600 Standard and its update, so, yeah, we're heavily involved.

As Mayor Foster had indicated, we regularly plan an exercise with Darlington. At least we do it with Darlington, and I'm confident that Pickering does it also with the Pickering site as well.

MEMBER PENNEY: With respect to traffic management with respect to evacuation, is that provincial or does that fall under you, say, for your area?

FIRE CHIEF WEIR: Predominantly, I believe it's through DMO, the region, and the OFMEM who look after that aspect.

THE PRESIDENT: Can we get the transportation experts here? We hear so much about the lack of evacuation planning, the inability to evacuate. Can somebody shed some light as to what kind of studies were done, are they up to date, are they consistent with PNERP? What's the plan?

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

I'll do a brief introduction, and then I'll turn to my colleague, Nathalie Boyd, from the Ministry of Transportation.

The PNERP certainly includes considerable content around evacuation. It is one of our primary and preferred protective actions. Under our Order in Council 1157/2009, which I referenced earlier, the Ministry of Transportation does have the provincial lead for preparing for transportation emergencies. Within the PNERP, the master plan, it's section 7.5.2 that requires the Ministry of Transportation to be the lead for the development of measures for evacuation, and specifically transportation management around each of the nuclear facilities in Ontario, as well as for the Amherstburg area in southwestern Ontario.

What I'm going to do at this point is turn it over to Nathalie Boyd. She will provide you some specifics related to their efforts to develop evacuation plans, and the measures that are in place around the Pickering Nuclear Generating Station.

**MS BOYD:** Thank you. Nathalie Boyd with the Emergency Management Planning Office of the Ministry of Transportation for the province.
Currently, what we have in place is if there was an emergency that were to occur we would work closely with the joint traffic control centre, where OPP, Durham police and Toronto police, as well as ourselves, work together to evacuate the municipalities and communities around the Pickering Nuclear Generating Station.

There is a nuclear emergency evacuation and transportation management plan that was done by our central region office, who did detailed modelling and exercises to look at evacuations in that area. That is in place now. We can enact it. When traffic does get to our highways, that's when we would enact it.

I understand that the Durham Region also has an emergency response plan, and the City of Toronto, as well as the Pickering Nuclear Generating Station.

As Michael Morton mentioned, we are currently working on the provincial nuclear emergency response plan requirements to implement a provincial all hazards evacuation and transportation methodology. That's the overarching framework.

In addition, we'll be developing unified transportation management plans for all four nuclear generating sites, including Pickering.

We have engaged with our central region
office, traffic operations office, to work on developing a request for bid to hire a consultant to develop the methodology and to develop unified transportation management plans.

We will also be looking to utilize a similar approach used for the Pan Am and Parapan Am Games in 2015, the unified transportation coordination centre, to operationalize the unified transportation management plan for Pickering.

THE PRESIDENT: Just so I can understand, if something happened today, is there a plan today for an orderly evacuation? When will the study, the further study you're doing, be available?

MS BOYD: Currently, right now, like I said, we would work closely with the OPP, Durham police and Toronto police to evaluate the areas within Pickering.

With respect to the RFB, the request for bid to hire a consult, we are working closely to bring that consultant on board for the fall and have the work done, completed, within two years.

MEMBER VELSHI: While you're here, I had a question for Mayor Ryan.

Pickering, with its current licence, the units are expected to shut down in 2020. I wondered what involvement you've had in their transition planning if the
plant were to shut down given what a major player it is within your community?

MAYOR RYAN: For the record, Mayor Dave Ryan.

We've been involved with the plant executive and with OPG executives for the past decade, frankly, in conversations regarding the eventual closure of the plant, which we understand is an inevitability at a point in time. Our concerns were threefold.

First, for the employee base, we're satisfied with that, with the refurbishment of Darlington and the opportunities that that provides.

Second, for the supply chain, we have worked with the Organization of the Canadian Nuclear Industry, OCNI, and we are satisfied along with the work with OPG that the supply chain also remains intact, again, given the continuation of the operation of the Darlington plant and, indeed, through Bruce as well, there is a connection.

Our final consideration was for the assessment base because Mayor Foster has indicated the plants are a significant contributor to the overall economy of the municipalities and, particularly, to the tax base. And although we haven't had a final word on that, we have had assurances both from OPG and from successive provincial
governments that we will find ways to assure that the assessment base has not been negatively impacted.

And I think there are other opportunities as well as we look at the work with the NWMO, which I know is not part of this, but they have, indeed, identified the existing spent fuel currently being stored at the sites as a commodity as it moves into the deep geologic solution that they have with their adaptive phase management.

So, I think that, you know, if the plants are going to close, it is another opportunity to balance the assessment impact as we look at that commodity base.

MEMBER VELSHI: Thank you. And just what about all the community support that you're getting from Pickering, and is that transition going to be managed well?

MAYOR RYAN: You're talking about the general population. I feel very confident that the general population is confident with the plant.

We have grown up around the plant. I've often used the analogy that when the plant was commissioned over 40 years ago that we were a population of less than 20,000. Today we're a population of a hundred thousand, so obviously we moved here in the full knowledge and expectation of the plant operation. It has met our expectations.

We continue to grow and to thrive. We are
the fastest growing community east of Toronto and expect to
double our population here in Pickering over the next 20
years and, indeed, Durham Region as a whole is expecting to
nearly double its population over the same timeframe.

So, obviously our residents, and I personally am very comfortable with the NGS operating in
our community.

MEMBER VELSHI: Sorry, I didn't ask my
question correctly. I meant, the community support, you
know, that OPG provides. With the plant shutdown, does
that leave a big hole for the community?

MAYOR RYAN: OPG has been, again as Mayor
Foster referenced, a very strong community partner. I
would anticipate that OPG would continue to be that strong
community partner whether or not the plant is fully
operating.

THE PRESIDENT: So, again, I'm going to
ask every municipality who appear in front of us; are you
happy with the PNERP as the new PNERP and the
implementation plan for Durham and Pickering, because we
hear noises about lack of funding to actually implement
them.

I sure don't want to get into the politics
of this, but I am concerned if you haven't got enough
resources to implement the plan, then it's a concern of
MAYOR FOSTER:  Adrian Foster, for the record. The brief answer is, yes; the extended answer is depending on any conditions that are imposed on the re-licensing, the communities would be concerned with resources that might come from the community, as opposed to the operator, you know, and resources do have a direct relationship to, you know, our ability to respond and react.

So, we're happy with it, but we certainly have a view to the future that if we have additional responsibilities we will need help.

And I'll ask Mayor Ryan if he has anything to add to that.

THE PRESIDENT:  Well, the Office of the Fire Marshal. I know in your deck you were pointing out there were lack of resources earmarked for the enhancement of PNERP. Is there an issue? I'm trying to understand, was there no discussion about whether additional increment or resources would be to implement those plans?

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

There are a very large number of organizations that have a role within the Provincial Nuclear Emergency Response Plan. They are, of course, at
all levels of government, including municipal.

From our perspective the nuclear industry has a long history of supporting governments, and particularly local governments in providing them with financial and in kind resources to supplement their existing and required emergency management programs.

And certainly there is review and discussion at the Nuclear Emergency Management Coordinating Committee around enhancements within the 2017 plan. At this time we have no indication of specific concerns, understanding municipalities are still working to bring their plans fully in line with the PNERP passed in November.

And historically, any time that a resource gap or a concern has been raised, that's been discussed at the Coordinating Committee, industry has been engaged in those discussions and industry and the municipalities have come to agreement to ensure that resources are in place.

So, at this time I'm not aware of any specific resources that would be required in addition to what's been provided, but that said, I can't speak for individual municipalities.

THE PRESIDENT: OPG?

MR. LOCKWOOD: Randy Lockwood, for the record. First of all, I want to thank both Mayor Foster
and Mayor Ryan for coming here today and making an intervention.

And my first comment would be reference to, we should never compromise public safety and I'm here to assure both intervenors, Members of the Commission and the members of the public that we will never compromise nuclear safety; that's our top priority, to ensure that our operations protect the worker, the public and the environment.

That said, the discussion right now about the implementation plan associated with the Provincial Nuclear Emergency Plan, we're currently in discussions with the various members in the community to do just that with priority. Our first priority is to address proper implementation of the new PNERP.

THE PRESIDENT: Thank you.

Question? Dr. Demeter?

MEMBER DEMETER: Hi. Thank you for the intervention.

More for the PNERP discussion. I just wanted to reflect what I heard and see if I'm interpreting this properly from a transportation and an evacuation point of view.

For the detailed planning zone, what I heard is that there's a pre hoc formalized plan for
evacuation. For zones beyond that, including the contingency planning zone, there's a discussion that will be had with other agencies at the time, in fact, that there's a distinction between a pre hoc formalized evacuation plan and a, we don't have that yet, but we'll talk to the other agencies.

Is that what -- is that correct?

**MR. MORTON:** Mike Morton, for the record, with OFMEM. I'll provide a little bit more context on what we have today opposed to what's in progress, as well as some of the enhancements within the 2017 PNERP, and then turn to Natalie Boyd from Ministry of Transportation to provide any further specifics that she'd like to provide.

I want to assure the Commission and the public that we have historically, and continue to have strong evacuation plans for all of the detailed planning zones previously known as the primary zones, the 10-kilometre areas around each plant.

These were previously referred to as joint traffic control plans and they are partnerships of a wide variety of particularly provincial and municipal stakeholders originally historically focused on traffic management, so, our police forces of jurisdiction and the Ministry of Transportation.

One of the major enhancements that came
from the experience leading up to and during the Pan Am and Parapan Am games was the evolution of that concept to what we're calling the unified transportation management concept.

This is essentially an expansion of methodology where an increased number of stakeholders is formally engaged in the planning process.

So, for example, Transport Canada has been engaged in that because of their areas of federal transportation, other modes other than road transportation.

And a particular enhancement is the formal engagement of transit agencies, not just here in Durham as has been done for a long time, but the engagement of the broader provincial public transportation networks including transit agencies in other municipalities and with Metrolinx as a provincial agency.

Those entities now would meet in what we're calling the Unified Transportation Coordination Centre.

Basically they all join together, similar to how they would under the joint traffic concept historically, and they have a very high level of coordination within a set methodology that the Ontario government heavily invested in in the lead up to the Pan Am games in cooperation with partners like Durham and City of
And that methodology was developed based on the lessons of other major events, such as the London Olympics and some of the other Olympic events that have been held internationally.

The advantage of the Pan Am/Parapan Am games is that we were able to implement that centre and that concept for a real event and to have that centre operational for about a three-week period and to deal with various incidents and complications that arose as we look to manage a special event on top of the existing transportation grid.

To ensure further due diligence with respect to the viability of these evacuation plans, a couple of really key enhancements that we've put into the 2017 PNERP include a requirement for evacuation time estimate studies to be done.

So, first of all, in the plan -- and this is section 2.6.3 of the Pickering implementing plan, for those that want to cross-reference it, there is a new requirement for the development of these evacuation time estimates that is a very similar requirement to what exists in the new CSA N1600 standard for nuclear emergency management and these time estimate studies are required to be done by the municipal and industry stakeholders on a
regular basis and are required to take into account changing population numbers and census data.

So, a few years ago OPG contracted reputable consultants to carry out time estimate studies looking at a variety of scenarios for the detailed planning zone. It was found under what we would consider relatively worst case scenario, very snowy conditions in the Pickering planning zone, that that evacuation in its entirety could still be carried out in eight hours and 40 minutes. Under our worst case scenarios that Kathy was outlining, the first possibility of release would be about 11 hours and Fukushima was something like 28 hours.

So you know, having those studies and making sure this can be done effectively is important to us, and we feel the studies have shown that this methodology can do that.

**MEMBER DEMETER:** Eight hours to what boundary?

**MR. MORTON:** The eight-hour figure, eight hours and 40 minutes is for the detailed planning zone, the 10-kilometre zone. The Ministry of Transportation has its own advanced modelling. It's looked at traffic models, of course, across the GTA which is their job and, you know, we have the confidence that that could be done on a broader scale and that the mechanisms that have been established
historically and through Pan Am, there is coordination efforts. Of course, they are not specific just at that 10 kilometres, so they can be applied anywhere in Ontario where an evacuation is required.

**THE PRESIDENT:** But again, so somebody maybe -- is it true that the evacuation zone equivalent to the 10 kilometres here, in Switzerland it's 50; is that correct? Anybody know?

**MR. FRAPPIER:** Gerry Frappier, for the record. I'd ask Richard Tennant to comment on that, please.

**MR. TENNANT:** Richard Tennant, for the record.

My understanding is that's not true, but we'll look that up to confirm.

**THE PRESIDENT:** Thank you.

**MR. BURNS:** Dr. Binder, Scott Burns for the record, OPG.

I would just like to make a couple of comments on evacuation. So my former profession was with the police service and I was on the other side of the planning with the region of Durham. So I am aware that both on this side and that side of the equation, we all share the same priority with community safety and I know these plans have been in place for a number of years. So
we have evacuation plans in place.

Our emergency preparedness plans are scalable. So in this conversation, we get really tied into the zones, detailed planning zones as if it's some hard barrier, but the plans are scalable.

And as Mr. Morton expressed, we are talking about partnerships here that involve the Ontario Provincial Police force, Toronto police force; Durham regional police force. They have had partnerships and worked closely together on a number of operations, both in road safety and others. The close relationships know how to coordinate plans.

So they would look at evacuation of what needs to happen and they would not be restricted by a detailed planning boundary that would be in place and an appropriate level of evacuation would occur.

I do want to comment on the evacuation time estimate studies. We did one in 2015. It gave us a level of confidence about our ability to evacuate around the Pickering area and the Darlington area. The company that we've used also does the evacuation plans for over 60 of the nuclear facilities in the U.S., and I believe there's 65 of them, and I believe they do the plans for approximately 62 of the facilities in the U.S.

So we have high confidence in this company
that they are going to take care of our community's safety needs.

I just wanted to make a couple of those comments.

THE PRESIDENT: Thank you.
Questions?

MEMBER DEMETER: I think I understand now. I mean part of disaster or emergency planning is to plan for more than one type of disaster. So my assumption was that evacuation plans would be put in place for other municipalities, other jurisdictions based on other risks and other scenarios so that you could, in fact, piggyback on some of that work that had been done -- evacuation plans generically beyond your detailed planning zone.

But I appreciate the answer and the effort that's going into the work in progress, and I think I'm satisfied with the questions.

MEMBER BERUBE: So thanks a lot. I have been listening with great curiosity and trying to figure out what's going on.

The question I have is this. Basically I'm listening to a lot of planning which is basically strategic in nature. What I'm really curious about, do you have the tactical assets on the ground to implement these things at this point in time? Is there a gap in tactical
assets to be deployed? How do we get to people that basically can't move on their own?

All of these kind of things, the minutia of actually doing this. It's one thing to talk about it on a theoretical basis. It's quite another thing to do it on a real basis.

So the issue is have we actually got to that level of detail where we have actually looked at even a small community and said we've got 10,000 people here. We're going to have to physically go and move 1,000 of them, or something like that. Do we have the assets to actually get that done?

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

There are a number of other people in the room and on the line with me who wish to comment.

But just to set a little bit of general context first, the PNERP master plan is, as you say, the overall policy framework and standard for nuclear emergency management in Ontario. It is supported by seven other plans that we consider as implementing plans under the PNERP, including the plan for the Pickering nuclear station which was just updated in March of 2018. It is the most recent iteration, so it gets into more specific local details.
But then where you get very particular implementing detail is in the local municipal plans, as well as in the ministry-specific plans that cover everything from radiation monitoring right up to, as Natalie Boyd said, the details of how evacuation would be carried out.

So I would suggest that perhaps Natalie would like to talk just a little bit more about the local planning committees and how those plans are made. Chief Weir may want to talk a little bit about local implementation.

There is also substantial resources at the provincial level and federal levels, including chemical, biological, radiological nuclear response teams, both within our Ontario system and maintained by our office, in partnership with fire departments such as Toronto and Ottawa and, of course, Health Canada, and other departments of the federal government maintain very robust specialized radiological response both for interventions but also for monitoring.

Again, I think there are certainly people in the room that would like to speak a little bit to their local capabilities implementation.

I'll pass over to Natalie from a provincial perspective to evacuation and then others may
want to jump in after that.

**MS BOYD:** Natalie Boyd, Ministry of Transportation.

I just want to clarify that we do, as mentioned earlier is that the ministry does have a nuclear emergency evacuation traffic management plan that was created in 2016. A situation office did do the initial modelling and looking at different scenarios, weather events, and so forth. That plan can be implemented on our highways. Once that traffic gets vetted to our highways we can implement that plan today.

As we move forward to implement and develop the unified transportation management plan for the Pickering area, we will be working with a nuclear emergency management coordination committee, the subcommittee for transportation management, to work with the local municipalities and other stakeholders to develop -- to ensure that the municipal plans for evacuation for traffic flow coordinates with our plan as well, as we move forward to ensure that we meet the requirements under the PNERP.

**MR. LEBLANC:** Ms Boyd, just for the interpreters if you can just slow down a little bit? I think they are having difficulty following.

**MS BOYD:** My apologies, sorry.

**MR. LEBLANC:** Thank you.
MS BOYD: Should I repeat that? Okay, we're good. Okay.

MR. JAMMAL: Mr. President, it's Ramzi Jammal, for the record.

You asked with respect to the comparison to the Swiss. It's very important to note that at the Convention of Nuclear Safety there was a component that the contracting parties have to present on the emergency planning in the context of the IAEA requirement on zones, Zone 1 or Zone 2.

But I'll ask Ms Kathleen Heppell-Masys to give you the equivalency. She will read it on the record that Zone 1 in Switzerland and their legal treaty element is almost equivalent to the Canadian under the CNS, 3 to 5 kilometres, and then they go to Zone 2 which is up to 2 kilometres. But Ms Kathleen Heppell-Masys will provide you with the wording associated with the Swiss.

So international benchmarking, I think it was Dr. Demeter who asked or someone asked. We are all equivalent with respect to the zoning within the range of 3 to 5 kilometres.

MS HEPPELL-MASYS: Kathleen Heppell-Masys, Director General, Security and Safeguards at the CNSC.

So to elaborate a little bit on what Mr. Jammal has just mentioned, as was stated at the Convention
of Nuclear Safety, Zone 1 in a Switzerland context, is the area around an NPP in which there could be acute dangers in the public, in the event of an accident and for which immediately protective measures are required. Depending on the NPP power reading and the exhaust height and site, Zone 1 covers a radius of about 3 to 5 kilometres. That is Zone 1.

Zone 2 joins Zone 1 and encloses an area with an outer radius of about 20 kilometres. The public can be alerted, individual sectors as appropriate.

So that's the context for -- the basis for planning and preparation for a specific measure called planning areas as have been defined.

I would just -- perhaps I could elaborate that we have done benchmarking, elaborate benchmarking at CNSC, and we've taken at look at German, Sweden and also the IEA recommendations, and it is the range of the zoning that have been alluded to this morning is fitting within the IEA range.

As well, it should be noted that the IEA recommendations developed are based -- most of them are based on the light water reactors and are meant to be used as a first approximation of zone sizes. Just I brought that to the record.

Thank you.
MR. JAMMAL: If you allow me, Mr. President, I want to precisely focus on one phrase that was mentioned on the record by Kathleen.

The key point here is the Swiss takes into consideration the design and the technology of the reactor. That's the key point. That's why they have the range to fire. It says "depending on the technology" because they have multiple technologies.

In Canada, as was mentioned by the Office of the Fire Marshal, it's a CANDU-specific design. We do not have a hybrid technology. So we really know the source term and we know the offsite consequences with respect to radiological consequences.

So that's the key point here is the Swiss have multiple types of technologies; in Canada we have a single technology. It’s called the CANDU.

THE PRESIDENT: Thank you.

Go ahead.

MEMBER PENNEY: I have another question for the MOT. And my apologies for interrupting you.

The Unified Transportation Plan, can you talk a little bit about that? I understand there are plans that exist since 2016 and then there’s more plans being developed.

If you could talk a little bit about that,
I would appreciate it.

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

Just to reiterate some of what I said earlier, we want to assure that we have longstanding plans in place that are specific to each nuclear facility to be able to carry out an evacuation of the ten-kilometre detailed planning zone.

And as we’ve noted, the methodologies that we use are able to be applied to any sort of evacuation. So they could easily be expanded beyond that ten-kilometre zone if necessary.

In fact, if we take the Parapan Am Games as an example, when we operated a Centre over multiple weeks, that was an event that spanned the entire Golden Horseshoe. And the Centre was co-ordinating with police services of jurisdiction, local transportation departments and public transportation across the entire Golden Horseshoe area of more than 8 million people over a sustained period.

Each of the areas around the nuclear facilities, though, have over really the last couple of decades had committees, the Joint Traffic Co-Ordinating Committees, that have worked on those detailed plans.

And as the representative from OPG
indicated who had been previously with the Durham Regional Police Service, they have that history of meeting regularly to develop these detailed plans, working with the applicable Ministry of Transportation, regions as they call them, and with the Emergency Management authorities to make sure that those plans are in place.

And they are very specific and detailed plans. They are publicly available.

And I think perhaps most importantly the time estimate studies take those plans into consideration. They take the existing transportation networks into consideration. They use advance computer models to actually simulate what would happen under those plans if an evacuation order was given and they are able to time under different conditions based on real life data, not just what MTO collects. But as was indicated, across North America the company that did these, KLD, has done over 60 different zones around nuclear plants and modelled those.

And the numbers that we gave from the 2015 study -- and again OPG has a wide range of these numbers that they could update on in more specificity -- we look more at the worst case. We look under bad conditions, under snowy conditions, under day-time traffic conditions, how long would it take people to get out.

And we are comfortable that the numbers in
that are well below the earliest potentiality for a release, even under our planning basis scenario.

MEMBER PENNEY: Thanks for that. I had to ask my colleague here what the Golden Triangle is, but I’ve got it now. Or the Horseshoe. Thank you.

THE PRESIDENT: Okay. Nothing else?

MR. LOCKWOOD: Randy Lockwood, for the record, President Binder.

In support of our commitment five, transparency and engagement with the public, I would just like to make the Commission aware that the evacuation time estimate that we spoke about earlier is posted. That entire thing is on our website.

MEMBER VELSHI: How frequently are these evacuation time studies done or when are you planning on doing the next one?

MR. LOCKWOOD: Randy Lockwood, for the record.

I will ask Scott Burns to speak to your question.

MR. BURNS: Scott Burns, for the record.

We are currently updating the plan as we speak and we do it as we receive new census data.

I would like to just say that although we do it when we receive the new census data, also the plans
look out ten years from that point. So the 2015 plan was looking out to 2025 projected populations.

**THE PRESIDENT:** Okay, thank you.

Any final thoughts?

**MR. FOSTER:** Adrian Foster, for the record.

A couple of final thoughts.

One is, I think as we’ve heard through this dialogue, that there aren’t static plans; you know, that these are evolving plans, which is important because we do not live in a static community.

And that is part of the confidence that the communities have in OPG and the operations on the plants, where we see things like post-Fukushima actions being taken, interoperable communications systems that didn’t exist but do now and should exist, and again the ongoing studies that are going on as well with the evacuation planning.

Something that was put in place ten years ago needs to be updated on a regular basis and we’re hearing that.

So I think the communities living and seeing these activities again generate that confidence.

To the earlier comments on resources to the municipalities, OPG has never shirked those
responsibilities and I can’t imagine they would in the future.

I will leave slightly off topic, Mr. President.

This is probably the last time that I will be in front of you in a formal fashion. Both Mayor Ryan and myself, and as a matter of fact all of the communities that form part of CANHC, would like to thank you for your interest, would like to thank you for the time that you have given us and would like to thank you for the service to our communities and to the nation as a whole.

THE PRESIDENT: Thank you very much. I think before the break we have one more intervention.

The next presentation is by the Mohawks of the Bay of Quinte, as outlined in CMD 18-H6.141. I understand that Mr. Shipley is coming through a teleconference.

Mr. Shipley can you hear us?

MR. SHIPLEY: Yes, I can.

THE PRESIDENT: Please proceed.
CMD 18-H6.141
Oral Presentation by
Mohawks of the Bay of Quinte

MR. SHIPLEY: Okay. Can you hear me okay?

THE PRESIDENT: Yes, we can.

MR. SHIPLEY: I am with XCG Consulting Ltd. We were hired by the Mohawks of the Bay of Quinte so I’m making this presentation on behalf of the Mohawks of the Bay of Quinte.

First of all, I would like to thank the CNSC for the funding provided under the Participant Funding Program. It was helpful to my client to be able to hire us to look at the technical details of this licence renewal application.

The Mohawks of the Bay of Quinte is a community located -- it’s a First Nations community -- on the north shore of the Bay of Quinte. It’s about 160 kilometres east of the Pickering Nuclear Generating Station.

It was important to the Mohawks of the Bay of Quinte to participate in this process because protection of the natural environment is a very high priority for the Mohawks. In the letter that we provided there is an Environmental Mission Statement from MBQ that you can read
that outlines the importance of the natural environment.

We looked at the Pickering Nuclear Generating Station and the licence renewal application from the point of view of how it could potentially impact the environment and human health of the Mohawks of the Bay of Quinte and its traditional lands.

So in preparing this we reviewed a number of documents that are outlined in Section 2.1 of my letter. So I would like to go through and sort of talk about the main points.

We got some feedback from the community, and the feedback we received had to do with the fishing, traditional fishing, and traditional harvesting. The community harvest salmon from the Lake Ontario and Shelter Valley areas and they also harvest crappie and wild rice from Rice Lake.

Now there are a number of areas where some concerns came to light. One of them is the aging infrastructure of the Pickering Nuclear Generating Station. The facility dates from between 1971 and 1985 when the various units came into effect. One of the concerns is that there is a plan to increase the effective full power hours of some of the units to 295,000.

We couldn’t find anywhere in the literature indicating where a CANDU reactor has previously
undergone this kind of an increase in its service requirements, and we are concerned with the aging infrastructure that there could be problems arising from the increase in the effective full power hours of these units.

Under the category of Nuclear Waste Management the Pickering waste management facility operates on the site. It stores low level radioactive waste. And there’s a concern that the Mohawks have, primarily relating to when this waste is moved from one place to another. If it’s moved in the future after the closure of the facility, how could that affect the Tyendinaga Mohawk Community where the Mohawks of the Bay of Quinte live?

The concern is that the transport either by Highway 401 or by the rail line or even along Lake Ontario through the waterways, any spill or incident that occurs could affect the Mohawks of the Bay of Quinte, and they would like to be notified in the event of any kind of transportation of that type. They’d also like to discourage any transportation of waste by rail or by waterways past the community.

Under the category of radiological and atmospheric releases, we reviewed the information provided to support the renewal application. We sat that in 2016 OPG had exceeded the effluent radiological liquid release
action level for gross beta.

There was supposed to be some follow-up on this, but it’s now two years later and we weren’t able to find any information on the follow-up to that incident. We think that, because of this renewal application it’s important to have completed that follow-up and to provide information on that.

There was also a heavy water release at Unit 7, which was contained to within the reactor building in November 2014. This type of event is a concern. It appears, from what we reviewed, that this type of event occurs approximately one to two times a year, which means for the upcoming 10-year period of the renewed operation you could have 10 to 20 similar events.

All of these are concerns in that they could potentially impact the Mohawks of the Bay of Quinte and their livelihood.

Sorry, I heard a sound there. Can you still hear me?

THE PRESIDENT: Yes, we can. Have you finished?

MR. SHIPLEY: No. No, I’m sorry, I just heard a sound and I thought I got cut off.

THE PRESIDENT: Okay, go ahead.

MR. SHIPLEY: So under environmental
spills -- and I believe I have about three minutes left, is that right?

THE PRESIDENT: Yes.

MR. SHIPLEY: Okay. Under environmental spills, we looked at the period from 2013 to 2017. There were 12 spills that occurred during that time of materials ranging from oil, sewage, hydraulic fluid, ethylene glycol, sodium hypochlorite.

These were not major spills, but the fact that so many spills occurred over that period indicates the potential for spills and the potential for possibly a major event, a major spill that could affect the Tyendinaga Mohawk Territory. The Mohawks of the Bay of Quinte have a concern about the aging infrastructure and the spills that, you know, potentially worse spills could occur and affect the community.

Under water cooling and fish impingement, we’re aware that there’s a thermal plume that’s permeated, occupying an area of 1.5 to 8 square kilometres. We saw that there was an event that occurred at one station in 2011/2012 that was above the 10 per cent threshold for no effect on round whitefish embryo survival. We’re concerned about this event.

We’re also concerned about the chemical usage in the water intake infrastructure, sodium
hypochlorite, hydrazine, ammonia, morpholine, and the potential impacts of these chemicals if they’re released on the fishery, because the Mohawks of the Bay of Quinte depend on that fishery for their livelihood.

Under the topic of seismic events, floods, high winds, the primary point to be made there is that this is an older facility. The information about its ability to withstand flooding, earthquakes, tornados and so on has not been released. At least we couldn’t find detailed information on its ability to withstand these types of events.

So we’re concerned that with an older aging infrastructure how can the Mohawks of the Bay of Quinte and the public be confident that such an older facility is capable of withstanding such events?

With that, I believe I’ve covered the main points. They’re summarized again in Section 7 of our letter. With that, I’ll end my presentation and turn it back to the Commission.

**THE PRESIDENT:** Okay, thank you.

Questions? Go ahead.

**MEMBER LACROIX:** Thank you, Mr. President.

Mr. Shipley, first and foremost I’d like to thank you for submitting such a well-documented submission. It’s well-laid out, the information is clear,
concise, precise, easy to read, easy to understand. So thank you very much for making my job much easier.

Second, you’ve raised this concern in your presentation and you also mention it in your submission. It’s on page 5, Section 6.3, second paragraph. It says that one month in 2016 OPG exceeded the effluent radiological liquid release action level for gross beta.

You understand that environmental action levels are 10 per cent -- and so on.

CNSC have indicated that they will be following up with OPG.

Staff, could you tell me what this event is all about, and is there a follow-up?

MR. FRAPPIER: Gerry Frappier, for the record. Yes, I’d ask Kiza Sauvé to comment on that.

MS SAUVÉ: Kiza Sauvé, I’m the Director of the Health Science and Environmental Compliance Division.

So this event from 2016, CNSC Staff did follow-up with OPG and OPG did follow-up with CNSC Staff, and the results of the investigation was that cesium-137 was found within the effluent, and which is actually coming from the lake and not from the reactor itself.

So, as Mr. Rinker mentioned yesterday, there’s still effects from nuclear fallout from the 1960s. So with this action level exceedance OPG took the correct
actions, they did an investigation, there were documents that went back and forth between the CNSC Staff, and the event is now closed.

**MEMBER LACROIX:** Thank you.

**THE PRESIDENT:** Ms Penney?

**MEMBER PENNEY:** Thank you, Mr. Shipley. I had a question, it’s looking at your written document, Section 7, Summary of Key Findings, number 6. You talk about the unplanned releases, spills and action level exceedences that have occurred at the Pickering Nuclear Generating Station would not have been expected to impact the Bay of Quinte.

However, you go on to request that there’s notification to the Mohawks of the Bay of Quinte if there is a potential for it to impact them in their territory.

So my question is to the CNSC around reporting and notification requirements. If you could clarify? Thanks.

**MR. FRAPPIER:** Gerry Frappier, for the record. So certainly, as mentioned, a lot of these spills are extremely small, because there’s a very tight requirement with respect to reporting to the CNSC for any kind of spills of any kind of material.

There’s also a requirement for any of these incidences to be posted. So there’s a communications
dimension to this that requires that both CNSC and the licensee, OPG, post all of these on their associated website.

**MEMBER PENNEY:** So, just to clarify, if there is an exceedance, it’s posted on the CNSC website and it’s also posted on OPG’s website?

**MR. FRAPPIER:** Gerry Frappier, for the record. So sometimes what we’ll post is just a link to the OPG one but, yes, that’s the case.

**MEMBER PENNEY:** Just to clarify, is there ever any direct notification of stakeholders?

**MR. FRAPPIER:** Gerry Frappier, for the record. So our communications team do have an ability to push out, as it’s called, the information. It’s not always done. That would be to all the people who subscribe to the CNSC information. I’m not sure these days whether it’s a tweet or whether it’s an email. I can ask our communications person to give you a bit more detail on that.

But as far as specific notifications, no, that wouldn’t normally be done.

**MEMBER PENNEY:** So there is a mechanism to receive notification that’s automated?

**MR. FRAPPIER:** Gerry Frappier, for the record. Maybe I’ll ask Megan Gerrish to explain how that
works, how you become part of the group of people who would receive the push-out information from the CNSC.

**MS SAUVÉ:** Before Megan does, this is Kiza Sauvé, for the record. I just want to make a clarification. That within Ontario and in Canada there are different category levels of spills. So there’s a Category A, Category B and Category C. So all the spills mentioned in this intervention are a Category C spill, and those wouldn’t have been posted on our website as they’re not -- there’s no impact on the environment or people.

OPG does report to the Ministry of Environment and Climate Change, which there’s a Spills Action Centre, so Environment and Climate Change Canada also gets notified. CNSC has a memorandum of understanding with Environment and Climate Change Canada, and we also share information anytime either one of us has a report of a spill at a nuclear facility. So there is that sharing of information.

Anything that is of a larger category that might have an impact on environment or people, those are the ones that would be posted.

I’ll pass it to Megan to talk about how those notifications would occur.

**MS GERRISH:** Thank you, Kiza. Megan Gerrish, for the record. I’m a Senior Communications
advisor with the CNSC.

There are various notifications that go around, and OPG and the CNSC would communicate back and forth in terms of if something is relevant to the public or their stakeholders. This can go out through a variety of methods, including through social media, which is the fastest.

They are posted to the website and OPG does post quarterly event reports, and we will post the event on our website as well. We can, as was stated earlier by Mr. Frappier, push these out to subscribers through our latest news, and it can take prominence on our website if it does in fact impact public safety.

MR. LOCKWOOD: Randy Lockwood, for the record.

I would just like to point out that it speaks to again our commitment drive about transparency and engagement with the public. As already stated, Category C, very low significance. What I will share with the Commission, we wanted -- or I wanted all these included in our CMD. It speaks to our drive for continuous improvement and being open and transparent.

MS SAUVÉ: Kiza Sauvé, for the record.

Similarly, CNSC posts all the events, including Category C spills, in the Regulatory Oversight
Report that goes annually to the Commission in our effort to be transparent.

THE PRESIDENT: And is there any of your environmental monitoring that you post that would be of interest to the intervenor?

MS SAUVÉ: Kiza Sauvé, for the record.

So CNSC's Independent Environmental Monitoring Program does have a part of it where we communicate with indigenous communities. So in particular the Mohawks of the Bay of Quinte would have recently received a letter noting that we are planning to do independent environmental monitoring at Pickering in 2019. So we are reaching out early to indigenous groups to get them involved to see how we can make our sampling program meaningful. Through that communication we also offer opportunities to meet and discuss previous results and help explain what our results mean and can be more meaningful to them.

MR. LOCKWOOD: Randy Lockwood, for the record. Maybe it would be appropriate for us to call Kenn Ross and speak about our relationship and our discussion with the Mohawks of the Bay of Quinte.

MR. ROSS: Kenn Ross, for the record, Indigenous Relations with OPG.

We do engage regularly with the Mohawks of
the Bay of Quinte. This averages twice a year with in-person meetings either in their territory in Tyendinaga or at Pickering. Just as an example, last August we conducted a tour of our fish diversion system with representatives of the environmental office for the Mohawks of the Bay of Quinte. At these meetings we typically discuss plant operations, environmental reporting and discuss any concerns that they have.

**MR. FRAPPIER:** Gerry Frappier, for the record.

Perhaps I will take this opportunity to also mention that the CNSC has a deep relationship with the Mohawks as well, not just because of the Pickering facility but there are other facilities that are of interest to the Mohawks that we regulate.

I would ask Clare Cattrysse if she could provide a bit more information on our interaction with the Mohawks.

--- Pause

**MR. FRAPPIER:** We can't hear you, Clare, I think your microphone is not on.

**MS CATTRYSSE:** Can you hear now?

**THE PRESIDENT:** Yes, go ahead.

**MS CATTRYSSE:** Thank you.

Clare Cattrysse, Director of the Policy
Aboriginal International Relations Division.

Yes, at CNSC we have been reaching out over the years with all indigenous groups that we have nuclear facilities that we are regulating in the indigenous territories. We are hoping -- we are moving forward now to do something a little bit more formalized with communities and we will definitely be offering with the Mohawks as we are moving ahead to maybe do something similar to what OPG has been doing as much more sort of a formalized regularized engagement on a regular basis where we can talk for example about the Independent Environmental Monitoring Program, discuss a number of the issues that have come up in this intervention, and it would be a great opportunity to meet with representatives of the community about the life, the issues and traditional uses that are taking place around not just Pickering but also other nuclear facilities that are in their territory and in their proximity. So we will definitely be reaching out in the near future to see if there is an interest in that. Thank you.

MEMBER VELSHI: I will start with OPG and then maybe staff can comment as well. So the Mohawks of the Bay of Quinte is the only indigenous group that has made an intervention for this proceeding. So, as Commission Members, you know, one doesn't know what one concludes from that. Does that mean the others are
satisfied with the relationship and your submission? So maybe you can put some light on that and maybe staff can comment why we haven't heard from anyone else either in support or with concerns.

**MR. ROSS:** Kenn Ross, for the record.

We do also engage regularly with the Williams Treaties First Nations. Four of their communities are proximate to both Darlington and Pickering nuclear generating stations. Those meetings occur at least on a quarterly basis and again we cover the same territory of plant operations, environmental studies, offers to participate in our own programs for monitoring. And for instance, just the highlight of that was a tour of the Pickering Waste Facility in January of 2016. So again, meetings that are meant to illustrate our transparency and openness and to take in any information and respond to any concerns that they have.

At the same time there is also the Métis Nation of Ontario. They have a community organization known as Region 8 that stretches from Durham all the way over to Guelph and we also meet with representatives of that community council again to go over exactly the same issues and concerns.

In terms of choosing not to participate, I would like to believe that is because we are robust and
regular in our communications, but they certainly have been informed and I have not received any personal feedback indicating dissatisfaction with our level of engagement.

**MEMBER VELSHI:** I want to make sure it's not from lack of resources or, you know, capacities, travelling, that's preventing them from participating and have you confirmed that that is indeed not the case?

**MR. ROSS:** Resources, I'm aware, have been made. I know from discussing with contacts at both Williams Treaties First Nations of MNO8 that there are a number of different projects that they are engaged in. Williams Treaties in particular have a number of projects going through their territory that do put demands on the resources that are available, so the VIA Rail link for instance for high-speed trains, the 407, et cetera. So in terms of stretching of their resources, I think it's the multitude of projects that they have to consult on that they have to prioritize.

**MR. FRAPPIER:** Gerry Frappier, for the record.

I will pass it to Clare Cattrysse in a minute, but certainly from our perspective, as in the case of the Mohawks of the Bay of Quinte, we do offer participant funding, as you know, and that would have been available if they had applied earlier.
I would ask Clare Cattrysse if she could comment on some of the other aboriginal groups.

**MS CATTRYSSE:** Hello. Clare Cattrysse, Director of the Policy Aboriginal International Relations Division at CNSC. Maybe I will just give a little bit of background because it is a very good question.

So we did meet with the Mississaugas of the New Credit First Nation and they explained to us that they would actually like to just stand back and let the Williams Treaties First Nations be the people to talk about what is taking place in their territories. Then we did meet with the Williams Treaties First Nations with OPG in September and also in November we met with them and we also offered the Participant Funding Program. The CNSC did give funding to Scugog First Nation to participate. They were going to intervene. So there was capacity funding given. However, they phoned and regretted that they could not intervene as they were in the middle of negotiations regarding treaties with the Crown. So they are still definitely going to be engaging with us in the future. We have discussed meeting on a much more regularized basis and we will continue to do so. And again, most of the interests there have been just about learning more about the activities taking place and what's taking place at the site and to learn more about our Independent Environmental
Monitoring Program.

And the Métis Nation of Ontario, we also have met with them and offered them participant funding. At this point in time their interests tend to be more around other facilities and it was their choice not to intervene and participate for this particular facility.

And obviously the Mohawks of the Bay of Quinte who are on the phone right now, we did offer and they have utilized, as they mentioned, the participant funding for their intervention. Thank you.

THE PRESIDENT: Thank you.

MR. LOCKWOOD: Randy Lockwood, for the record.

I would like to say thank you very much for the Mohawks of the Bay of Quinte for making this intervention. That said, I see that as OPG we have to do additional follow-up based on my reading of their intervention to provide additional clarification as there are several items.

One item that really sticks out for me and has all along is their concern that we share around the environment, particularly the fish. And we did consult, as the Commission knows, in our search to receive a fish authorization from DFO and maybe I will ask Raphael to speak a little bit about that discussion. Raphael...?
MR. McCALLA: Raphael McCalla, for the record.

So, as Mr. Lockwood just mentioned, in the execution of our application for a Fisheries Act authorization for the Pickering facility, OPG actually went and engaged a number of the indigenous communities to make them aware of our application, the offsets that we were putting in place to address the impacts from the station. It also gave them an opportunity to provide feedback to us with whether or not they were supportive of the approach that we were taking. All of this information was submitted as part of the application to Fisheries and Oceans Canada in order to obtain the authorization.

We continue to use the regular meetings that are held with these indigenous groups to provide more and more information with respect to the operation of our facility. I will also comment that we did make an offer to hold stakeholder sessions with a number of these communities and where they were receptive to that we met with them as well.

THE PRESIDENT: Thank you.

Ms Penney...?

MEMBER PENNEY: Thank you for that. With respect to the DFO authorization, I think DFO is in the room and I had a question for them about the follow-up
monitoring program.

--- Pause

**MEMBER PENNEY:** Perfect. Thanks very much for being available. So I understand that the authorization has been issued and I would just like you to explain, because it is of interest to many of the intervenors' interventions that we have read, how the follow-up monitoring program works, the requirement for submissions to you. And then maybe OPG, you could add something to that.

**MS THOMAS:** Jennifer Thomas with Department of Fisheries and Oceans, Manager of Regulatory Review.

So with respect to the *Fisheries Act* authorization, one of the common requirements is to have annual monitoring. So OPG is required to report to us on an annual basis, both on the effectiveness of their mitigation measures, so the net that they put in place, as well as their offsetting plan. So they report to us and they provide reports and we would review those and provide comments back to them.

**MEMBER PENNEY:** In the course of the negotiation or the process that happened there was First Nations consultation, there was indigenous consultation by DFO?
MS THOMAS: Yes. Jennifer Thomas, for the record.

Yes, that is correct. We did meet with first Nations communities. We didn't have a lot of interest, I think simply because Ontario Power Generation and CNSC did quite a bit of consultation.

MEMBER PENNEY: OPG and then CNSC staff of course.

MR. McCALLA: Raphael McCalla, for the record.

So as was mentioned, OPG received a Fisheries Act authorization in January of this year. I will say that OPG actually has two authorizations. We have an authorization for our Darlington facility as well as the Pickering facility.

There are a number of conditions that are built into the authorization, as was just mentioned. We are required to report out annually with respect to the level of impacts that we are having and there are actually thresholds built into the authorization, which if they are exceeded would require us to sit with Fisheries and Oceans Canada as well as the CNSC to look at additional opportunities. There are requirements for us to do entrainment studies to support the data that was utilized in support of our application and there are conditions
around for instance the offset itself. And I will say that that was probably the most significant part of our application in that what was requested of OPG in terms of demonstrating that the offset was productive was leading edge technology in the sense that there wasn't any methodology in place to demonstrate that, so OPG actually met and worked with Fisheries and Oceans Canada as well as the academic community to develop appropriate methodology to demonstrate that we could show that the offset is being productive.

So we look forward to continue this work. As I said, I don't believe anyone else is doing this work at this particular time, but this is work that will benefit not only OPG but the industry as well with respect to understanding how to compare your actual impacts to the production that you are offering.

**MEMBER PENNEY:** And just remind me -- thanks for that -- what is the offset that you are doing?

**MR. McCALLA:** Raphael McCalla, for the record.

So the offset that we are doing, there are two components -- well, three components to the offset. So we have offered up hectares in the Bay of Quinte where we have restored a wetland at Big Island, as well as work nearer to the station in Duffin Creek. We are also
restoring that area to provide additional offset. And finally, we spoke yesterday about the Bring Back the Salmon partnership with the Ontario Federation of Anglers and Hunters, where that is also one of the components that we are actually offering up as well for the impacts from the station.

**MEMBER PENNEY:** Thank you.

CNSC staff...?

**MR. FRAPPIER:** Gerry Frappier, for the record.

So certainly as part of our compliance program we are also looking at environmental, as you know, including the different monitoring that we do.

I would ask Kiza Sauvé to give us a bit more information as to how it interacts with the fishing authorization.

**MS SAUVÉ:** Kiza Sauvé, for the record.

So since the fish diversion system, the barrier net has been in place since 2009, OPG has been reporting on the effectiveness of the barrier net and that has been a requirement of the Licence Condition Handbook. CNSC staff review that report and provide their review and recommendations to DFO as well.

Since the authorization is in place as of January under a Memorandum of Understanding with DFO, CNSC
staff will be performing compliance on the authorization and providing the results of the compliance to DFO and we will be doing that compliance both in the station as well as at the offsetting projects as best we can and we will work with DFO on that. One of the discussions we have had with DFO is access to the plant can be difficult I guess for DFO, so CNSC staff has that access and can do that compliance program.

**THE PRESIDENT:** Is the annual compliance report public or posted?

**MS THOMAS:** Jennifer Thomas, Fisheries and Oceans, for the record.

DFO's reports that they receive from OPG would not be posted on the Internet at this time.

**THE PRESIDENT:** Is there a particular reason? Is there any sensitive information in there? After all, we know what the authorization is. Presumably any exceedance would become public. So what's the problem with releasing the annual report?

**MS THOMAS:** Jennifer Thomas, Fisheries and Oceans, for the record.

There is no problem with making it public. DFO just doesn't have a vehicle to make that public at this time. With the *Fisheries Act* changing and a public registry likely coming into effect, that will likely
MEMBER PENNEY: Does OPG make these annual reports public?

THE PRESIDENT: Well, CNSC, you were going to say something about this?

MS SAUVÉ: Kiza Sauvé, for the record.

So the results of these reports do go into our Regulatory Oversight Report, not the actual report, but we do report on the barrier net and going forward we will report on the Fisheries Act authorization.

THE PRESIDENT: I know, but some people ask for the actual report. I'm just curious to know what's so sensitive about it. Anyhow, you may want to think about it. You often claim willing to be proactive in disclosure, that could be something on your list.

MR. LOCKWOOD: All right. Randy Lockwood, for the record.

Not often claimed, actually true and definitely thinking about that, Mr. President Binder. We have just consulted with an Environmental Director. I see really no reason why that information is not posted. He has advised me that we do and I have read -- of course we send that information to the CNSC. The CNSC has asked if they could disperse that, we have said yes, I really see no reason why not.
THE PRESIDENT: Okay. Thank you. Anybody else? We are going to take a break. You are standing between us and the break.

MR. GREGORIS: President Binder...?

THE PRESIDENT: Go ahead.

MR. GREGORIS: Steve Gregoris, Deputy Site Vice President Pickering.

There is one item I would like to speak to and it's a correction in this intervention that's important for us to make. It is on page 5. It refers to a Unit 7 event in November of 2014 where a station emergency was declared and it also talks about that event being a regular type of event, that station emergencies are declared on a regular basis one to two times a year.

So first, I would like to correct the intervention by saying that that is not a likely or common occurrence, that kind of event on Unit 7, it is very unlikely. Station emergencies are not regularly declared at the station. So in the last licensing period, so over the last five years we have declared two station emergencies over those five years, not one to two per year as stated.

I would also like to point out that station emergencies are not declared only for radiological type of incidents. Most commonly they are proactively
declared to protect people from different kinds of hazards, to move people away from those hazards in a fashion because that method of communication is much quicker than normal communication methods within the station and that is typically the case for declaring station emergencies at the site.

THE PRESIDENT: So, Mr. Shipley, you have the final word.

MR. SHIPLEY: Yes. I just wanted to follow up on one point. It was mentioned that there was an investigation done into the 2016 radiological release and that the matter was now closed. I'm wondering if that information on how that was done and whether there was any corrective action put in place, whether there is any follow-up, whether there is any improvements made, is that information in the public realm at all?

THE PRESIDENT: Staff...? Does anybody recall?

DR. VIKTOROV: It's Alex Viktorov, for the record.

Yes, there was an action item initiated to follow up on this event and CNSC staff requested OPG investigate many possible ways that led to a particular exceedance of the releases. So the investigation was done to the satisfaction of CNSC staff and we do believe that
the origin of the release was not of the station but heat from the environment. The current status is that we request OPG to keep monitoring if any similar incident would occur.

THE PRESIDENT: But was this report available anywhere or is it in the public domain? I think that was the question.

DR. VIKTOROV: The report is available, but it's not within the public domain.

THE PRESIDENT: Okay.

MR. JAMMAL: It's Ramzi Jammal, for the record. There is a difference between posting and providing information. So anything that the intervenors requested were provided to them. So we will take into consideration what you just mentioned, but again, information is available upon request. As we just mentioned with respect to the report of the fish, we report it in the ROR. If the intervenor requests the information we will provide it to them. On action items, again, we report the issues in the ROR and information is available. But we will take into consideration if it needs to be posted or not. But again, we take risk-informed decision-making in consideration. Anything of significance is posted and pushed out, and anything of a low risk we report in the ROR and it is available upon request.
THE PRESIDENT: Okay. But Mr. Shipley asked for it and so just contact him and see if he can get a copy of the report.

MR. FRAPPIER: Gerry Frappier, for the record. We will do that.

THE PRESIDENT: Okay. We are going to take a break for -- we are going to be back at five to 10:00 -- five to 11:00, sorry. I just echo what I'm told.

--- Laughter / Rires

--- Upon recessing at 10:37 a.m. /

Suspension à 10 h 37

--- Upon resuming at 10:58 a.m. /

Reprise à 10 h 58

THE PRESIDENT: The next presentation is by Mr. O'Toole, MP for Durham, as outlined in CMD 18-H6.74.

Mr. O'Toole, the floor is yours.

CMD 18-H6.74

Oral presentation by the Honourable Erin O'Toole

HON. O'TOOLE: Thank you very much, Mr. President, and thank you very much to the Members of the Commission for allowing me the opportunity to speak today.

My name is Erin O'Toole. I am the Member
of Parliament for Durham, and I've grown up in the area and served as MP for almost six years.

And my brief remarks today will be related in large part to my letter of intervention from May 4th, 2018, I refer the Committee to, with respect to the 10-year renewal for the Pickering operating licence and the transition to safe storage by 2028.

I should mention at the outset I'm very pleased to have some colleagues from the provincial level of the provincial parliament with me who were recently elected. So they weren't able to intervene by letter and by appearance like I am, but I do want to recognize them: MPP-elect Peter Bethlenfalvy, the MPP for Pickering-Uxbridge, and MPP-elect Lindsey Park, the MPP for the riding of Durham. And both very strong supporters of the industry in our region and happy to have them here.

I would note, and I think it's in the public interest, that the Pickering renewal was an election issue. It was a live election issue where the NDP actually opposed the full life of the facility and the PC party supported it. And I would note that the Mr. Bethlenfalvy, the PC candidate in Pickering-Uxbridge, was elected. So you can't call that a referendum per se, but it was certainly a live issue in the election that got a lot of coverage. And I would note that Premier-elect Doug Ford
has already appeared to show provincial support for the subject matter we're dealing with today.

I would also note, as having grown up in the area, I recall fondly, as a grade 5 student in St. Joseph school in Bowmanville, interviewing the MPP at the time, Sam Cureatz, about the construction of Darlington before it was constructed. So you could say I've had an interest in nuclear energy since my childhood, in some ways. And now I'm honoured to be the Member of Parliament representing the community. And I'll speak about that shortly.

In my letter, I outlined that I believe, as a community representative at the federal level, that OPG has demonstrated to the community that their ongoing staff training and investments in Pickering and in the community, including the replacement and upgrading of equipment, have resulted in a top world-class safety record.

And this renewal is about safely and effectively maximizing the utility of our utility. And I think that can't be lost on us.

In 2014, the Pickering facility passed the 11 million hours mark without a single lost time incident. I think that shows its world-class effort. But the same year -- and I think this is very telling -- the same year
that milestone was passed, the Pickering facility committed to a risk improvement plan, both for facility, staff, and community engagement. So their ongoing efforts at being best in class when it comes to safety, when it comes to emergency planning, and when it comes to community engagement should be noted.

In 2016, they received the Canadian Electricity Association's gold award for safety.

And as a former military member, testing and evaluation through exercise, I think, is critical for evaluating the effectiveness of your safeguards. And I would note in December 2017 in Exercise Unified Control, which almost sounds like a military mission itself, strong results were demonstrated both for on-site and for off-site emergency preparedness.

The safety measures post-9/11 have also been remarkable and shows a committed investment by OPG, both at the Pickering and the Darlington sites. And as the former Minister of Veterans Affairs, I'm very proud that many of the investments on the safety arm have come as a result of hiring veterans. So OPG is one of the largest employers in Ontario of veterans of the Canadian Armed Forces and first responders. And I think that's why we're seeing such world-class results.

As MP, it's perhaps best for me to speak
for a few moments about their community engagement program as part of the public information plan, both in Pickering and in Darlington. These enhancements, in line with the risk improvement plan of 2014, have enhanced efforts at reporting, public education, and consultations. You've heard a bit about that today.

And I would suggest perhaps the most effective example of public engagement in emergency preparedness we saw just in the last few years in the Durham region, when 200,000 potassium iodide pills were distributed in communities like mine in the 10-kilometre primary zone as a result of the Commission's previous guidance for these facilities.

Not only was this done successfully -- I can tell you, my little package is in my kitchen cupboard in Bowmanville -- the engagement that continues through PrepareToBeSafe.ca and the ability for people in the secondary zone to access KI pills demonstrates that this engagement has gone far beyond just public affairs initiative to actually at-home, 200,000 households, who have received not just the KI pills but a brief when it comes to emergency preparedness.

In the House of Commons, I'm not allowed to have props, but I am allowed to have props here, I think. And this arrived in my own mailbox just last week
in Bowmanville, and this is part of the ongoing neighbour series for both Pickering and Darlington. It focuses on CNSC and meet a CNSC safety inspector on the back. I would note that this is part of the ongoing engagement and public education with respect to the facilities and emergency preparation. That's part of the overall social licence that's been talked about here.

Prior to my election as Member of Parliament, I did work on some of the early initiatives in the Bring Back the Salmon campaign we've heard reference to a few times. And OPG and its senior officials were some of the biggest supporters of that River Runs Through Us gala in Bowmanville, helping build a fish bypass channel for migrating species on the Bowmanville Creek. This is part of regular and ongoing engagement with the public.

And as Member of Parliament now -- the River Runs Through Us gala was before I was elected, but as Member of Parliament, I've only seen an enhanced approach to public engagement.

We've heard a little bit about the emergency response plans for both Pickering and Darlington and the areas in the Durham region that I'm proud to represent. My office will work closely with OPG, with Clarington, with the region of Durham, and with the Province on the provincial Nuclear Emergency Response Plan.
on the notifications, on the traffic control plans, and on the public education.

In my constituency office in Bowmanville there is materials available to the public if they have any questions with respect to the Emergency Response Plan, with respect to KI pills. OPG has been very effective at providing all levels of government and all public officials in the Durham region with information to be a partner in preparation.

We saw with I would say mixed success the Alert Ready mobile testing system for emergency response on our cellphones. Most of -- mine went off; my wife's did not. So we see we still have work to do on the Alert Ready, but I think the province, the federal government, municipal governments, and corporate partners like OPG will continue to have more tools to provide both information but also direct emergency assistance for people in the event of an incident of any kind.

Finally, the last two points I want to raise is as Member of Parliament for Durham, I clearly recognize the provincial guardianship of the long-term facilities in Pickering and Darlington and the regulatory oversight at the federal level and partnerships at the municipal.

But often we forget that the nuclear
industry and the 70,000 people employed in it in Canada are part of our innovation economy and have been since the 1950s. We talk about innovation and hubs and investments today. Well, the nuclear industry has been doing that since the 1950s.

Canada, as the second country to have controlled nuclear fusion, has a proud track record of safe and effective and reliable nuclear power. With six other nations also having access to this same power through the CANDU technology, I've had the ability to meet with regulatory officials and public officials from many of those CANDU countries. And the track record of our technology is world-class.

It also contributes $7 billion in annual activity to our GDP.

And in 2014, I participated in the debate on the Energy Safety and Security Act, updating civil liability caps, limitation periods, and making us fully compliant with IAEA provisions at the federal level.

And after my election, I helped start a nuclear caucus in Ottawa, because I was quite startled by how little even public officials know about the regulatory and safety, the long-term storage, and waste plans through the Nuclear Waste office, and just how many jobs are directly attributable to this industry.
My final point is perhaps the best aspect of this industry, which is appreciated today much more than it was in the 1950s, and that's the fact that through our generating stations in Darlington, in Pickering, the Bruce, we have almost two-thirds of our electricity in Ontario generated virtually greenhouse-gas-emission-free. That wasn't an appreciation, really, in the 1950s, but I think it is today.

If Canada does not prudently and safely embrace our nuclear technologies and our industry, we will have no chance -- no chance -- of meeting our Paris Climate Change commitments, which I think we should be meeting. The International Energy Outlook 2016 suggested energy consumption in the world will go up by 50 per cent by 2040. If we deviate from having baseload electricity in Ontario and other places generated from nuclear energy, we will certainly have no chance at meeting our Paris targets.

And in fact, if you'll permit, I think the next frontier that you will be seized with helping regulate, the small modular reactor technology, will allow us to actually tackle some of the remaining large emitters within our economy. I often say in my opposition to the carbon tax that one-third of Canada's greenhouse gas emissions -- one-third -- are directly attributable to 596 facilities. Why we don't have a specific targeted plan for
the main emitters, many in the resource and energy-intensive industries where small modular reactors could actually help make those industries emission-free or carbon-reduced, that needs to be a serious part, I think, of our energy and our GHG emission plans for the future.

And in Ontario, we're very fortunate that for two generations we've been able to see 80 per cent of our electricity produced through clean sources in terms of emissions, either from hydro or from nuclear technology.

So it's my honour here today to supplement my written submission to you in these areas: climate change, safety, emergency preparedness, the public information programming conducted by OPG, and the excellent safety track record that I've been able to see first hand as an elected official. And I certainly hope these are helpful considerations in your deliberation with respect to the 10-year renewal.

Thank you very much.

THE PRESIDENT: Thank you.

Questions?

MEMBER LACROIX: Mr. O'Toole, thank you very much.

Why aren't you the MP in my riding? It's too bad.

HON. O'TOOLE: Where do you live?
--- Laughter / Rires

**MEMBER LACROIX:** Far away. In Sherbrooke.

**HON. O’TOOLE:** Move to Durham.

**MEMBER LACROIX:** My question is this. You had a great idea concerning this caucus. Does it still exist, and what is its scope, its activities?

**HON. O’TOOLE:** Thank you, Mr. Lacroix.

Yes, it still exists. It was primarily based as being an outreach tool for members of Parliament to learn more from the industry, to meet with stakeholders, and to raise essentially what I call the base level of knowledge of members of Parliament.

Outside of Ontario, in nuclear host communities, like we heard from Mayor Foster earlier this morning, there is little knowledge about the technology. That startled me, because Canada is one of the innovators, so our caucus not only toured Darlington, we met with several suppliers in the CANDU industry stakeholder group. We also toured Chalk River and talked about the medical isotope issue at the time. That's why I was very happy to see the announcement of the moly-99 isotopes announced just last week by OPG through the Darlington facility. Nuclear health and the isotope issue is something that we are going to lose from the experimental reactor at Chalk River, so we continue to try and engage, but as I said, I briefly ended
with the small modular reactor technology holds great promise, particularly for places like the oil sands or for smelting facilities, where there's a high energy need to refine our resources.

I often remind Canadians the resources in Alberta and Saskatchewan are not just theirs, they're all of Canada's, and we cannot only benefit from the responsible extraction and secondary processing of our resources, we can mitigate water-use energy through smart investments in technology. I think that has to be the cornerstone of a smart plan to meet our Paris targets. That's why I often say without embracing nuclear we have no hope of meeting our Paris targets.

So the public information and education campaign continues, and I try and work with my provincial partners and municipal partners too.

**MEMBER LACROIX:** That's good. Thank you very much, Mr. O'Toole.

**MEMBER VELSHI:** Thank you; and thank you for bringing your colleagues along with you.

What you have described with your caucus members we've heard from many interveners, especially those not living close to the facility, a lack of awareness of the facility, of the emergency plans, especially in the GTA area. I don't know whether through your recent campaigning
if that's what you've heard from your constituents about lack of awareness and the need for greater education. From where you are, what advice or recommendations would you give to the Commission, to the CNSC, on how that can be improved?

**HON. O'TOOLE:** I'll speak for a moment. Then, if you permit, I would invite my colleagues, who spoke to thousands of people on their doorsteps just recently, to give you their take.

One challenge that I think was alluded to by Mayor Ryan and Mayor Foster, and one challenge that our community faces, is the east side of the greater Toronto area is the fastest-growing part of the province, it's also a great place to live, Mr. Lacroix, as per our last comments, and it's the most affordable.

Clarington, for example, is the place where a lot of people are moving to from Brampton or from Markham to get that larger home, for great schools, great communities, that sort of thing, so we have a lot of turnover within Durham from people that came from, say, the west side of the GTA or even the north that don't have a history of living in communities with Pickering, with Darlington. I think that presents an added challenge, and I think OPG, in particular, is always looking at ways to tackle that. I've often suggested the GO train should be
plastered with information, because in most of these new suburban developments people are still working in Toronto, Mississauga or Markham, they just choose to live here, yet they don't have the history of living in the community, as I said, interviewing my MPP, before Darlington was constructed. In communities like Courtice and Bowmanville we have a number of people that are society members or PWU members, and they are part of the education, but this fast-growing pace I think is going to continue to be a challenge, that's why I think the outreach they do is very important.

Do you have anything to share?

**MS PARK:** Hi. I'm Lindsey Park, the MPP-elect for Durham.

I've noticed, sort of speaking with my colleagues, I think our experience, experience with my constituents in Durham, is much different than in maybe other parts of the GTA, such as Scarborough. I think there is still a need for greater awareness in some of the other areas. I find, in fact this may surprise many people, concern about nuclear safety did not come up once at the doors over the last year and a half or at community events. In fact, there's a great awareness of the safety measures in place, partly because many in our community work at the facility, but I think something that's noteworthy is how
close to the facility those people choose to live who work there. I think sharing that anecdotally I found with my colleagues outside of the area it's very hard for them to argue that there are real safety concerns, because they can't kind of put together in their mind why someone who worked at the facility and can see the daily safety measures would choose to live so close. I think that's something anecdotally that I like to share in conversation, and it speaks a lot to what we have going on here.

MR. BETHLENFALVY: Peter Bethlenfalvy, MPP-elect for Pickering-Uxbridge.

I'll address your question about awareness, but first just some background.

I did tour, as a nominated candidate, the Darlington and Pickering facilities to get more knowledgeable about the facilities. I did canvass. The riding goes all the way from basically the Pickering nuclear station almost up to Lake Simcoe. I did knock on virtually all the doors, particularly in Frenchman's Bay, Bay Ridges and the West Shore community. There's a very high degree of awareness through most of Pickering. The big issue really was more about jobs and affordability, and a good knowledge that it's low-cost and clean energy. Obviously, for the jobs, Pickering and our neighbouring ridings have a fair amount of employees at the facility, so
they're very knowledgeable and obviously very aware.

But I was struck by, knocking on so many doors in the community, the level of engagement, the level of knowledge. Obviously, as Mayor Ryan mentioned before, there were 20,000 people here, so at the time it was built, 80,000 people came here with the knowledge that they were coming to a community with a nuclear station, so there's a high degree of awareness, concern and understanding about safety, and the priority toward safety.

Then, quickly, how does it affect my pocketbook: low hydro costs, jobs, and a part of the community.

**THE PRESIDENT:** Questions?

I'm intrigued by the little brochure you showed us. I want to know who actually produced it, is it OPG, is it the Office of -- what I'm trying to understand is where was it distributed? I mean with things like this, we had a lot of discussion that you're focusing only on the primary zone, which is the 10 kilometres, but does anything like that go beyond that, so the 20 kilometres or 50 kilometres? That's where the awareness is much less than really near the facilities. I'm trying to understand to whom those kinds of things are sent, particularly if it mentions a CNSC inspection. Are you aware of that?

**MR. MANLEY** Robin Manley, for the record.
I'm the Vice-President of Nuclear Regulatory Affairs and Stakeholder Relations.

The Neighbours brochure, which has just been shown there, is distributed within about 10 kilometres of both of our Darlington and Pickering stations on a quarterly basis to approximately 120,000 households.

**THE PRESIDENT:** So nothing like that ever goes beyond the 10 kilometres?

**MR. MANLEY:** To the best of my knowledge, it's the region that I just described -- Robin Manley, for the record -- but we do post all sorts of other information on our public website, opg.com, and we can provide lots of details about that kind of information, as well as the other disclosures that we make.

**THE PRESIDENT:** The Office of the Fire Marshal, are you not concerned that there is no such periodic update or reminder to people living beyond the 10-kilometre zone?

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

I just want to start with a little bit of more generalized context in that under the *Emergency Management and Civil Protection Act* all municipalities in Ontario are required to have a public education program that focuses on the risks that they have identified to
their community. They then allocate their resources in accordance with the severity of risk that they face.

With respect to nuclear emergency management and public awareness and education, these requirements are outlined in section 3 of the PNERP master plan. In 2009, we added a fairly extensive annex, Annex C, to the master plan that establishes detailed requirements for public education. It also has a requirement that each area, so each area around the facilities, would have a committee of stakeholders. This includes the industry, it includes responders, emergency management coordinators, and has the opportunity for public input as well. Each of those committees develops a strategy to help enhance the awareness of those living around the facility.

As you note, the emphasis of these programs is on the 10-kilometre zone. That's where we have public alerting measures in place. That's where we would anticipate that the risk could potentially involve evacuation, and those are the people that we want to have most aware of the measures that they may need to take.

That said, there is a wide amount of information that's provided. First of all, anyone who requests KI pills who lives between 10 kilometres and 50 kilometres would receive information with that package.

There is information on all of the
stakeholder websites, including the Ontario government websites.

So, Ontario.ca/Be Prepared has a section dedicated to nuclear. That site in general has about 100,000 visits per month and we've had significant interest in downloads on the nuclear information that's there. So, it covers really all of the various measures that the public may be requested to take.

OPG, Durham Region and others also have very similar information.

**THE PRESIDENT:** So, I don't want to belabour this because I think we will hear more about this in a couple of other interventions. But are you satisfied that all the information necessary is being conveyed to those beyond the 10 kilometres, or do you look for further enhancement?

**MR. MORTON:** Mike Morton, for the record. Public education programs really need to reflect the local needs, the local interests and the risk assessments of those areas and in Ontario those public education programs at the municipal level are all hazards.

We have in the last months, as was referenced earlier, been making a lot of effort to highlight the availability of the Alert Ready System and we'll probably get into a little bit more detail on public
alerting, but there has been significant investment in public awareness campaign for all Ontarians, all people in Canada as well, to raise their awareness of Alert Ready, the fact that they can now get alerts on their mobile devices as well as through broadcast-intrusive alerting through television and radio.

So, our perception and the results of those campaigns have been that people's awareness and public alerting in general has gone up significantly, but we do see public education as something that needs constant attention and constant local and municipal engagement as well to make sure that resources for education are allocated as reflective of the municipal risk assessment and the situations that the local populous may face.

**MR. BURNS:** Dr. Binder. Sorry, Scott Burns, for the record, OPG.

I could probably add a little bit of information to help you with the context outside of the 10 kilometres.

Durham Region will be here tomorrow I understand and can probably speak to this a little bit more, but in the spring of this year they continued their spring and fall EP and KI pill awareness campaign through a wide variety of platforms, and it's our understanding -- and confirm this with the Region -- they go -- their
campaign goes throughout the Region, so well beyond the 10 kilometres.

So, they include it in newspapers, transit ads, social media, childcare Newsletter articles, so a number of venues in the Durham Region.

I'd also like to clarify a couple of points that were made yesterday and really I think correct the notion that absolutely no information is available. That's just not true.

When you go to the City of Toronto's website they have a red page they call it and it's Your Action Plan to a Nuclear Emergency. You can find that in about two minutes, maybe less if you're more savvy than me, and they encourage people to print that off, put it on their fridge. It tells you everything you need to know about what to do in the case of a nuclear emergency, how to access KI.

So, in the information that we have from OPG perspective, people want information at their fingertips, they want it online. And we know that if you go to the Province's website, if you go to the CNSC's website, if you go to our website, the Region's website, all of our websites tell you lots of information and direct you to each other's website. You know that we're clearly working in partnership to keep our communities safe around
emergency preparedness.

So, I want to make that point that, you know, we've done -- we've invested millions of dollars in directing public education out to the 10-kilometre zone, to distribute pills, give people campaigns, that's in the City of Toronto and the Region of Durham, and there are mechanisms in place that go beyond that.

But we do know specifically, we've heard from our community, they want it at their fingertips and it is available online.

THE PRESIDENT: Okay. Thank you. Thank you for that.

Any final thought to share with us?

HON. O'TOOLE: Thank you very much for the opportunity, and I can leave this for you, Mr. President --

THE PRESIDENT: Sure.

HON. O'TOOLE: -- if you'd like to see it. There is quite a bit of information and...

THE PRESIDENT: The moment you do it, I's on the record.

HON. O'TOOLE: There you go, it's on the record. Thank you very much.

MR. LEBLANC: Please leave it with Ms Levert at the back, that would be appreciated.

HON. O'TOOLE: Okay.
MR. LEBLANC: Thank you.

THE PRESIDENT: Thank you very much.

I'd like to move on now to, the next presentation is by the Canadian Environmental Law Association as outlined in CMD 18-H6.57, 6.57A and B.

I understand that Ms McClenaghan will make the presentation.

CMD 18-H6.57/18-H6.57A/18-H6.57B

Oral presentation by the

Canadian Environmental Law Association

MS McCLENAGHAN: It will be Ms Blaise, Mr. President.

MS BLAISE: Good morning, President Binder and Members of the Commission.

I am Kerrie Blaise and I am legal counsel with the Canadian Environmental Law Association. Joining me today is co-counsel, Monica Poremba, and our Executive Director, Theresa McClenaghan.

While our sustainability expert couldn't join us in person, she is available on the phone to answer any questions you may have and her name is Dr. Tanya Markvart.

So, CELA is a non-profit public interest
law organization. We are funded by Legal Aid Ontario as a specialty legal aid clinic. For nearly 50 years we have advocated for strengthening of Canada's environmental laws and have sought to advance the public interest in order to increase environmental protection and safeguard the health of our communities.

The issue before the Commission today is whether to allow the operation of the Pickering Station. We have extensively reviewed the OPG and CNSC staff reports and supplementary materials and we do not find that the millions of people who live within 50 kilometres of the Pickering Station or the millions of people who rely on Lake Ontario for fresh drinking water have been sufficiently considered and protected from the effects of Pickering's continued operation.

CELA has received participant funding to be here today and to participate in this hearing.

Our review had three goals. First, to review the adequacy of emergency planning at the Pickering Station; secondly, to review how considerations of sustainability were factored into the CNSC's environmental review conducted under the Nuclear Safety and Control Act; and lastly, we reviewed the adequacy of the regulatory framework currently in place for the decommissioning of the nuclear power plant.
Section 9 of the Nuclear Safety and Control Act requires that the Commission, in fulfilling its duty, ensures the prevention of unreasonable risk to the environment and the health and safety of persons. For the following reasons, we submit there is not the evidence or of detailed and robust planning before the Commission necessary to make this finding.

CELA reviewed the current emergency plans for the Pickering Station and we found that the level of emergency preparedness is insufficient, specifically for residents in the 20 to 50-kilometre zones around the plant where detailed emergency planning is not required.

We also noted that the Ontario Provincial Nuclear Emergency Response Plan, the PNERP, which was released in December of 2017 is currently undergoing a technical study by the Office of the Fire Marshal. This study, once completed, will look at meteorological effects around the nuclear plants, it will assess planning zones and the distance for KI pill distribution and it will also study the water quality and drinking water impacts of Pickering.

These findings, however, will not be available until the end of 2018.

Secondly, while we heard from OPG yesterday that its emergency response plans are robust and
well integrated with off-site authorities, the implementing plan for Pickering which was released under two months ago requires changes to on-site and municipal level emergency response plans. These plans have not been updated and neither have they been aligned, nor have they been tested to make sure they're actually operable and functional.

As we further detail in our submission to the Commission, despite updates to the PNERP, detailed emergency planning for evacuation, for KI distribution or for public awareness is not required beyond the 10-kilometre detailed planning zone.

It is critical that detailed planning for emergency measures be extended beyond the immediate 10-kilometre zone, not only are residents beyond this mark deserving of equal levels of protection, it's required under Section 3 of the Nuclear Safety and Control Act that the Commission ensure that its decisions align with Canada's international obligations.

As a member of the IAEA, it is the Commission's responsibility to, at a minimum, ensure we align with international standards.

In this slide we've excerpted the recommended zones and accompanying measures provided by the IAEA. Our submission details this chart further.

So, reviewing the sufficiency of emergency
response plans also requires the Commission to consider the effects of venting radiation over Lake Ontario. The PNERP explicitly states that in the event of a radioactive containment venting will occur over the lake. However, there is no accompanying contingency plans which detail how an alternate drinking water supply will be provided to millions of people. Neither is there modelling of Lake Ontario's currents or studies demonstrating the effects of venting on the unique characteristics of Lake Ontario's near and offshore areas.

We submit these studies should be complete before proposing to vent over Lake Ontario.

CELA has provided a total of 31 recommendations to the Commission, unfortunately, because of time we can't review each and every one. So in order to remedy what we see as the most fundamental deficiencies before the Commission, here's our key recommendations.

First, the current 10-kilometre detailed emergency planning zone should be extended to 20 and the contingency planning zone which is currently 20 should be extended to 50.

So this does mean expanding emergency response measures like evacuation and ensuring that it functions for the millions of people who live in a region already plagued by traffic congestion. This also requires
alerting residents that they can order KI pills online at PrepareToBeSafe.ca and providing KI to vulnerable groups.

Secondly, given the Ingestion Planning Zone is currently at 50 kilometres, we recommend it be extended to 100 kilometres so that the protection of our food from farm to fork is ensured.

I will now pass the presentation over to my colleague, Monica Poremba, who will discuss our findings and recommendations related to sustainability and environmental assessment.

**MS POREMBA:** Thank you, Kerrie.

CELA reviewed all CNSC and OPG materials for this hearing and find that the key tenets of sustainability have not been considered. The following slides highlight our findings related to five critical sustainability issues that remain unaddressed by OPG and CNSC.

To begin, sustainability requires that the costs to future generations be studied and analyzed: What does the continued operation of Pickering mean for Ontario when cheaper and safer options exist? Where is the accounting of the financial cost of a nuclear reactor across its life cycle?

Sustainability also requires accounting for greenhouse gas emissions by conducting a climate test.
The total GHG emissions associated with nuclear power in Canada are estimated to be in the range of at least 840,000 tonnes per year.

Another requirement for progress toward sustainability is providing meaningful public participation opportunities. Compared to public participation opportunities under CEAA, CNSC's review did not provide as many opportunities, nor the opportunity for iterative review among experts, stakeholders and decision makers. We also found that neither OPG nor CNSC staff account for transition planning among the stages of operations and stabilization.

Demonstrating that sustainability has been considered should be a prerequisite to licencing. This would require that OPG's licence application be evaluated against the purpose and need for the undertaking with direct reference to the public interest and compare other reasonable alternatives. It is also necessary that a sustainability assessment be conducted for all stages of the Pickering plant's life.

CELA's key finding on environment assessment is that the NSCA's process, which CNSC staff have titled an environmental assessment is at best an environmental review of a proposed environmental monitoring program.
Section 24(4) of the NSCA, which states that in providing a licence the Commission must ensure that the licensee will, in carrying on the activities make adequate provision for the protection of the environment, is too narrow a statement to be equivalent in scope, review and outcome to Canada's existing environmental assessment legislation. In contrast, Canada's Environmental Assessment Act sets out, in law, the grounds for a review of the project which are not required under an NSCA environmental review. This includes environmental effects, cumulative environmental effects, their significance, feasibility of mitigation measures and the purpose, need for, and alternatives to the project. These parameters, which are required under a federal EA, have likewise not been applied by the CNSC in its review of OPG's proposed decommissioning activities.

In the context of decommissioning, an analysis of all options needs to be explored and justification provided for the preferred strategy. This review should actively engage experts, public and stakeholders and allow all interested parties to comment.

CELA specifically reviewed the record before the Commission, to review the accuracy of protections in place for human health and the environment, these objectives which, according to the NSCA, must guide
the CNSC. We ask that OPG's request for a 10-year licence be denied, for the reason that the record before the Commission is inadequate in fulfilling the Commission's public interest, health, safety and environmental protection mandate.

Thank you.

THE PRESIDENT: Thank you. Questions?

Who wants to start? Ms Penney...?

MEMBER PENNEY: Thank you for that.

I am looking at your recommendations or comments on sustainability. So I think it's slide 8 and then 9, and then the recommendation being that there be a demonstration of sustainability. Just I'd like you to give me a tiny bit more detail about how the NSCA environmental assessment could have been expanded to include what you would describe as appropriate sustainability

MS BLAISE: Thank you for the question. It's Kerrie Blaise, for the record.

I believe our expert, Dr. Markvart, is on the line. If she is, can we see if she is able to answer this question? Thanks.

DR. MARKVART: Yes, Tanya Markvart here. Can everybody hear me okay?

THE PRESIDENT: Yes, we can. Please proceed.
DR. MARKVART: Yes. So to answer the question when it comes to proper consideration of sustainability in environmental assessment, we first need a proper working definition of sustainability, and one of our findings of our analysis included that REGDOC 2.9.1 includes just a very simple definition of sustainability. It just simply gives one sentence.

A proper working definition of sustainability would provide enough substantive information about what the concept of sustainability entails for the CNSC to then analyze whether or not the proponent has met those requirements, as well as to provide guidance for the proponent on how to properly consider sustainability and assessment.

So to get a little bit more detailed, a proper working definition includes things like not just providing a simple definition, but also laying out for authorities and proponents, what the generic requirements or progress towards sustainability are. That would then lay out certain tests that CNSC and proponents could then follow and incorporate into their environment assessments to ensure that those requirements for sustainability have been met. It also includes specifying the generic requirements for the particulars of case and context, and we did this in our report.
We laid out in a table all of the different contexts, specific requirements for nuclear energy generation and waste management specifically, not Pickering specifically, that should be covered for an appropriately stringent application of sustainability in this kind of EA.

And then we also need to know how the concept of sustainability was applied in analysis through the process of decision making.

Those are the three key points that I made in the report regarding how we can elaborate on the concept of sustainability, what it means, and how it should be applied in analysis.

THE PRESIDENT: Staff, do you want to tackle this?

MR. FRAPPIER: Gerry Frappier, for the record.

A couple of things and I'll pass it to Mr. Mike Rinker to speak specifically around the EA and the comparisons.

But I would note that part of their sustainability considerations that they are concerned about is cost to future generations. Certainly, the nuclear industry and the nuclear regulator require very extensive plans with respect to decommissioning, where the waste is
going to go. We can argue about whether it takes too long or too short, but at least the plan is there, the funding is there.

We check on an annual basis, as we talked about a little bit earlier, that there is sufficient funding for managing the entire cost of a life cycle. So that's certainly one that I would suggest maybe the nuclear industry should indicate that they do that very well compared to other energy sources.

With respect to the environmental assessment aspects, I'd ask Mr. Mike Rinker to comment.

**MR. RINKER:** Mike Rinker, for the record. I'm the Director General responsibility for environmental and radiation protection.

So under the context of sustainability, the intervenor references some of the work done by Professor Bob Gibson, who has published works on next generation environmental assessment and is one of the Canadian leaders on where sustainability may fit in Canadian environmental assessments.

Professor Gibson is part of a committee called "The Multi-Interest Advisory Committee" for which I am also a member of, and this committee is providing expert advice to the federal Minister of Environment and Climate Change Canada on where the next generation of environmental
assessment or impact assessment would go in Canada.

However, this advice is for a replacement for the *Canadian Environmental Assessment Act*. It is not something that is being incorporated into other federal areas of permitting or life cycle regulators or other aspects. It's for that larger planning basis type of legislation such as environmental assessment and impact assessment.

I think that advice is being brought forward into the federal oversight through what is being proposed as the impact assessment legislation that is before Cabinet now.

As towards how our environmental assessment is used for this regulatory purpose, I'll ask Dr. Ducros to answer.

**DR. DUCROS:** Dr. Caroline Ducros. I am speaking on behalf of my former position as the Director of the Environmental Assessment Division.

So I would like to put a little bit of context. As a nuclear regulator we don't look at the socioeconomic aspects, so in terms of sustainability and the NSCA we wouldn't be examining those aspects. However, it is our mandate to protect the environment, health and safety of people and we do this in several ways that are elaborated in REGDOC 2.9.1 that was referenced by the
intervenor. That is the REGDOC on environmental protection, environmental principles, assessments and protection measures.

So how we do that as one of the underpinnings of the EA under the NSCA is the environment risk assessment. The risk assessment is based on very conservative assumptions. We also have licensing and in the licence limits, those are also established several magnitudes below expected levels when we do establish them.

We have a five-year cycle for the environmental risk assessments, so that's at a minimum a five-year cycle, unless there is new activities or new science. So we have that adaptive management potential in case any of the predictions that we have made are not as anticipated.

We also in the EA in the NSCA have gone beyond that to look at the regional aspects. So we look at data from other government departments at different levels. We look at the Ontario Ministry of the Environment climate change data, Ontario Ministry of Labour, Health Canada data, and we look at CNSC’s Independent Environmental Monitoring Program too, to get the full picture to see whether there are any effects off-site that are being caused by the facility or anything is different.

So as a lifecycle regulator we have that
longitudinal, that temporal and the spatial view of what’s going on for a facility that we’ve been regulating for several decades.

In my estimation there is a sustainability element imbedded in how we regulate.

**THE PRESIDENT:** We are talking about Pickering here, not about general. So I’m trying to understand what the intervention would have liked to hear about the alternatives here as part of -- it says here accounting for alternatives to this.

I thought we talked about alternatives and all those things, a Government of Ontario decision, not ours. So what does it have to do with sustainability?

Something doesn’t connect here. Maybe the intervenor can enlighten me here.

**MS McCLENAGHAN:** It’s Theresa McClenaghan, for the record.

I will begin and then I’ll ask Dr. Markvart to add to what I have to say.

The question for the Commission is whether to grant the licence under your authority and in doing so the Commission documents make statements that it includes an environmental assessment process under the statute, the *Nuclear Safety Control Act*.

And our question for Dr. Markvart was:
Does that actually have the hallmarks of sustainability?

So vis-à-vis Pickering then, if you did apply an environmental assessment process and not just next generation environmental assessment but today’s environmental assessment as recognized internationally and in practice, you would normally include questions of alternatives.

And that’s an extremely important question in today’s context where we do have surplus of power in Ontario, where we do have alternatives.

I know you are going to say this is Ontario policy choice --

THE PRESIDENT: It is and it is totally out of scope.

MS McCLENAGHAN: But the question is --

THE PRESIDENT: We are dealing with existing pieces of legislation, not hypothetical.

MS McCLENAGHAN: Right. But the question for the Commission is whether, on all of the evidence, to grant the licence. And sustainability is a very important consideration in terms of necessity, especially when you are considering questions of risk and safety to the surrounding population. That means you look at the alternatives.

And if you are considering a situation
where in our contention too much hazard and too much concern around safety is being imposed on the population in a context where there are alternatives, this is directly core to your sustainability question under the Act you have to administer.

I will ask Dr. Markvart to add to that.

**DR. MARKVART:** Yes. Tanya Markvart here, for the record.

Theresa, you covered most of the points I would have made. I would only add that best practices in a sustainability based environmental assessment -- and I would argue that REGDOC is heading in that direction -- requires not just looking at alternative means but also a discussion about need for the project. And that discussion about need for the project then sets the basis for a statement of purpose and then an analysis of alternatives to the project, as well as alternative means of undertaking the project.

Those four things together should be laid out really clearly so the public can see very clearly that there is a demonstrated need and that that need is really closely connected appropriately with the purpose, and then an analysis of alternatives to an alternative mean, which is done in a comparative way that incorporates sustainability considerations throughout.
THE PRESIDENT: Ms Velshi, questions?

MR. MANLEY: President Binder, if I may?

Robin Manley, for the record.

Perhaps OPG could have a chance to speak to this issue of sustainability.

The intervenor may not be aware of the fact that Ontario Power Generation has a sustainability policy. It’s available on our website. I’m looking at it right now on opg.com. And it speaks to many of the kinds of things that have been discussed here, such as the mission of this company, which I maybe could briefly speak to.

“Power with Purpose – Providing low-cost power in a safe, clean, reliable and sustainable manner for the benefit of our customers and shareholder.”

Our policy speaks to the values of the company, our behaviours, our strategic comparators, including our social licence, and the outputs that we think are important: safe, clean, reliable energy; reasonable electricity rates; displacement of fossil fuels; safe, healthy and engaged employees.

And I can go on.

When it comes to the topic of a policy and
whether or not there are alternatives, other regulators in Ontario have already spoken to what is the right source of power for Ontario.

The Ministry of Energy in Ontario has that accountability and the Independent Electricity System Operator has evaluated various options that are in front of the Ontario government. It argued in front of the Ontario Electricity Board that the Pickering continued operation to 2024 has an economic benefit to the province as a whole.

The question in front of you is safety, not economics, so I won’t go more into the question of cost. But I will mention the topic of greenhouse gases.

Ontario Power Generation is very proud of our contribution to the reduction of greenhouse gases that we have made through closure of coal and the fact that we produce a very sizable amount of the total electricity in this province 99 per cent greenhouse gas free.

It’s not just us who says that nuclear contributes to low greenhouse gas emissions. You can refer to one of the other intervenors. The Toronto Region Board of Trade, in CMD 18-H6.27, notes the benefits and it quotes from the Intergovernmental Panel on Climate Change, which shows in its research that nuclear has less greenhouse gas emissions than a wide range of other alternatives, including less than solar.
So I submit to you that sustainability is a very large component of our overall accountability as a good corporate citizen, and people can read about it on our website.

THE PRESIDENT: Thank you.

Ms Velshi?

MEMBER VELSHI: Thank you.

I want to talk about Recommendation 16 around public awareness. I did check the City of Toronto website and yes, in 30 seconds I got to their page.

And I’ve actually ordered my Ki pills and they will be delivered to me in four weeks.

So it does work.

But I do want to let you know that the first site that you get when you do a search is City of Toronto’s Nuclear Emergency Plan that is dated September 2012.

So if someone didn’t go further down, then I don’t even know why that’s on the site.

But the question is for OFMEM.

When we talk about demonstrating public awareness outside the detailed planning zone, what does the PNERP require or what do the implementation plans require and what kind of confirmation exists now that that awareness exists?
MR. MORTON: Mike Morton, OFMEM, for the record.

The PNERP master plan in Section 3, in Annex C, outlines the public awareness and education requirements. These are focused on the detailed planning zone.

Obviously the committees that are established under Annex C take a broader perspective and can work within any scope that’s decided by the local stakeholders in supplementing again the municipal level public education programs that are required for the entire municipality, for all municipalities in Ontario, under our legislation.

I’m not in a position to speak to those programs at the municipal level. There are other efforts that OPG may be engaged with, but they may wish to share on some of those efforts.

MEMBER VELSHI: I will ask OPG or Staff if they are aware of any requirements outside the detailed planning zone around awareness and how is that measured.

MR. BURNS: Scott Burns, for the record.

In terms of comments from the province, the requirement is clearly outlined in the Provincial Nuclear Emergency Response Plan from our perspective and then speaks specifically to the detailed planning zone.
So generally we design, in collaboration with the partners, our focused campaigns to that zone.

But as mentioned earlier, we put a focus on reaching all members of our community through websites.

The pamphlet or the kit that we sent out at the end of last year, Mr. Gregoris profiled it for the Commission at the Part 1 hearing. We have an online pamphlet that describes that plan in general, all the components of emergency planning from a nuclear perspective easily found online.

I’ve mentioned the Durham Region and their focus. We’ve heard from their Director who frequently tells us --

MEMBER VELSHI: I’m sorry to interrupt, but I really want to know outside the detailed planning zone what’s being done.

I understand there are no specific requirements in the PNERP and it’s left up to the local implementation teams to do so.

So any information on outside the detailed planning zone.

MR. BURNS: Scott Burns, for the record.

That was my point about the Region of Durham. Their campaigns don’t just focus on the detailed planning zone. They target the entire region of Durham.
MEMBER VELSHI: So yesterday we heard from an intervenor about the Bruce and how they had their brochure go out, I think it was to 20 or it may even have been a 50 kilometre zone.

As we kind of sit here, we go well, who oversees that? Who co-ordinates? Who makes sure there is consistency?

And clearly the City of Toronto has got something on their website but how effective is it and who monitors this to make sure it’s being done?

Maybe, Staff, you can have a stab at this?

MR. FRAPPIER: Gerry Frappier, for the record. So certainly talking, we’re a big believer in Defence in Depth of course, and so most of our effort is spent on the plant itself and on the operations of the licensee. But Level 5 of Defence in Depth does talk about emergency planning, and we do have some requirements on that and we’re mostly focused close in to the plant.

With respect to what we do in the broader sense, I’d ask Mr. Richard Tennant to provide some additional information.

MR. TENNANT: Richard Tennant, Emergency Management Program Division, for the record.

Yes, RD-2.10.1 spelt out guidance for the licensees on their communication plan, so it does, specific
to the designated preliminary exposure planning zone, which
is now the detailed planning zone, so that is the 10 km.

But outside of that, in the PNERP Master
Plan, Appendix C, Section 4, there is a reference to
agriculture as well. So there is a mention how to
communicate and explain things as well, and this is for the
ingestion planning zone, which needs to be differentiated
between emergency planning zone, which is outside the
shelter and evacuation.

MEMBER VELSHI: So the City of Toronto has
passed a motion that the CNSC and I think it’s OPG and the
Province should be doing more to raise awareness outside
the detailed planning zone. What would your advice be to
Commission on that?

MR. TENNANT: Richard Tennant, for the
record. The regulation RD-2.10.1 spells a minimum
requirement, but we would strongly support any efforts to
extend communication and education past the requirement.

THE PRESIDENT: But I’m still back to the
KI distribution. So I thought that in the REGDOC there is
a reference to vulnerable population that should be treated
differently. I assume it doesn’t mean that somebody goes
online and order it, it means that there’ll be a
proactive -- making it available.

So I’m trying to understand, to the
vulnerable population; schools, hospitals, retirement homes, what is being done over and above the normal make it available?

**MR. TENNANT:** Richard Tennant, Emergency Management Program Division, for the record. So the stockpiling, which is outside of the DPZ, it does reference vulnerable populations, and part of that would be the management of where the KI would be stored, so it can be expediently given to these identified populations.

**THE PRESIDENT:** So who does this? Whose responsibility is it to make sure that it’s done? Is that the Office of the Fire Marshal or the local community, or the local municipality? Who actually makes sure that those vulnerable communities have access to the KI pills in the 50-km zone?

**MS McCLENAGHAN:** Mr. Chairman, if I may indicate what our position is on that question, which is that while the mechanics and cost of providing the KI and the information beyond the detailed planning zone should fall to the operator, and while the municipality should be cooperating with that as necessary. That it is integral to your role as regulator to ask, as you are doing right now, whether it is being done, and to require it to be done as a condition of licensing.

As you point out in the REGDOC that you
issued, you did require that particular consideration be given to sensitive populations such as children and pregnant women within the designated ingestion planning control zone.

So this is the kind of question that we are raising when we say we don’t see evidence of this happening around the Pickering plant for those vulnerable populations.

MR. BURNS: Scott Burns, for the record. So I’ll just make a couple of comments. We’re talking about a few different things. We’re talking about the deployment strategy of KI outside of the detailed planning zone.

So we have a clear strategy inside the detailed planning zone and we have a clear stockpiling strategy outside of the detailed planning zone.

In terms of the Bruce, they have modified their strategy, which we heard about yesterday. Some of the foundation of their decision we understand to be in relation to potential road closures, which occur more often in their community and don’t generally occur as often in ours.

So if we were fundamentally talking about changing that strategy, it would have to be an evidence-based decision. Simply just stockpiling in the
school does not necessarily make it more effective. It depends on the time of day.

As we know, if you do have a controlled release, that progresses over some period of time. We know that generally families facing evacuation would want to reunite with their children. So there’s a number of different factors that we would have to think about and consider in order to change that strategy.

So it’s not as -- although it seems, on the face of it, it might be as simple as just changing the strategy and putting it in the schools, there would have to be a collaborative discussion with the partners. OPG, we support our municipal, regional, provincial partners in this. We’ve heard this morning we’ve never shirked our responsibility with that, nor would we ever.

But I’d like to come back to what we heard this morning about the planning basis. We heard from the CNSC and from the Province around that planning basis. We heard from Health Canada. Everybody that spoke about it said they were satisfied with that planning basis.

We, as a community, are following that planning basis in order to keep our community safe.

The provinces indicated they are in the process of doing a technical assessment. We are following that closely and looking forward to the results. So if
there are recommendations that come out of that, it would be our intention to follow and support those recommendations.

THE PRESIDENT: What I'm trying to find out is the meaning of the words “vulnerable population” in the REGDOC. What does it mean in terms of a requirement? I’m not getting a straight answer.

MR. JAMMAL: Ramzi Jammal, for the record. Since you’re talking about REGDOC and the regulatory requirements, in the REGDOC we have two components. I would like to take 30 seconds to walk through and clarify the difference between a requirement and the guidance. So in our REGDOC we say that as a requirement, Section 2.3.4, that the licensee shall:

“ensure that a sufficient quantity of ITB agent is pre-stocked and ready for prompt distribution within the designated ingestion control planning zone; this inventory of ITB agents shall be located so that it can be efficiently obtained by, or distributed to, members of the public when required”

Then we go on, as a requirement, number 4, that’s your question, Mr. President:
“ensure that particular consideration is given to sensitive populations such as children and pregnant women within the designated ingestion control planning zone”

Then we go to the guidance, which is under the same section. Then we provide the guidance for the responsible authority:

“Pre-stocked ITB agents for the designated ingestion control planning zone should be located to facilitate prompt and efficient distribution during an emergency. Recognizable locations with credible persons within the community (such as fire stations, police stations and pharmacies) should be considered in the selection of pre-stocking locations.”

So we have the guidance in place.

We previously spoke about international. If you look at the Swiss, we just finished under the Convention on Nuclear Safety the Swiss report. They said the Canton has the responsibility to make sure that the distribution is done. So the regulator provides guidance
and provides the requirement. The implementation, internationally, there is the local authority, there is the federal authority, and then equivalent to provincial authority.

So, as a regulator, we’re providing requirements, we’re providing guidance, and with respect to the implementation let’s take the Swiss, they specifically state the Canton.

In Germany the federal regulator provides recommendations -- not even a "shall" shell statement, a recommendation -- in certain areas. Like, the state, Aachen, where it’s a proximity to Belgium, the local authority decided to pre-distribute, at the 50 km, iodine.

So the consistency is applied from a regulatory perspective on what is the best way for protective measures and actions to be taken, the implementation is at the local authority.

So the question is, who is in charge? It’s the provincial and the local authorities will make sure that there is coordination, but at the same time it will be useful to be use in the case of an emergency.

THE PRESIDENT: Well, I accept that the first requirement that was mentioned is being handled. I’m not sure about the second requirement. In terms of the "shall" here for sensitive populations, I don’t -- what has
it got to do with fire places and...? So I’m not sure about that.

Dr. Demeter, you wanted to ask a relative question?

MEMBER DEMETER: Well, this is an issue that I’ve been struggling with as well, especially since the two teachers and their boards talked.

So from PNERP, can you tell me is there a detailed document that lays out where the KI pills are distributed beyond the 10 km, the volume, and the plans for getting that to vulnerable populations?

If there is such a plan, can it be tabled with the Commission so that I can have some confidence? Because right now, to be honest, all I’ve heard is a lot of arrows going in different directions without actual firm statement that, yes, we’ve stockpiled, here are the locations, here are plans for getting to vulnerable populations.

I need that degree of certitude, because it is our responsibility to make sure that those people are safe.

MR. MORTON: Mike Morton, with the Office of the Fire Marshal, for the record. So just to back-up one step, and we just want to make sure that this is on the record, is that the new PNERP is consistent with the REGDOC
reference 2.10.1 in that KI has been distributed. It is required within the detailed planning zone. As we heard earlier this morning, those zones have been established based on the planning basis, based on the credible scenarios and even were based on an INES 7 level emergency.

With respect to KI in the broader IPZ, we do have the requirement for stockpiling out to 50 kilometres and there is that requirement that those be made to any resident, not just vulnerable populations but to anyone that requests that. And when they do that, they would be provided with not just the pills but with information on those pills, which we heard about earlier they can read about on a variety of websites and through a variety of communication methodologies. So again, the PNERP requires pre-distribution in the 10-kilometre zone because that is what the risk scenario indicates and the analysis of our Ministry of Health and Long-Term Care indicates.

That said, we want to ensure that anyone that has an interest in this within the 50-kilometre zone has an easy way to obtain that and for that reason around 6 million doses of KI have been stockpiled and are available not just for pre-request if individuals choose to request that but could be distributed on an emergency basis outside of the 10K zone, which would be very much based on an
assessment of the situation, a technical assessment, and would be more into an incident, because this is to protect from a very specific risk, when a plume moves over and there is a potential for airborne exposure. Our preference is always going to be to evacuate if we have plume consequences that are moving in a certain direction or potentially outside of that 10K zone into any sort of hotspot.

**MEMBER DEMETER:** So I guess I have heard some more detail, so 6 million doses have been distributed, but do you have a planning document that outlines in lined form where things are stockpiled and how to distribute them to select vulnerable populations and can that be tabled?

**MR. MORTON:** Mike Morton, for the record. I'm going to turn to my colleague Jonathan Stone, who is our Manager of Planning. He will speak to that scenario and then we can see if that does address your question. If not, we can take an endeavour for the Ministry of Health to respond more fully. They are not able to be here today, but if necessary we can ask them to provide further detail.

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

So I can confirm that the 6 million doses are in stocks held and maintained by the Ministry of Health and Long-Term Care in the Greater Toronto Area at the
government pharmacy. So they are in a centralized location. The location has easy and ready access to distribution points via 400 series highways.

And in terms of the specifics of a plan, we are currently working with the Ministry of Health and Long-Term Care and our colleagues at the OPP and MTO to develop that plan. That plan will be aligned with the 2017 PNERP Master Plan and will take into account ultimately the result of the PNERP technical study.

That said, in the event an emergency were to occur today, the distribution of those stocks would occur and be coordinated via the Provincial Emergency Operations Centre, which would handle delivery of potassium iodide pills in the IPZ as part of the overall provincial emergency response operations.

So at a high level the PEOC scientific section would assess -- would undertake an assessment to determine the need for thyroid blocking, specifically where that would be required in the IPZ. This would include a direct engagement with the Ministry of Health and Long-Term Care and the Chief Medical Officer of Health. We would then work with our ministry partners within the PEOC to undertake the emergency distribution. So that would include MTO, Health, OPP. It would also include our partners at the municipal level. And I think at a high
level we would already use the resources that are in place to access and distribute the doses to the distribution points and this would also include the provision of instructional material to people receiving those doses so they were clear on how to take it and in what timeframe.

**MR. JAMMAL:** Dr. Demeter, it's Ramzi Jammal, for the record.

I think we are going in circles here. What is of key importance here I want to reemphasize the fact that the PNERP has been updated and in the implementation of the PNERP there is a requirement on the power generation such as the licensee to fulfill the requirement, and then there is a requirement on the provincial authority and the local authority. So if you look at the implementation plan of the PNERP, the key point here has just been mentioned, there is a Chief Medical Officer, and I think if there is confusion what I'm recommending is for CNSC staff to work with the provincial authority, include the medical officers of the areas for them to understand what it is that should be done to address the sensitive population in the Greater Toronto Area. Because once there is an order to provide the potassium iodide pills it's going to be an order coming from the Ministry of Health and Long-Term Care, but the key point here is there's Medical Officers who are in charge of
the well-being of the community and they should be engaged in this discussion to determine what needs to be done.

**MEMBER DEMETER:** So I understand the decision to release and take the potassium iodide is usually through the Medical Officer of Health, the Chief Medical Officer of Health or their designate. What I was drilling down to is what I've heard is that this stockpile is in a central location within the Ministry of Health and not in a distributed model like some other regions like Bruce. The 6 million doses are in a central stockpile is what you said.

**MR. STONE:** Yes, sir.

**MEMBER DEMETER:** So I'm being very down to earth and mechanical here. What I want to get a sense of assurance is that it's centrally stockpiled and the logistics for distributing that, you know, because that's the important thing once it's decided that you need it.

**THE PRESIDENT:** But that wasn't my understanding. I thought you guys said it's in pharmacies all across GTA. Okay, so we are going to have the Medical Health Authority I believe on Thursday here and maybe we can raise it with them, because I think you are right and we are talking about two different types of population, we are talking about the general population that the plan now says, you know, go and get it. I'm talking about the
vulnerable population that needs it to be distributed before, they are not getting it distributed, and I was thinking about school boards, maybe hospitals, maybe retirement homes, this kind of a thing. So I want to hear from the medical authorities what their plan is. Now --

**MS McCLENAGHAN:** Mr. Chairman, when you have them here -- and I will try to be webcasting on Thursday but I won't be here -- one thing to keep in mind and for all of us to keep in mind is that the Health Canada guidance is that the KI needs to be distributed or to be consumed, pardon me, to be most effective, just prior to a release that might include radioiodines and its effectiveness tails off very quickly after it's ingested, in the order of a couple of hours, up to six maximum. So we are talking about logistics that would have to account for how to have those children and vulnerable populations in that 50K zone actually consuming the KI before, preferably before a plume to which they might be exposed, and if not then pretty much right at the same time. And absolutely I agree evacuation is the preferable strategy, but this is just about accounting for circumstances where something went wrong and there is a quicker timeframe.

So when you are asking those questions about logistics, which I am very happy to hear you doing because I have encouraged you to take on this
responsibility of checking that these things are actually in place on the ground, that kind of question that Dr. Demeter is asking about the logistics is very apropos. And to think that we actually could get it distributed to all of those facilities, you know, in something under four hours all across the 50K zone from a central facility is the kind of thing that I think if you drill down you are going to find -- it sounds like there is not a plan yet, but it belies logic that it could be effective. So that's why we are advocating for pre-distribute to those vulnerable facilities so that you leapfrog those logistics.

THE PRESIDENT: Okay. Thank you.

Other colleagues? Ms Penney...?

MEMBER PENNEY: Hi. Thank you. I wanted to talk about decommissioning. So I'm looking at your slides 13 and 14 and your submission, Section 5, 5.1 and 5.2. You have concerns about the regulatory framework around decommissioning and the timeliness of a decommissioning plan, and when I look at CSA N294-09 and the CNSC guidance G-219, you say in addition to that there should be additional guidance from IAEA and I would like you to just talk about that a little bit. I'm hoping that maybe there is something in that IAEA guidance other than a different option than the one that has been proposed by OPG and accepted by the CNSC with respect to in-place, not
immediate decommissioning. So perhaps you can give me a little bit more around the decommissioning issues, and then of course staff and OPG.

**MS BLAISE:** Kerrie Blaise, for the record. Thank you for the question.

So I think the decommissioning segment of our report also comes from our sustainability chapter, so I think what's important to recognize is by saying there is a preferred decommissioning strategy jumps over the fact that the alternatives haven't all been looked at, so what are the options for decommissioning, what would they look at, where are the technical studies, where is that review. So while the IAEA GSR Part 6 stipulates that the preferred decommissioning strategy such as immediate dismantling, if that is chosen, you have to consider all of the other relevant factors in other situations which could be applicable to the situation.

**MR. MANLEY:** Perhaps OPG could speak to the decommissioning as well. It's Robin Manley, for the record, and I have Art Rob here who is our Vice President of Decommissioning who is prepared to expand on this further. But just a couple of remarks.

First off, with respect, this is not a decommissioning licence hearing, we are not applying for a decommissioning licence. We do have a preliminary
decommissioning plan filed on our public website, and again, it has been discussed in front of the CNSC Commission in the past. We do update our preliminary decommissioning plan on a regular basis and we will in time prepare a detailed decommissioning plan as well.

We are familiar with the IAEA documentation and we perform extensive benchmarking around the world as to what decommissioning plans, strategies and actual things have actually happened. In fact, if you look around internationally, there is not a consensus on what is the right answer on decommissioning. In fact, it is done on a case-by-case basis and it does take account of local considerations, safety, the environment, cost and all sorts of other things, and OPG has looked at those factors and they have all informed our decommissioning strategy to date. In general terms, the international industry is split sort of 50:50 on whether to go to prompt decommissioning or delayed or deferred dismantlement. In addition, there is a third option about a sort of a local storage option as well.

Perhaps at that point I can pass it back to Art Rob to expand on this.

**MR. ROB:** Art Rob, for the record. I am the Vice President of Decommissioning with Ontario Power Generation.
So Mr. Manley has done a good job characterizing some of the work that OPG has done so far in preparing detailed decommissioning -- or, sorry, preliminary decommissioning plans.

I think just to clarify maybe a point about the IAEA, the IAEA recognizes of course the different strategies that can be used for decommissioning and it's sort of a case-based, risk-based kind of approach that they would endorse. One of the things that drives the IAEA position on prompt decommissioning would be of course the capability or the predictability of the constituent to be able to actually carry out the decommissioning in the future. Today we have heard actually about the financial guarantee process that actually is endorsed by the Commission and of course OPG has been through that process and demonstrated our capability to actually manage the decommissioning costs in the future. So I don't think that the IAEA case in this regard is appropriate for the Pickering decommissioning. So we have a demonstrated financial guarantee in place, we actually have plans in place, and we have worked carefully to make sure we have appropriate planning.

THE PRESIDENT: This intervenor and many other intervenors are going and repeating, saying Canada lacks an adequate framework for decommissioning. Staff...?
**MR. FRAPPIER:** Gerry Frappier, for the record and I will move it to Ms Karine Glenn in a minute.

We would disagree with that. We do have a framework in place. We have just been to the IAEA in Vienna on the convention on how nuclear waste is managed and that was part of the discussions.

But in general with respect to our overall framework, I would ask Karine Glenn to provide some info. She is back in Ottawa.

**MS GLENN:** Karine Glenn, for the record. I am the Director of the Waste and Decommissioning Division at the CNSC.

As Mr. Frappier pointed out, we disagree with the intervenor's statement that Canada has an inadequate regulatory framework for the management of waste and of decommissioning. As Mr. Frappier stated in May, the Canadian delegation just attended the Sixth Review Meeting of the Joint Convention for the Safety of Used Fuel Management and the Safety of Radioactive Waste Management. Part of that is a review of the Canadian report which clearly elaborates what framework we operate under.

In addition to the *Nuclear Safety and Control Act*, there is also the *Nuclear Fuel Waste Act*, the Government of Canada National Policy on Radioactive Waste Management and a number of other guidance documents that
the CNSC has, as well as a whole suite of CSA Standards that deal with waste management and CSA Standards that deal with decommissioning planning. All of that put together creates a comprehensive and adequate framework for the regulation of waste management and decommissioning as well. Recently, in April of 2018, the CNSC issued a fact sheet that outlines the framework and that is available on the CNSC website as well.

The other thing I would like to point out is that the CNSC has undergone two IRRS reviews, one in 2009, a follow-up in 2011, and while there were opportunities for improvements identified in the area of guidance for waste management and decommissioning, and we are currently addressing those improvements through our modernization of our decommissioning and waste management guidance document, there were no gaps identified. More recently, staff here at the CNSC have undertaken an extensive side-by-side comparison of the IAEA documents that are available against the CNSC and the CSA documents and they have confirmed that there are no gaps.

THE PRESIDENT: Thank you.

MR. LOCKWOOD: Randy Lockwood, for the record.

If I may, personally I find the comments from the intervenor around decommissioning to be extremely
vague. Currently we meet all the requirements that are in place. We have laid out our strategy to all stakeholders, including the public in various community information sessions, council updates, tours, et cetera. It is posted. Our preliminary decommissioning plan is posted on our website for all to see.

As well, that plan takes into consideration what we hold dear, protection of the worker, the public and minimizing the impact on the environment. We have talked about what our long term is in line with and we have talked about our long-term plans for low and intermediate waste as well as spent fuel. Finally, it looks at minimizing the cost based on what we presently know now.

And lastly, I would like to say that we have ensured that there is adequate funding through the financial guarantee, which is reviewed on an ongoing basis to ensure that there is adequate funding to carry out that proposed decommissioning plan.

**MS BLAISE:** President Binder, if I may respond to that briefly?

**THE PRESIDENT:** Go ahead.

**MS BLAISE:** Thank you. Kerrie Blaise, for the record.

I would just like to reiterate that in
addition to decommissioning triggering regulations and rules under the NSCA and the Nuclear Fuel Act and many CSA Standards, I would just like to point out that currently decommissioning is not under the project list for the proposed Impact Assessment Act. So decommissioning as an activity doesn't trigger an environmental assessment. So in a request for a ruling that CELA, along with Greenpeace and Northwatch, put to the Commission is that decommissioning become a project under the proposed Impact Assessment Act. The proposed Impact Assessment Act is still a Bill right now, it passed third reading and it's proceeding to the Senate, and so I think if we could see decommissioning under a project list, that would trigger a federal environmental assessment under Canada's new Impact Assessment Act, that would remedy -- it would be a first step. It would address many of these issues.

THE PRESIDENT: But it is not really going to be this Commission's decision about whether it is part of the designated project or not, so why are you suggesting that we do anything about that?

MS BLAISE: We would recommend that the Commission makes a recommendation to the Ministry of Environment and Climate Change that it would --

THE PRESIDENT: It is a piece of legislation now going through Parliament. All the
consultation has been done, so I don't understand how we can help on that concept.

**MS BLAISE:** So the consultation on the project list is still ongoing. There was a June 1st deadline for one phase of the consultation.

**THE PRESIDENT:** For which you made a submission. We all read your submission, everybody read your submission, so the process will follow right now the process. Nothing to do with us.

**MS BLAISE:** But the consultation remains open. Everything is still proposed, so there is still the opportunity for decommissioning to be a designated project under the IAA.

**THE PRESIDENT:** Go ahead. Go ahead.

**MEMBER LACROIX:** Thank you, Mr. President.

This question is for CELA. It's on recommendation number 11. It's about the maintenance of Pickering NGS in a safe configuration. You mentioned that CNSC should exercise its authority to compel OPG to undertake an alternative means of analysis that utilizes the best available up-to-date science and methods. I want to know, what is wrong with the actual science and methods used by OPG and what is right about the alternative means?

**MS McCLENAGHAN:** The recommendation is aimed at the situation where the plant closes and there is
quite a bit of debate, as you are hearing here, about what should happen after that in terms of what's a safe state for the plant. It has to do with the decommissioning discussion we just had. That has to do with the pace of decommissioning, where should material be stored on the site, what if there aren't other facilities elsewhere, and fundamentally the question about whether we have a satisfactory state at the moment is still I think very open to debate. Do we think that the current location and security around fuel waste onsite is sufficient, do we think that the intermediate waste is well stored at present, and this needs to be considered for the kind of near to medium term. So we are not suggesting that we have the answers today, but we are suggesting that this is a very live debate both in the community and for Canada in general as we move into this phase of nuclear power and we need to explore whether we have sufficient research and science around those options so that we have the maximum security, not just environmental health and safety but also security for all of those kinds of waste and facilities as we move from one dismantling/decommissioning long-term state to another.

**MEMBER LACROIX:** I'm a bit confused here. You're talking about science or practices?

**MS McCLENAUGHAN:** Well, we --
MEMBER LACROIX: It's totally different.

MS McCLENAGHAN: We also think that ongoing research about alternatives, for example, to deal with intermediate waste as well as fuel waste, is highly necessary. So for example, we've been involved in the deep geological repository. And there's absolutely all kinds of ongoing science still needed for that facility for intermediate waste and low waste as well as for the NWMO process. And science is going on all over the world in that we haven't arrived at the right answer for all of these facilities yet.

MEMBER LACROIX: I would like to have a reply from OPG, please.

MR. GREGORIS: Steve Gregoris, for the record.

So we have a very clear plan that was discussed during our presentation with regards to waste once the units are shut down. Specific to the fuel, we have shown that we will defuel the units in the first one to three years of shutdown. That fuel will be stored in the irradiated fuel bays for up to 10 years. At that point, that fuel is transferred to the dry storage facilities.

Through the periodic safety review, we did a full review of the irradiated fuel bays, including the
health of those bays and the supporting equipment. And the bays and supporting equipment were found to be in good health and the programs will ensure they remain in good health so that we can execute the strategy as shown.

As far as the dry fuel storage and our waste management facility, that facility meets regulatory requirements. The storage of the fuel there can be for an extended time. It's designed that way. Ms Morton spoke to that. If there's any delays, it's designed to cater to that. And it meets all security regulations.

THE PRESIDENT: Okay. Staff?

MR. FRAPPIER: Gerry Frappier, for the record, and I'll pass it to Ottawa in a minute, there.

I think that certainly science is always something we should be keeping track of and moving forward with, and there are certainly more and more science research going on associated with optimization of decommissioning and waste storage.

With respect to some of the areas that we're talking about, you know, fortunately, you do have a regulator and we are considering all those matters. And so with respect to putting the unit into a safe state at the Pickering site, there's already a couple of units that are in safe state. We are going through -- or pardon me, Hydro-Québec has also done that with the G2.
We have a very good compliance program associated with how to take that nuclear power plant, move it in a safe way towards complete shutdown and safe storage. And as was mentioned by OPG, moving the fuel -- defuelling it, putting it into the wet storage, and then eventually moving all that to dry storage.

THE PRESIDENT: Okay, we're going to have in 2028 there will be application for decommissioning.

MR. FRAPPIER: Uh-huh.

THE PRESIDENT: Where most of those things -- this is not a decommissioning kind of a hearing here now.

MR. FRAPPIER: Okay.

THE PRESIDENT: So I really would like to move on.

And do you have any particular question?

MEMBER PENNEY: I was just going to say to CELA we had fulsome description last night of waste management from both CNSC staff and OPG, so you might want to -- if you haven't.

MS McCLENAGHAN: Yes, and we know there are other intervenors here focused on waste management.

THE PRESIDENT: So the one last -- the one question I have, and I want to put this away once and for all. Somebody talk to me about contaminated water. Lake
Ontario will not provide drinking water. Where does that come from, and it is likely, and what's the plan?

MS McCLENAGHAN: Mr. Chairman, do you want --

THE PRESIDENT: I'm looking for the Office --

MS McCLENAGHAN: Yes, do you want me to start with what the concern is and then you could ask them --

THE PRESIDENT: No, I heard your concern. We've read your concern. I would like to hear it from the Office of the Fire Marshal.

MR. MORTON: Mike Morton with the office of the Fire Marshal, for the record.

So we want to begin again just by assuring that there are plans and procedure in place to protect drinking water supplies and also to assess the effects of an accident on drinking water.

Within the context of our plans, there's really two scenarios that we're looking at. We would be looking at the impacts following an accident at the plant that releases to the air. But we also, under the liquid emission plan, look at an incident that would involve a release of tritium. So these are two separate and distinct scenarios for which we have separate plants that have been
well detailed.

In terms of the specifics of those plans, it essentially involves a combination of real-time monitoring at the water intakes as well as for airborne contaminants that's done by our Ministry of the Environment and Climate Change. And there are very specific levels that are set that would indicate when a drinking water supply would have to be closed as a result of contamination.

We do have a representative of the Ministry of Environment and Climate Change who is attending on Friday. He's highly specialist in these areas and could speak to Ontario's regulations related to drinking water and the very particular details of this. And --

**THE PRESIDENT:** That's the Ontario Ministry of Environment?

**MR. MORTON:** That's correct, the Ontario Ministry of Environment that has the direct oversight of drinking water in Ontario --

**THE PRESIDENT:** They will be here on Friday?

**MR. MORTON:** Here on Friday with their specialist who works directly with these plans and the regulations for water safety.

**THE PRESIDENT:** Okay, go ahead now.
MS McCLENAGHAN: Mr. Chairman, I am not aware of any specific plans. And I do a lot of work on Ontario drinking water. In fact, I wrote a book for Carswell on Ontario drinking water law. I pay a lot of attention to this issue.

I would like the Commission to find out what the plan is and to table it publicly.

There was some assessment of routine operation radiological hazard for the source water protection plans with some consideration that intakes might have to be closed if there were an accident. But I am not aware of any plans for contingency supplies for the kinds of populations we're talking about, nor am I aware of any assessment having been done and made public about what the hazard would be in the wake of various accident scenarios.

And I might add that the Minister -- OFMEM's Minister asked them to provide that in 2013 after she met with CELA, Greenpeace, and Durham Nuclear Awareness. And as far as I know, that has never been done, a contingency plan for drinking water around the nuclear plants.

THE PRESIDENT: So staff, when the calculations for release were made, were there no calculations about those release impacts on the water and what kind of contamination will result from that plume
hitting the water? Was any of this stuff done?

MR. McALLISTER: Andrew McAllister, director of the Environmental Risk Assessment division.

I'm not too sure if this will fully address your question, but to get around the idea of, you know, has there been an examination of accidents near us that may impact the Lake Ontario specifically from the nuclear generating station, the answer is yes. This was done under the Pickering B refurbishment environmental assessment that was conducted in around 2007. And it looked at a direct discharge to Lake Ontario as a result of a release of moderator grade heavy water to Lake Ontario, resulting in a maximum tritium concentration in drinking water of around 17,000 becquerels per litre, which translated to a dose to a member of the public of less than 1 microsievert per day, which is a fraction of both background radiation dose and the annual public dose limit in Canada.

So it has been examined in the Bruce refurbish -- sorry, the Bruce? -- the Pickering refurbishment environmental assessment, and that has helped -- that helped or was concluded by the Commission of no significant environmental effects in that case.

THE PRESIDENT: So did any of this get translated into action in the PNERP? Go ahead.
MR. MORTON: Mike Morton, with the Office of the Fire Marshal and Emergency Management.

We'll reference a couple sections of the PNERP, and then I'm going to turn over to Lorie Whitcombe is our senior scientist. She can speak to our procedures that would be put into place if there were an accident affecting potentially water quality. And she'll also speak to our liquid emission response plan.

But for reference, our water standards are in section 1.9.4 of the Master Plan, and then Annex E, Appendix 2, is where we have our specific intervention levels in terms of contamination in water that would be put these procedures into place.

But at this time I'll turn it over to Lorie, and she can give us an overview and then we'll see how far that takes us.

We do, again, have the Ministry of the Environment coming on Friday.

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

The Province does have the Provincial Liquid Emissions Response procedures. These procedures are subordinate within the PNERP and they are intended to address an emission directly from the station into a lake. We follow these procedures, which outline how all of our
stakeholders come together; how we are going to take samples and from where; who will do the analysis, whether it is the Ministry of Labour or, for example, Health Canada; and what our next steps collectively as a group are.

As a part of that group, we have stakeholders that are embedded in the Environmental Radiation And Assurance Monitoring Group. These are both provincial ministries, such as the Ministry of Environment and Climate Change, and also a federal contingent, including Health Canada and the Canadian Food Inspection Agency. In addition, under the PLERP, we also include the region and the local medical officer of health, who comes into this group to provide guidance and advice.

Outside of a direct release from a station into a lake or other body of water, under the Environmental Radiation and Assurance Monitoring Group, we can take samples of water from any source that needs to be assayed, so from well water, from lakes, from rivers, wherever we need to take that sample we can do that, and we can then analyze and formulate actions as they are needed.

**THE PRESIDENT:** Questions? Ms Velshi.

**MEMBER VELSHI:** I have two very quick ones. The first one is for OFMEM.
The technical study that's being done right now, and this may be premature, but is it likely to change the emergency planning zones' dimensions?

**MR. MORTON:** Mike Morton with OFMEM, for the record.

It really would be premature for us to suppose what the technical study would say. Once we have those results, our approach within the public service is to make recommendations and options to government. Then, based on that information, those decisions would be made, and if any changes were indicated, then that would be taken through the same process that has led us to our current plan, which is cabinet review and approval of the plan.

**MEMBER VELSHI:** Thank you.

The next question is to staff. This is around Recommendation No. 12. There was some indication that the Licence Conditions Handbook does not make reference to the latest version of REGDOC-2.10.1. Comment on that, please.

**MR. FRAPPIER:** Gerry Frappier, for the record.

As we've discussed before, REGDOC CSA standards have a certain process by which they get into a licence space. For this particular one, I'd ask Heather Overton to give us some details.
MS OVERTON: Heather Overton, for the record.

REGDOC-2.10.1, version one, which was published in 2014, is in the Licence Conditions Handbook. The simple reason is that when OPG first notified us that they were going to renew the licence, we put together a list of new and updated REGDOCs and CSA standards that were considering for inclusion in the Licence Conditions Handbook and asked OPG to provide us with their implementation plans for those new standards.

Just to have some certainty for their licence renewal period, we established a cut-off date, and we informed OPG that any new or revised standards published after that cut-off date would be introduced into the Licence Conditions Handbook after renewal, following our regular implementation process.

Version two of REGDOC-2.10.1 was published after the cut-off date, so it will be introduced into the LCH following our regular process. Once new REGDOCs and standards are eventually introduced into the licensing basis, the Commission is informed of that on an annual basis through the regulatory oversight report.

MEMBER VELSHI: As I'm not really clear, the proposed licence conditions handbook that's attached to
the staff CMD, does that have version two in it as the licensing basis?

**MS OVERTON:** It has version one in it.

**MR. JAMMAL:** Ramzi Jammal, for the record.

You've been described aloud here the process with respect to establishing a licence and the Licence Conditions Handbook. What is important to understand is the content between the versions is identical. It's very, very similar. There's only one reference in version two that will be updated, so the key point here is the content between the previous version that we issued, as the CNSC, and the new version that's upcoming, they are very, very identical, similar.

I will pass it on to Richard in order to tell you what is the -- it's so minimal. It's administrative in nature. We established the take-off point as being, I hate these numbers but anyway, 2.10.1, the version, the previous version, and now we're updating it with the second version.

The LCH will be updated as soon as the implementation plan is in place, or at the frequency that first comes. If there are any major gaps that really impact safety, we'll make the change immediately, but Richard will provide more detail.
MR. TENNANT: Richard Tennant, for the record.

Version one, when it was released, shortly thereafter there was an update to REGDOC-2.3.2 on accident management, so REGDOC-2.10.1 was updated, because they speak to the same topic. The updates for version two updated the changes in REGDOC-2.3.2, accident management, so a long story short, there's no changes in the regulatory criteria specific to REGDOC-2.10.1 that applies to emergency management between version one and version two.

Version two has been released, but as Ms Overton said, there was a cut-off date.

THE PRESIDENT: Okay. Anything?

Go ahead.

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

I'd just like to do a very brief supplement to Commissioner Velshi's question around the technical study, and also a brief supplement to Lorie's presentation, just because of the concern expressed that there wasn't a plan. I just want to reference the PNERP section 7.15, which is about liquid emission response, and 7.15.2 requires the development of the provincial liquid emission response plan that Lorie referenced. That is, though, a separate plan, which we're happy to provide, it's
just not in the master plan which establishes the 
requirement for it, so we can certainly provide that.

Then, 7.6 is the Environmental Radiation 
Assurance Monitoring Group Plan that's actually just been 
fully refreshed, and it is a separate plan in support of 
the PNERP. We wanted to offer that clarification, and 
also --

THE PRESIDENT: Those plans are available?

MR. MORTON: Those plans are openly 
available. All of our plans are public, they're just a 
supplement to the PNERP, so that's why you don't see them 
in the main text.

I also want to just give Lorie the 
opportunity to speak very briefly about the technical 
studies' scope with respect to drinking water, because we 
are working to fully assess what we have in place now to 
make sure it's adequate. Again, that would inform any 
changes that might be needed.

I'll just turn back to Lorie for just a 
moment, if that's okay.

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

Just to clarify, as Mike alluded to, the 
technical study will include, as an integral part, a 
detailed analysis of the impact on drinking water, water in
general, under the three accident scenarios that have been chosen for the technical study, that is, a design-basis accident, a beyond-design-basis accident, and a severe beyond-design-basis accident. Each of those will have a water element included in the technical study.

**THE PRESIDENT:** What's the estimated release of that study? Will there be a consultation about that study? I'm trying to understand the process.

**MR. MORTON:** Mike Morton with the Office of the Fire Marshal and Emergency Management.

The study's target and date is by end of calendar year 2018, and it is building upon the work that's been done to date in terms of the public consultations, so they will have obviously full access to the public commentary, the advisory group report, as well as the facilities having granted them access to source term. Really any information that they determine they need will be made available.

**THE PRESIDENT:** Okay. Thank you.

CELA, you have the last word.

**MS POREMBA:** Thank you.

The Commission's role is to ensure that the plans are robust enough, and that includes practical questions like sufficiency of planning zones and sufficiency of the resourcing. As we recommended, active
public awareness and KI distribution should extend to 50 kilometres.

After considering the response to CELA's presentation, as well as interveners last night, we feel the need to make the following request for a ruling under section 27(3) of the CNSC's Rules of Procedure. We ask the Commission to direct OPG and OFMEM to release all plans regarding the stockpiling of and distribution of KI in the ingestion planning zone around the Pickering nuclear station to confirm compliance with section 2.3.4, clauses 2, 3 and 4 of REGDOC-2.10.1, by 5:00 p.m. on June 27, 2018.

We make this request for the following reasons:

One, we have heard from CNSC staff that the only requirement for KI stockpiling and distribution in the IPZ is that there be a plan, but we have reviewed all publicly-available information and there is nothing in the public domain to confirm the existence of such a plan.

Two, we have heard evidence and public concern during these hearings that Bruce Power has complied with this clause by stockpiling KI in all schools within 50 kilometres of the Bruce nuclear station, but OPG has made no equivalent effort.

Three, the large population around the Pickering nuclear station would make the prompt
distribution of KI to vulnerable communities, such as children, logistically challenging in the event of an emergency. There is no evidence on the record to show that the province or OPG could distribute KI promptly enough to protect a large number of vulnerable individuals in the ingestion control zone.

Four, as we heard last night, the Toronto District School Board has passed a motion requesting the CNSC facilitate the stockpiling of KI in Toronto area schools.

Five, without this information on the record, we don't believe the Commission has sufficient information to make a determination of whether OPG is in conformity with its licensing basis or has demonstrated sufficient effort to protect the health of Canadians.

Thank you.

THE PRESIDENT: Could you pass that in writing to the secretary, please?

Okay. Thank you.

We are going to break now for 45 minutes. Can everybody do lunch in 45 minutes? Is that okay for everybody, 45 minutes? Okay.

--- Upon recessing at 12:59 p.m. /

Suspension à 12 h 59
--- Upon resuming at 1:45 p.m. /
Reprise à 13 h 45

THE PRESIDENT: Okay. We are ready to proceed.

And the next presentation is by Ms Tilman as outlined in CMD 18-H6.24 and H6.24A.

Ms Tilman, the floor is yours.

CMD 18-H6.24/18-H6.24A

Oral presentation by Anna Tilman

MS TILMAN: Thank you very much and good afternoon.

I would like to go over the Power Point presentation now, as you will see in front of you, very quickly in order to work on some issues that are important.

You know what the OPG's licence request is, this is known, but the point I want to stress is this is in contrast to the shutdown as proposed in 2020 in its current licence.

One of the issues of Pickering, if we review its history, it's a legacy of safety issues. In particular, a particular point is the last two bullets: all reactors share the same safety and support systems. That's
unique I believe. And at least two units at Pickering B must operate to support the safe operation of Units 1 and 4 of Pickering A.

So, there's a safety issue concern just in terms of this alone and I'm not sure if OPG has planned to deal with this.

Going through the history again, originally the Units 5 to 8 would enter into operation -- continue operating until the end of 2020 or the limit of 247,000 equivalent full power hours would be reached. Units 1 and 4 had their pressure tubes replaced, so that's another issue.

And it was proposed that after the last shutdown, Pickering would apply for a deferred decommissioning strategy with a 30-year safe storage period.

But things have changed. This is a quick chart to show what was projected as end of life for the current licence period, and you can see that the years for Pickering B in particular vary from 2019 to 2021.

But now we see a change in plans as OPG is requesting to extend Units 5 to 8 up to 295,000 EFPH and operate until 2024.

However, as noted, there is a caveat in their materials in that, in quotes:
"OPG must notify the CNSC no later than December 31st, 2022 in case it wishes to extend its operation beyond the 2024 date." (As read)

Now, that is a red -- that's a difficult point and it is a great concern because does that mean that there is no end in sight, no final end in sight to operations?

I have spent a fair amount of time looking at the issue of pressure tubes and the importance of their integrity in the safe operation of these. Right now the current licence -- or the current licence is for 247,000 EFPH, but OPG's requesting 295,000 which they'll need if they want to continue operating for that much longer.

Aging issues are a critical factor here and the pressure tubes, the components, calandria tubes, et cetera, become more fragile. The other point is there's no way to predict when a critical fuel channel component will fail.

So, a fair amount of this presentation was based on aging issues, fuel components, the deterioration and the degradation and leakages as outlined here.

There's an increase with age of cracks to develop and if not -- if they're not repaired or detected in time, if it's even possible, it could lead to a loss of
coolant accident.

One of the main factors involved is the increase in concentration of hydrogen or deuterium, if you like, ingress which, as it accumulates, creates the formation of blisters and cracks and it's been the dominant contributor to reduction in what's known as toughness of pressure tubes.

This, in turn, can lead to a development of cracks and growth in cracks as with migration and what is called delayed hydride cracking is most pronounced during the transition state between shutdown to full power and vice versa. And very little of that is actually mentioned.

There's a fair amount on this slide dealing with deuterium ingress and corrosion.

And what I want to highlight in all of this is the effect of temperatures -- increasing temperatures such as the third bullet, the pick-up of hydrogen at rolled joints, but what's really important, is this issue has been researched for decades, but it still remains a major source of uncertainty, and I think that all operators would agree and the CNSC would agree with that because, in fact, in reading through the materials of CNSC and Canadian Nuclear Labs, formerly AECL, that uncertainty does strike one that there's a lot that is not known.
Now, this is just a diagram from CNSC's document -- a document showing the sources of deuterium intake and this is a concentration profile. You can see what's happening after a number of years of service, what is happening with the ingress of deuterium at the rolled joint and at the two end joints, particularly the end joint. And, again, very little is known about this.

One of the issues, too, that comes up that I have some issue with is that a lot is based on effective full power hours which only includes the time which power is produced; whereas hot hours, which includes close, turn on and shutdown times is a longer period and this affects the condition of the pressure tubes as well.

So, I would like to see more on that. Most of the literature that I've researched shows hot hours versus EFPH is the metric to use.

There's been a great deal of discussion on emergency planning and I don't want to go over some of the issues that have already been addressed in previous presentation, but the main thing is, if a severe worst case scenario accident were to happen today any time, are the emergency planning and preparations, the essential components in place?

And we've seen talks about public alarm systems, provisions for food, medical assistance. We've
had discussions on for vulnerable populations. One of the issues, are the planning zones even appropriate? We hear talks about the five, the 10, the 50, but how they're determined, how they're delineated; are they circular or not, do they cut off people or not? And I think it's very unclear how they've been designated.

You've heard discussions about the distribution of KI pills. And again, I won't repeat what you've heard in the previous presentation, but there are concerns whether it will reach the people most needed and it has to reach it within a timely fashion.

Also, KI pills we must remember only deal with one radionuclide release; there are many others. So, it is not a panacea, it is not the only thing we need to worry about.

The thing is, safe sheltering, where is that? We need far more discussion on safe sheltering. It's not just sheltering, it's not just evacuation. And farmland, livestock, I haven't heard very much about that.

We did hear about considerations given to vulnerable populations and workers, concern about workers in carrying out evacuation.

So, coming to the end of this part. In the interest of public safety, we find the time has come to shut down Pickering Station rather than risk an accident
which would be so devastating for so many.

We have a number of recommendations for CNSC based on this: that you provide explicit directions to OPG to prepare for a shutdown and issue an operating licence specifically for the period between. A suggested date is going back to the current licence period of 2020 to 2021. And then, during this time the preparation for safe storage decommissioning is to be undertaken, the public are to be engaged with all these matters and CNSC is to ensure that, and OPG must have a complete decommissioning plan I think sooner, rather than later, which would be subject to due public process and consultation.

There is no justification at this stage to proceed with a 10-year licence period, it is far too long, it entails a number of operations and unnecessary risks and it doesn't allow for public scrutiny at the level that at least a five-year licence or shorter licences would be.

In considering the age of the station and its history, its proximity to a highly populated area and safety issues, to continue to operate it as proposed for at least six more years poses enormous risk to the safety that CNSC as regulator should not accept.

Continuing operating Pickering also blocks far more affordable, safer and cleaner alternatives for residents of Ontario.
So, in conclusion, the position that is being put forward I think is very clear, that I don't think there's a leg to stand on to keep supporting the continuing operation with aging components, things that can go wrong, nobody wants anything to go wrong; not the operator, not the CNSC, not the public.

It is a public safety issue for which you are responsible, and I urge you to exercise that responsibility which I know that you can and have the power to do so.

Thank you very much.

THE PRESIDENT: Thank you.

Questions? Dr. Lacroix?

MEMBER LACROIX: Thank you, Mrs. Tilman, for this presentation.

Right off the bat, you start off in your submission with a sentence that you repeat twice. It says:

"It is unconscionable that the Provincial Government, the CNSC, and OPG give their unqualified support for continuing operations at Pickering..."

I hope that in this group of unqualified supporters I'm disqualified.

MS TILMAN: I think to start it off, with
the way I was intending to conclude was part of it, was to state there are serious concerns.

You have the power to look at these concerns. I mean, when I see issues such as possibly even extending the life of Pickering beyond even the request to 2024, that's a huge concern.

So, yes, you do have the authority to deal with it. You are the grantors of the licence and this is what concerns me as I -- not that you are the holders of that licence, but should that licence be granted, is it safe? Is it safe, is it secure? Do you -- I don't have that comfort level when I look at particularly the components involved, and that's my main area for this particular submission.

And things can happen. Nobody wants them to happen, but not every pressure tube out of the 380 per unit are tested to know. You have models, leak before break, which are used to back up if there is, but a model is not the same as the reality and one doesn't know. These tubes are very old in Pickering B.

So, that's why I don't want unqualified support, I want some serious thought as to whether this particular request should be granted, particularly as -- I think what bothered me most is going over the previous, the current licence in the previous hearing in 2013 where there
was a surety that these plants would be closed by 2020 approximately. They would be reaching their extended equivalent full power hours by then, but now there seems to be no termination that's definite. And I think that should be a concern of the Commissioners.

Have I answered you?

**MEMBER LACROIX:** Yes, yes, yes, indeed you have answered my question.

OPG and CNSC staff, is there an issue, among all the issues that Mrs. Tilman raised, is there an issue that has not been addressed yet?

**MR. FRAPPIER:** Gerry Frappier, for the record.

We've talked. I guess I'm melding a little bit between what we've talked about yesterday and today, versus what we have talked about over time. Certainly, the pressure tube concerns that she has, we have certainly talked about them. I'm not sure how much we have talked about them in this forum.

But other than that, I would say there is no information in there that we would say is surprising and, as she mentioned, a lot of the information she has is from our own sort of presentations, or own submissions. From that perspective, if you go back to Part 1, we did have quite an extensive discussion around pressure tubes.
and that.

THE PRESIDENT: SO why don't you -- the intervenor actually mentioned the hot hours versus the EFPH. Why don't we get an answer to the intervenor about the difference between the two, and which one is reliable, and which one is not?

MR. FRAPPIER: Gerry Frappier, for the record.

So I'll ask Glen McDougall to come and explain both differences and how we use them, because we do in fact, use both.

THE PRESIDENT: Okay.

MR. McDOUGALL: Glen McDougall, for the record.

Yes, in a presentation that we gave to the Commission in January of 2018 that's available on CNSC's website, we went into the differences between hot hours and the EFPH, but just to reiterate that I think it's important to distinguish between the two purposes of having these metrics for measuring operating time, and the metrics that staff use for judging the fitness for service of pressure tubes so we can make recommendations to the Commission about future safe operation.

Hot hours and effective full power hours are two ways that the industry and, primarily researchers,
use to compare apples with apples. You need to be able to compare pressure tubes in the same reactor, pressure tubes across a given station, and pressure tubes between stations across Canada to get an idea of what the trends are in different kinds of aging such as the ones that Ms Tilman mentioned in her presentation.

The reason that there are two different metrics are because they are used to gauge the amount of aging that happens for different types of aging mechanisms and fuel channels. For aging mechanisms that are primarily driven by temperature differences, the preference is to use hot hours because they record the total amount of time that the pressure tubes are exposed to temperatures where corrosion can take place.

So typically, if you're looking at data that is measured in terms of hot hours, you're looking at something that is linked to corrosion, so for instance hydrogen pickup would be the most common one.

However, many types of pressure tube degradation involve the damage to the material that occurs from the neutrons that fire on inside the core. For that purpose, a better metric is effective full power hours because it takes into account only the fraction of the operating time when the material is being irradiated by neutrons. So this is the reason you have two different
metrics.

But to get back to my first point, the most important thing that we worry about as staff is the degradation of the pressure tubes themselves. For that purpose we don't use operating time as a metric. If you look in the CSA standards, which are the basis for the assessment of pressure tubes and also the basis for all the acceptance criteria for fitness for service of pressure tubes, you'll find that time does not enter into the question.

The acceptance criteria in the CSA standards, which are the basis for staff recommending to the Commission that a pressure tube can continue to be operating, they are not based on hot hours or effective full power hours. They are based on the actual structural integrity of the pressure tube and its likelihood to remain integral.

So for this reason, a pressure tube could have two hot years of operation or it could have 40 hot years of operation. Provided it can continue to meet the same acceptance criteria in the CSA standard, it would be judged to be fit for continued service.

**THE PRESIDENT:** Let's get some questions and then I'll give you the floor.

Ms Velshi...?
MEMBER VELSHI: So a question for OPG. I share the intervenor's concern to an extent about a possible request to operate beyond 2024. I too remember the 2013 hearing when OPG wanted to operate to 2020 and the Commission had asked specifically -- Mr. Manley was there -- so are you likely to come in front of us and ask for a further extension, and I recall the answer was a vehement "no".

So here we are today, and if you flash forward to 2024 -- and we've just heard from staff it's not based on EFPH, the staff will make sure that it meets acceptance criteria that there is a safety basis and meets all their requirements -- and if the situation were to change and now there is an economic case to continue operating the units beyond that because you've met the safety requirements, would you operate the plant any differently over the next few years if you thought you had to -- and I know you have said it's going to be in better shape the day it closes than it has ever been, but would your investment decisions, would your operations, maintenance plans or processes be any different if you thought you were going to run for 10 years as opposed to six years more?

MR. LOCKWOOD: Randy Lockwood, for the record.
So you have several points in there that I would like to respond to. Starting with the last one, would we run the plant any different? Absolutely not. I committed yesterday six commitments. The last one was we will continue investing in Pickering. There is no reason why we would not. It makes logical sense from a business perspective to keep investing in Pickering.

As well as our commitment number one, is that we will continue with nuclear safety as a priority. So to answer that question, that would not bear into this at all.

The next piece is -- with all due respect, what I am about to say is that I did read the transcript from 2013 after our Part I hearing. I thought it best that I do that before responding. Again, with all due respect, there was a volley of discussion and the discussion was around ensuring it was safe based on -- and I summarize -- based on a current business plan. Again, with all due respect, there wasn't a definitive "no". By the same token, there wasn't a definitive "yes" if you can accept that, please.

The current application before the Commission and I think what you're alluding to here, is I can really only tell you what we put in the application, right. We were asked by the shareholder to look at and
continue operations of Pickering beyond 2020 to 2024, and
their rationale, as I have explained, and we have included
in our various submissions and on the record, was to
provide base load generation during refurbishments at Bruce
or major component replacement at Bruce and refurbishment
at Darlington. That's the rationale and that's why we are
continuing.

There is a number of refurbishments that
are in overlap during that period, I believe. I can be
corrected, but up to five. So a significant drain on base
load supply in Ontario.

Also, we have mapped out that what our
intention here was, was to seek a 10-year licence with the
end of commercial operations being the end of 2024 and
place -- shut the units and place them in safe storage for
that period and be in safe storage by 2028, and then
proceed with safe storage and the rationale, as I just
outlined why for those particular timelines. So that was
included in our application.

I will point out to the Commission and
members of the public here, that one of our current licence
conditions is to make known to staff what we intend to
do -- what the intended shutdown dates are. We supplied
that letter June 28th.

I can tell you I thought a lot about that
letter, and that letter says that we intend to operate Pickering to the end of 2024. It's posted on our website for all to see, including the entire application for this licence application, is on our website.

I have communicated this to staff; I have communicated this to the public through our community information sessions; I have communicated this to counsel updates that those are our intentions. As well, that I will point out to the Commission is that is my mandate, safely run and operate Pickering beyond 2020 to the end of 2024, properly implement and execute Project 2024. That's my mandate.

So with my honest hand on my heart, I can say that's what our intentions are.

**THE PRESIDENT:** Okay. So can I jump on that?

So then I don't understand this December 31, 2024 hold point. I'm trying to understand what does it mean? I didn't understand the language: OPG must notify the CNSC no later than December 2022 in case it intends to operate. That doesn't sound like it must have the approval and a process to go beyond that. I didn't -- I don't understand the language here.

**MR. FRAPPIER:** Gerry Frappier, for the record.
So as you noted, the licence does put a requirement on OPG to come back to the Commission if they do intend to operate beyond 2024. So by December 31, 2022, they would have had to come and express their desire to operate longer than that. We didn't want to presume what the Commission would want to do about that. So the Commission, of course, would be able to say "no". They would be able to say "yes" as long as -- put new conditions on whatever the case would be.

**THE PRESIDENT:** Well, that's a very good clarification but I don't read it in this sentence that moving beyond 2024 is subject to the Commission's decision. I don't think that is the intention here.

**MR. MANLEY:** President Binder, if I may? This is Robin Manley, for the record. I’m looking at our Draft Licence Condition Handbook, Section 15.4, and there’s a statement there that says:

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

**THE PRESIDENT:** If that’s there, I’m happy.
MR. FRAPPIER: Yes, that’s what I was trying to say.

The licence does require the licensee to come back in front of the Commission if they intend to go beyond 2024.

The language here, as I think was just read out there, that essentially how we capture that into something that requires approval is the fact that we would say that’s a change to the licensing basis and it requires approval from the Commission.

THE PRESIDENT: But I’ve got to tell you, it’s not only this intervenor. A couple of other intervenors picked it up as language that all you have to do is notify and you’re ongoing.

So I think there could have been better communication on that particular one.

MR. FRAPPIER: I think Mr. Jammal would like to add to that.

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

It’s just been stated what I wanted to say. You establish the safety case and no one can get out of the safety case.

So with respect to clarity, we hear you. As a matter of fact, the licence is the
Commission licence so you can request an amendment. That’s why we are giving a draft licence. But we will provide clarity in the LCH because the LCH is unequivocally clear that the licensee shall apply for CNSC approval.

THE PRESIDENT: Okay, thank you.

Questions?

MR. LOCKWOOD: Randy Lockwood, for the record.

I would just like to add a point, President Binder, if I could.

There is absolutely no doubt in our mind if we were for some reason to extend beyond 2024, that we would be appearing in front of the Commission again.

As well, I would like to give members of the public and yourself confidence and a little bit of context.

We sought a ten-year licence for the reasons that I said, to carry on commercial operations to a certain point and then under that licence place the unit in safe storage, defuel and dewater.

With some context here for two things. I wanted to make sure and provide comfort and confidence to everyone that the plant was safe to do those activities and our programs were in place to get to that point in 2028.

As well, I wanted to provide comfort that
there is margin here; that even if we did this PSR based on a ten-year licence, to provide the Commission and the public with that confidence that there is margin.

We have the intention to end Pickering operation at 2024, as I just stated. That is the plan. But to give everyone confidence that that plant is safe to do so, but also acknowledging when we completed that PSR on certain aspects that the intention was to end commercial operation in 2024.

THE PRESIDENT: Thank you.

Questions? Ms Penney?

MEMBER PENNEY: Just going back to fuel channels, pressure tubes, I had a question for CNSC and maybe for OPG around how often they are inspected versus how often you use your models to look at them.

And if the intervenor has anything else to say after the fact, that would be good too.

So CNSC?

MR. FRAPPIER: Gerry Frappier, for the record.

Again, I would ask Glen McDougall to talk about the inspection plan versus what we do with pressure tubes that are not inspected.

MR. McDOUGALL: Glen McDougall, for the record.
Currently as part of their licence OPG commits to apply CSA standards. There is one CSA standard that we use that prescribes the schedule for fuel channels to be inspected. It also prescribes how many channels have to be inspected and it explains exactly what properties of the pressure tube have to be monitored.

A second standard explains what happens if OPG finds something in any of the inspected pressure tubes that does not meet acceptance criteria. It basically specifies engineering assessments that have to be done and the acceptance criteria for those assessments.

I would like to point out, because there’s been a concern in a number of hearings about the implications for safety of extended operation, it is very important to remember that acceptance criteria that are in the CSA Standards for fitness for service of pressure tubes. They were established in the late 1990s by industry. They have been introduced in licences granted by the CNSC since 2002, and the criteria have not changed. And there is no intent by Staff to go along with or to recommend that any of those acceptance criteria change.

What has changed is that some of the assessment methodologies that are used to determine whether a certain kind of degradation in a pressure tube, of what implications it can have for safe operation. But at the
end of each of those assessments you get a result and the result must be compared against acceptance criteria.

It is those acceptance criteria that are a line in the sand that has not changed.

For uninspected pressure tubes the CSA Standards prescribe a series of risk assessments. The two most important ones that you hear of, that you’ve heard a lot about in recent hearings and Staff described in a January presentation, have to do with the property of pressure tubes called fracture toughness.

Fracture toughness is the resistance that a pressure tube will offer if a crack should occur in the tube and attempts to move down the length of the tube to the point where the tube might rupture.

The two types of risk assessments are called Leak Before Break and Fracture Protection.

The CSA Standards explain how these types of assessments are to be done. And once again there are fixed acceptance criteria in the standards which the licensees either meet or don’t meet.

Our requirement as the regulator is for these risk assessments for fuel channels that are not inspected, the entire reactor core must meet the acceptance criteria in the CSA Standard.

MR. JAMMAL: Ramzi Jammal, for the record,
to complement what Mr. McDougall has mentioned.

We go back to the LCH itself and it clearly describes the compliance verification criteria associated with the safety control area, fitness for service. And the same thing applies for the effective for power hours and what is required with respect to the end of commercial.

So page 140 of the LCH clearly states what are the requirements for OPG to come to us for approval on the basis of the end of commercial operations and clearly states what Dr. McDougall has mentioned with respect to the compliance verification criteria for fitness for service.

We go on through the details of what is applicable and how we review it from our expectations from our perspective.

**MR. GREGORIS:** Sorry, it’s Steve Gregoris here, for the record, just to add on to what Mr. McDougall said.

So OPG has a Lifecycle Management Plan that is well aligned with CSA Standards and what was described by Mr. McDougall.

What I would like to stress is, first off, that if fitness for service is not shown for a fuel channel, that fuel channel will not go into service. We will do additional inspections. We will do assessments.
We will replace that fuel channel and we have removed and replaced fuel channels in the past. We have procedures and people that are proficient to do that.

And again in line with our commitment around fitness for service, we will ensure fitness for service, including our fuel channels, from now until end of operation.

**THE PRESIDENT:** Thank you.

**MEMBER PENNEY:** One last clarification.

So what’s different here from Bruce is OPG is not asking to exceed the hydrogen equivalent. That’s correct?

And therefore the models that haven’t been developed don’t apply in this case.

Am I understanding this correctly?

**MR. FRAPPIER:** Gerry Frappier, for the record.

You are correct. So in this case the CSA Standard already talks about up to 120 parts per million. And as noted for the Pickering case, they don’t expect to be reaching those levels of hydrogen uptake.

**MEMBER PENNEY:** So all they are requesting is to exceed the full power hours.

**THE PRESIDENT:** Dr. Demeter?

**MEMBER DEMETER:** Just a very broad stroke
question.

So with the strong presumption that OPG will cease operation in 2024 and then go through a three-year stabilization period and then go through decommissioning, which I gather would have to come before the Commission, could the stabilization activities be considered a prelude to decommissioning?

This is an unusual circumstance. So what’s the downside of having a six-year licence with decommissioning starting at the stabilization activities period versus a ten-year licence?

This is an unusual circumstance where we have a strong presumption of operations. So why not lump it in with the other one?

You have to come before the Commission anyways for either decommissioning or an alternate request.

MR. FRAPPIER: Gerry Frappier, for the record.

Again the period of the licence is a convenience with respect to administrative burden that there may be. The ten-year requested licence would take us through a couple of phases, as you’ve mentioned. Those phases would be doable, and they have been shown to be able to be done, and would not require the Commission because they’re not going to be actually decommissioning the
facility within that. They would be moving into safe storage.

So at some point presumably -- and I think that’s what OPG has said -- for their next licence they would be moving everything into being more of a decommissioning and also putting their waste facility together as a licence.

I’m not sure if I’m answering your question.

The downside is just the administrative burden.

**MEMBER DEMETER:** I just looked at your horizontal bar graph on slide 5.

It just says the decommissioning licence would start August 2028. That’s just a four-year difference -- three year difference.

So that’s just that sliding that little bar, it’s not a huge difference between a six-year licence and a 10-year licence. You still have to apply, based on your graph, for a decommissioning licence in 2028 versus 2025.

**MR. FRAPPIER:** Gerry Frappier, for the record. So I think the date there of the 2028 is because this licence will end at that period. So we’re expecting at that point they’re going to be looking for something a
bit different.

I think the key thing is that after shutdown there’s a period of time that’s a couple of years that is required to move into being a safe shutdown and stabilized shutdown.

So, again, if we look at G2, they shutdown in 2012, they’re at 2020 before they have all the fuel removed from the pool. So somewhere in that period we believe is the right time to be switching over. The actual date could slide.

MR. JAMMAL: Ramzi Jammal, for the record. It’s very important to note the fact that the safe shutdown, or what we call on a technical term a layup, this is not a unique situation. So it’s part of the operation. So an existing operating licence allows any operator to go into layup mode or the safe shutdown. That is the practice that is being done when they have a planned outage, they go into a safe shutdown and then they restart.

Now, with respect to the decommissioning, so the 10-year licence is not really for convenience. We’ve done a PSR based on a 10-year. Within the PSR and the improvements, so they have to take place -- in this case, it takes into consideration the preparation for the shutdown and the eventual decommissioning as a decommissioning activity in accordance with the PDP.
So the phased approach in the operation takes them into a decommissioning state at that point as a decommissioning standalone licence, would be before the Commission for approval. So the dates are proposed planned dates, it’s not a regulatory date. The licensing term really is not a regulatory function. The licensing term is to put really stakes in the ground with respect to what needs to be done at what point.

But the key point here, I want to go back to the safe shutdown or layup or GSS, that is a normal operation for every existing licence that currently exists. So when we go to the decommissioning phase, that’s a whole different licensed activity that requires the Commission’s approval.

But some of the decommissioning can be done in the existing operating licence. When I speak of decommissioning, is they do it anyway; when they remove a tube, currently operating reactors, for example Darlington, is taking out a tube, that is a decommissioning function. The only difference in decommissioning is you never put a tube back in, you just take it out and break it up.

So that’s why you’ve got the 10-year licence, in order to allow that activity under operation to take place, and then the phased-in approach towards decommissioning will kick in.
MR. GREGORIS: Steve Gregoris, for the record. I’ll just add from OPG’s point of view and to add to Mr. Jammal there.

So as far as a 10-year licence, the PSR was done and it covered a 10-year period, so the safety case for the licence for 10 years has been assessed. The activities associated after shutdown, after 2024, which include defueling, dewatering and drying the systems, those are activities that we execute in outages under the operating licence.

Those are operating licence activities that we execute in our current outages, and which Darlington just executed under an operating licence for their refurbishment. So these activities, with procedures currently developed, are executed, obviously they’re going to be done on a larger scale, but they fully fit within the operating licence and, again, as I said, with a 10-year safety assessment across that entire duration.

So really, there isn’t a safety case to end it any sooner. It provides a lot of benefit for the licensee to be able to transition smoothly into the shutdown, defueling and dewatering, with the existing procedures.

THE PRESIDENT: We’re going to move on. Go ahead. What is your reaction to all you’ve heard?
MS TILMAN: Before final words, I am reacting to some of the discussion here and I’m seeking some clarification here. I’ll start off with a simple one. How many tubes are tested versus subjected to the model? I didn’t hear a breakdown of that number. I’ve heard, or I think from reading, I would suggest 30 per cent, but I could be wrong. How many tubes are actually physically inspected versus subject to modelling to see how long they are, their condition?

THE PRESIDENT: Well, why don’t we start with OPG, and then Staff?

MR. GREGORIS: Steve Gregoris, for the record. I’m going to ask Kathy Charette to give the specifics for that answer.

MS CHARETTE: Okay thanks, Steve. So I understand you want to know how many tubes we’re testing versus how many we’re assessing in the specific assessments?

MS TILMAN: Versus the -- yeah.

MS CHARETTE: So we test our tubes every outage. So we go and do an inspection on a certain number of tubes every outage, as has been explained, as per the CSA Standard; there’s a minimum requirement that we’re required to satisfy, and we exceed those requirements. Then every four years we actually pull a
tube from the reactor and send it over to a lab for some destructive testing so we can get some real good information on the condition of those tubes.

So according to our Lifecycle Management Plan, we’ll be continuing these activities all the way through to 2024 to ensure that the tubes are fit for service all the way through to their end of life.

**MS TILMAN:** I guess my question is, how many of these tubes out of the 380 tubes in any one reactor are being sent for the first test, which I presume is the kind of test you’re doing on...

**MS CHARETTE:** Kathy Charette, for the record. As I said, we do one every four years. So we’ve done the total -- I think we’ve sent three or four now. Four for surveillance testing, just four --

**MS TILMAN:** Four tubes?

**MS CHARETTE:** Correct. But we also have -- since 2009 OPG, Bruce Power, and Canadian Nuclear Laboratories have undertaken an extensive life management project for the research and development activities on fuel channel specimens basically. So we’ve done all kinds of work. We’re actually on our 35th first test now under that program.

So we are continuing to do a lot of work that doesn’t necessarily involve taking tubes out of the
reactor at that time. We will take a tube out of the reactor, cut it into four sections or so, and then test each of those sections. So there’s extensive work going on right now so we have a good understanding of our degradation mechanisms.

**MS TILMAN:** I’m still not --

**MR. LEBLANC:** Just before, I’d like to remind all participants, you’re all talking to the Commission --

**MS TILMAN:** Oh, I’m sorry.

**MR. LEBLANC:** -- and not to each other.

**MS TILMAN:** I have this habit.

**THE PRESIDENT:** Okay. But, first, let’s -- I don’t think there’s clarity with doing too many different tests. There’s pulling out the tube and for actual crack testing there’s some other testing. Why don’t you clarify?

**MR. McDOUGALL:** Glenn McDougall, for the record. There are two types of testing that are done, as Ms Charette just mentioned. Maybe another way to look at it is if there’s -- there are two different ways of assessing whether fuel channels are safe to continue operating.

We mentioned earlier that there’s the fitness for service assessments that are done. Many of
those assessments rely on assumptions about the material properties of the pressure tube. To get those material properties industry doesn’t rely exclusively on models.

Ms Charette pointed out they periodically remove actual irradiated pressure tubes from the reactor to make sure that the inputs that they’re using for their fitness for service assessments are based on real pressure tube data, not just tests that might go on in a laboratory somewhere.

Unfortunately, there are some pressure tube properties that you can’t measure in an in-service pressure tube. You actually have to remove a pressure tube in order to measure those properties. That’s an additional reason why industry periodically removes pressure tubes.

That isn’t just at Pickering, it also goes on at Darlington, it goes on at Bruce, it goes on at Point Lepreau. So industry takes all of these pressure tubes that are removed, they make a whole series of different measurements that are all prescribed by the CSA Standards, and they create a big database of property information on pressure tubes and the look at it from a number of different points of view.

They look at it from the point of view of temperature, how long pressure tubes have been in the reactor, how much hydrogen they have in them. That forms
the basis for most of the safety assessments that are done on CANDU pressure tubes.

All the licensees share that information, so it’s not as though Pickering only looks at Pickering tubes. They share operating information from some of their competing utilities. So that information is used across the board by all the CANDU utilities.

**MS TILMAN:** Can I --

**THE PRESIDENT:** So that’s the test, the actual test, of the material. What about the tests they do in each outage, the inspections? What are they inspecting?

**MR. McDougall:** Glenn McDougall, for the record. As a requirement of the CSA Standard licensees conduct a periodic inspection program. I mentioned earlier that there’s a standard that specifies the schedule and the number of fuel channels that have to be inspected. That standard also says what are the different types of degradation in pressure tubes that they have to look for?

So that includes most of the degradation that Ms Tilman talked about in her intervention. For example, the presence of surface flaws on the pressure tubes, hydrogen content in the pressure tubes, that can actually be measured in service --

**THE PRESIDENT:** So, roughly, how many do you do? We’re looking for some numbers here.
MR. McDOUGALL: Oh okay, yes. Under the CSA Standard it requires 10 fuel channels every three years. But OPG, for a long time now, has gone well beyond that. By my calculation, their current numbers are about 30 per cent.

THE PRESIDENT: Okay.

MS IRVINE: So, it’s Sara Irvine, Senior Manager of Fuel Channel, Life Confirmation Project, for the record. So I do have the numbers that Ms Tilman has asked for. As Mr. McDougall stated, the CSA Standard would have us do 10 full-length volume metric and dimensional inspections every three years; looking at the dimensions of the tube, how it’s getting bigger with time, thinning with time.

Our Lifecycle Management Plan exceeds that, and we actually inspect anywhere from 12 to 15 every two to two and a half years, depending on our outage schedule.

As well, to sample for deuterium, we do 10 or more body-of-tube scrapes every outage. That’s where we go in and take a thin sliver of metal from the inside diameter of the tube and send those samples to a lab to get the concentration of deuterium in the tubes. As well, the region of most concern is at the rolled joint, where deuterium concentration is the highest. That’s the numbers
that we have provided on the end-of-life and it's about 120 ppm limit. That is where we are most likely to see it. So again, every outage we go in and sample 10 or more tubes.

In other areas, such as elongation, we inspect every single tube. We are able to do that from the outside of the reactor. So we have inspected every tube for elongation and as well to look for spacer movement and to confirm that the spacers that keep the gap between the pressure tube and calandria tube to avoid blistering are in position. We have inspected every channel and we know where those spacers are and we go back and subject them to reinspection to confirm the location of those spacers. And, as Mrs. Charette said, we do do surveillance every four years as required by the standard, where we remove a tube and ship it to Chalk River. And again, we rely on models that aren't just built on our tubes, they are built on the industry data sets. So that's a very robust program.

So just in conclusion, we do exceed what's required of us by the CSA Standard in terms of inspections.

THE PRESIDENT: Okay. Go ahead.

MS TILMAN: [Off microphone] not final, but just to say in response to that, I am still concerned about the number of tubes that are being inspected. Different tubes age differently. There seems to be some
uniqueness in these tubes. From what I read and discussions with Bruce, this is with Pickering as well, the conditions aren't the same. So I am concerned about the numbers still, the proportion that are being tested.

I am also concerned about the hydrogen concentration that is now at 120 ppm. I don't believe right now that your tubes are anywhere near that at the outlet in terms of hydrogen concentration. So we are entering into a new territory the longer these tubes are operating. And yes, there may be more testing that might go on, but I really question how safe and how robust this will be in the end. I'm speaking quite honestly of a concern about this. This is not something I'm dreaming up when I read this.

And also, I have to question again the metrics that were used. The explanation was given we use hot hours, but sometimes we use equivalent full power hours and other conditions. Well, why wouldn't one apply the most robust, the strongest level in doing this, and why apply one metric for certain conditions, another metric when they are really measuring time that the tube is operating? Why not use the most conservative measurement of all?

**THE PRESIDENT:** Okay, you expressed your opinion. Does anybody else have a question? You have a
question. Go ahead.

**MEMBER BERUBE:** Maybe we can get some clarity on that. This is interesting. We need to understand this, I need to understand this. When we are talking about HEQ and we are talking about equivalent full power hours, in terms of metrics on tube viability, for all intents and purposes, fitness for service, are these proxy variables? Are these in your model in order for us to understand the relative health of these tubes? Is that what we are actually talking about? So when you are modelling, you are using these as proxy variables, these are the worst-case scenario and that that's why we use these variables; is that correct?

**MR. FRAPPIER:** Gerry Frappier, for the record.

I will pass it back to Glen McDougall in a minute, because I believe there's two dimensions to the question you are asking there. One is with respect to making a determination on the pressure tubes and the material properties of it and all that stuff and I will let Glen explain that because he will be much better than I was.

There is also a licensing dimension to this as to having something that is measurable, that is understandable to everybody with respect to saying your
licence is good until, so a date is often obviously one that we use. And the effective full power hours is another one that's very effective to use and as long as it is bounding all the others with respect to the time and whatnot, it's a good licensing tool for saying let's be clear, we are not going to allow you to operate beyond 297,000 hours in this case.

But with respect to the physical properties, because I think that is what you are really going after, I will ask Mr. McDougall to explain that.

**MR. McDOUGALL:** Glen McDougall, for the record.

Yes, that's a very important question. I would like to break it into two pieces. I will talk about the fitness for service assessments that are done and those are done on actual inspected pressure tubes. In the second part of my question I will talk about the risk assessments that are done on the uninspected pressure tubes.

For the fitness for service assessments, these are done on actual inspected pressure tubes and the industry uses a portion of the CSA standard to guide which of those tubes they should be looking for. So in that case, yes, they do use proxy variables, but that's only for the selection purpose to decide which channels they should look at. For trending purposes in fact the standard
defines which pressure tubes they have to look at. So if they have looked at some pressure tubes in the past, the standard says a certain number of the pressure tubes you will look at next time will be the identical tubes so that you can look for possibly negative trends in some type of aging.

However, when it comes time to actually assess the pressure tubes themselves, there is no reliance on proxies of any kind. The pressure tube is inspected using non-destructive means. For example, there are ultrasonic testing methods that will determine if there's an imperfection in the service of the pressure tube. At that point the standard does not care where the imperfection came from, it just applies hard engineering methods to say what is the possible consequence of having that in imperfection in the pressure tube. But it is important to know that the standard does not allow a licensee to absolve all further inspection of that tube. What it says is here is the engineering method you will use to check the fitness for service of that tube for a defined period into the future. Typically the defined period is until the next inspection outage and then if the result of that assessment is that this imperfection can be found to have little or no impact on safe operation, the tube is deemed fit for service up to the next inspection.
When it comes to uninspected pressure tubes, risk assessments are done. There are several different types that are done. In this case again we have to have some way of determining which are the most important tubes to pay attention to. So the two types of risk assessments I mentioned earlier, the leak before break assessment and a fracture protection assessment, they rely on a parameter that can unfortunately only be measured in a removed pressure tube. That is fracture toughness. So we can't use any non-destructive method to be able to determine that when a pressure tube is in the reactor. But in this case we can use a proxy, we can use hydrogen equivalent concentration to determine which are the tubes where we really have to pay attention to what happens to that fracture toughness. So for that reason, industry has developed two models which tell them how fracture toughness will decline as hydrogen levels increase, and those models are then used as part of the risk assessments for the pressure tubes.

But I would like to clarify a misconception. When some people refer to models for risk assessments, it's almost as though we are just throwing in a whole bunch of benchtop experiments and waiting to see, you know, what will happen in reality. That is not actually what goes on. The models at their heart begin
with research and development, but as a regulator we require the models to be validated against actual irradiated pressure tubes, and industry has done that with the fracture toughness models in particular that have been developed in the last few years. Industry has done a very large number of very specific tests on removed pressure tube material to be able to show that if the model predicts that the fracture toughness at a certain hydrogen level will be X, the burst tests have to come in at a level above X just to show that the model is in fact being conservative. Industry is continuing those tests and I hope that answers the question.

THE PRESIDENT: Okay. I think we need to change topics here.

MEMBER VELSHI: One last question on this. So you have said you have had experience doing single pressure tube replacement. So other than for tubes that have been removed for destructive testing, how many other tubes would you have had to replace because they didn't meet the fitness for service requirement?

MR. GREGORIS: Steve Gregoris, for the record. There has been zero pressure tubes replaced due to fitness for service.

**MS TILMAN:** I just want to remind as we say so far none have been replaced or everything is okay, that is under present circumstances. You have to extrapolate to what is being asked in this licence to the 295, not the 247 or at present the 240, and that's the unknown. So the way I see it, as a licence request, it's an open door, it's allowing for extension of the lives of aging reactors well beyond what could be their end of life for safety. The mandate of your Commission -- of the Commission is to protect the health and safety of Canadians and the environment. So you need to weigh as the Commission whether granting OPG's licence would conflict with your mandate. So I am urging you, and I am urging you Dr. Binder as well, as regulator and protector, to use the utmost precaution in considering OPG's request. Then, Dr. Binder, you can maybe retire knowing you have made some pretty good decisions in this respect.

**THE PRESIDENT:** Thank you.

We are going to set up for the next presenter. So the next presentation is by the Canadian Nuclear Laboratories, as outlined in CMD 18-H6.41. I understand Mr. Cotnam will make the presentation.

--- Pause

**THE PRESIDENT:** Please proceed.
MR. COTNAM: Thank you, Mr. President and Members of the Commission. For the record, my name is Shaun Cotnam, I am the Chief Regulatory Officer from Canadian Nuclear Laboratories, which is commonly known as CNL.

I am speaking before the Commission today on behalf of CNL to voice our strong support for OPG and their application to renew the operating licence for the Pickering nuclear station for the proposed 10-year period.

As Canada's national nuclear laboratory, CNL, formerly AECL, has served as a world leader in the development of nuclear science and technology. All the nuclear power stations across Canada and the work carried out at CNL is closely tied to this, including the Pickering Nuclear Generating Station. Given this long relationship, CNL is well positioned to act as a knowledgeable intervenor and advocate for the Pickering nuclear station at today's relicensing hearing.

As one of the largest generating stations in the world, Pickering station serves as a critical facility for the delivery of electricity to residents of
the Province of Ontario and the nuclear power generated in Pickering is approximately 14 percent of Ontario's produced electricity. This is created safely and virtually free of greenhouse gas emissions, as you know. This helps Canada reduce its carbon pollution and fulfil our international commitments by meeting climate change targets.

The safe continued operation of the Pickering Nuclear Generating Station has many important benefits for Ontario and its residents. This includes a reduction of those greenhouse gas emissions by an estimated 17 million tons and savings of approximately $600 million for avoiding more expensive forms of electricity. It would also produce much needed electricity to the Province of Ontario while the Darlington and Bruce nuclear stations undergo their plant refurbishment. As an environmentally responsible corporate citizen, CNL, we wish to place particular emphasis on that latter point, on the ability of Pickering to produce greenhouse-gas-free electricity during those key refurbishments.

CNL, as the Commission knows, has a long history with pioneering in the development of medical isotopes. I listened closely yesterday, as I'm sure everybody else here did, and Pickering is making those isotopes. It may often go unnoticed during the focus on safe electrical production, but irradiated cobalt from
Pickering is used for medical instrument sterilization as well as protecting our food supply.

OPG has demonstrated strong leadership on important challenges that benefit the nuclear organizations across Canada and they help ensure industry compliance with changing CNSC requirements. For example, OPG co-leads a multi-year and multiphase project to demonstrate the robust safety case for the life extension of these same fuel channels we have been talking about. This is a key CANDU Owners Group, COG, led project. It has been a major initiative for about a decade now, with the best fuel channel experts from across the industry involved. Extensive R&D testing and analysis, you heard about the destructive testing, that has all been performed at places like our Chalk River labs, Kinectrics and other facilities. This program is still ongoing and marks a very significant investment by the industry in fuel channel safety and performance. And personally, listening in the last hour, I'm not sure that was fully reflected in what I heard.

OPG also co-championed an industrywide culture of continuous improvement in nuclear safety. OPG and Bruce were very early adopters of international benchmarking, peer reviews and what I would call applied safety culture learning. I have personally observed OPG exhibit those behaviours, I have seen it in action, and
they do adopt what I call the four cornerstones of corrective action program, observation and coaching, benchmarking and self-assessment. In my own opinion, the nuclear industry in Canada owes a great debt of gratitude to OPG and Bruce Power for championing those.

I also would offer up that OPG has played a major role in industry in response to the new fitness for duty requirements in our industry. Our new industry pays close attention to this issue. We have programs in place to assess and accommodate. However, as the first fitness for duty REGDOC, which was about managing fatigue, was in the consultation process, OPG was instrumental in demonstrating strong leadership to help the industry with a very robust and extensive way of defining safety-sensitive positions. They also shared their OPEX willingly as well as their third-party information and so on.

Additionally, OPG led the ongoing COG program which ensures that all members have essentially access to a robust suite of industry codes and standards. This is particularly important to the power plants, but it also is very important to the supply chain and to those of us in the labs working with those same codes for the industry. Again, that demonstrates OPG's commitment to strong leadership beyond its own organization.

Most importantly, we are here for
Pickering and it operates with an unwavering commitment to safety. Through decades of collaboration, CNL knows OPG is a responsible member of the nuclear sector, an organization that places emphasis on safe operation and is dedicated to the health and well-being of its constituents and the public.

CNL notes that the Pickering Nuclear Generating Station received the highest achievable safety performance from the CNSC in 2015 and ’16. This rating reflects improvements in a number of important areas like operational safety, reliability and human performance. And in 2017 Pickering's injury rate was something to be envied, it was in line with industry best around the world.

Overall, the Pickering station has been upgraded and safely operated for decades and at CNL we remain confident it will continue to be operated that way in the proposed licence period. Given its exceptional safety record, the role Pickering plays, especially in greenhouse-gas-free electricity emission, there are many benefits to the community as well as the environment through this and we at CNL give our strong support here.

Thank you for your time, for the opportunity to speak here today. Mr. President and Members of the Commission, that concludes my remarks and I would be happy to answer any questions about CNL's views.
THE PRESIDENT: Thank you.
Questions? Dr. Demeter...?

MEMBER DEMETER: Thank you for your presentation, Mr. Cotnam. If you were responsible for the operation of Pickering from this point on, given what you know, and you are sort of an insider, and acknowledging all of the positives you have said, what do you think will be the biggest challenge that you would pay the most attention to to maintain that safety assurance standard? I'm sorry to put you on the spot.

MR. COTNAM: A thoughtful question. Thank you, Commissioner Demeter. In fact, we at CNL have recent experience in this. In 2015 the government announced the NRU reactor would be closing, so in those three years we did something similar that's being planned by OPG here for the safe permanent shutdown of operations. So I can say that those very attributes, I would say there are three, strong leadership starts right from the top with the CEO, CNO, for us it was NRU management, for OPG that's Ops management. I believe they have that in place, strong leadership to deploy our -- many of you Commissioners would have heard us talk about our three R's: to retain, retrain and redeploy. So strong leadership, I see that they have that. Secondly, as our former CEO Dr. Walker used to say, in those three years we had time to plan but not time to
waste. I have used that quote many times with staff and it applies here. In fact OPG, although Pickering being a bigger organization than the people we managed through NRU, they are not trivial numbers in either case and we are talking about people and that gives you time to plan. I believe this licence period gives them about double the planning period that we had. So it can be done and I think they have time to plan. And I would say the third point is to have an engaged and strong workforce. I listened in yesterday. They certainly have early engagement with the unions, that is particularly important.

We are quite proud of what we were able to do, all the accomplishments of NRU that were recognized at the CNS conference out in Saskatoon, but that was built on those last three years of planning, strong leadership, CNO, NRU management, junior management, shift by shift to make sure you don't have a distracted workforce towards the end.

So I would say those three things, the leadership, they have it; the time to plan, they have more than sufficient for the numbers involved; and the third point, engage workforce and they have had the union engagement, which is very important.

THE PRESIDENT: Questions?

So you heard us talking about aging management and it was mentioned that they pull a channel
and send it over to CNL. Are you guys still able to do those tests? They allow the NRU?

    MR. COTNAM: I am glad you asked that question. Yes, sir, we are. In fact, what they were talking about was two different tests. The fuel channels that are sent up for what's called surveillance testing, there is a whole suite of hot cells between our universal cells and our building 375 fuel material cells. Those are unaffected, those are planned to be in place to support industry. Those continue. In fact, they have benefited from getting good nuclear operators, those are valuable people to have working in the cells that have come over from NRU as part of the 3 Rs. So we are able to do both surveillance testing, but most importantly, and I've lost track, I thought it was 34 burst tests that we talked about, I personally have witnessed two of those in our universal cells, they are very interesting to watch where you subject the pressure tube to very serious and significant pressure to see how it handles. These are mimic tests for the R&D that OPG and CNSC are better equipped to talk about than I am. We are certainly able to and are still doing those tests, sir.

    THE PRESIDENT: So did you participate in developing the model that will actually predict the burst?

    MR. COTNAM: The best experts are
essentially between Kinetics, ourselves, and CNSC and the industry folks and everybody is building this database together. I personally don't even remember the genesis of the model, but I can tell you I've seen the charts where they plot all these burst tests and talk about the hydrogen.

We now have a proprietary process that we've developed just recently at CNL which will be able to mimic much higher hydrogen concentrations should there be need to test in that vicinity. So the R&D program looks well ahead.

I'm not sure the Commission realizes this is about a 10-plus million project a year that has gone on for probably more than a decade now. I think we're on burst test number 34. So we can do both those surveillance testings tests, we still do them. We can do the burst tests, which we still do them in universal cells. We're fully able to support them going forward.

THE PRESIDENT: Anything else?
Okay, thank you. Thank you very much.
The next presentation is by Mr. Cuttler as outlined in CMD 18-H6.35 and H6.35B.
Mr. Cuttler, the floor is yours.
CMD 18-H6.35/18-H6.35B

Oral presentation by Jerry Cuttler

DR. CUTTLER: Good afternoon. For the record, I'm Dr. Jerry Cuttler. I'm a Canadian scientist with 54 years' experience in nuclear science and engineering and 25 years of radiation health studies.

My submission has two parts, the licence renewal and the radiation health effects.

I studied the OPG application, the two CMDs, one from OPG and one from CNSC staff, and I listened to the April 4th webinar. My conclusions are based on my 47 years of knowledge and experience regarding the Pickering station.

The documents are of high quality and comprehensive. The presentations I found were accurate and effective. The design of the Pickering nuclear plant is very safe. The plant is being maintained in very good condition. The pressure tubes are being monitored. The reactor can tolerate a pressure tube fracture with no public or safety concerns. If we had that experience, a pipe failure, which I personally experienced, would not release any radioactivity to the environment.

The Pickering plant could operate safely beyond 2024, in my view. So I recommend that this licence
application be approved. And I also recommend that OPG considers submitting an application to operate the reactors beyond 2024, as it's economic.

Now, onto part B, about health effects. Radiation was used for 120 years to treat many diseases. Low doses of radiation cured many types of cancers, infections, wounds, asthma, arthritis, inflammation with no apparent long-term effects. In 1924, based on more than 28 years of experience, the tolerance dose limit set for workers was 2 milligray per day or 700 milligray per year.

After atomic bombs were used in 1945 to end World War II in Japan, US scientists created a great radiation scare to stop further bomb testing. However, this scare also stopped the medical treatments using low doses of radiation. All government regulators accepted the LNT and ALARA ideology without examining the evidence, and there is none that support that LNT model and ALARA. This, the evidence, shows that low doses stimulate beneficial effects, not harmful effects.

We know that breathing air produces DNA damage naturally at a very high rate due to oxygen reactions with biomolecules in our body. So organisms have many powerful protection systems that prevent, repair, remove oxidative damage, and they protect also against other toxins and pathogens in our environment.
The damage rate due to low level radiation is negligible compared to the natural spontaneous damage rate caused by oxygen. However, low doses of radiation stimulate protection systems and therefore produce beneficial health effects which are easily observed.

Large doses, however, produce harmful effects. The dose thresholds for onset of harmful effects are known. This is the threshold for radiation-induced leukemia, cancer. And this is the dose rate threshold for reduction of life span. And it's also compatible with the limit that was set for radiation workers.

Now, if we look at Chernobyl, 28 firefighters were killed by high doses of radiation, 106 had acute radiation syndrome and were treated. They survived more than 19 years with no delayed effects -- basically same health as unexposed people.

Okay, looking at Chernobyl, the residents received an average of 17 milligray, which is very low. Many suffered post-traumatic stress due to fear of radiation. The thyroid radiation doses were low. Screening for thyroid nodules leads to overdiagnosis of thyroid cancer, which is a special self-limiting cancer, and this resulted in many unnecessary thyroidectomies.

And at Fukushima, worker doses did not exceed the 1924 dose limits for workers -- radiation
workers. But 1,632 residents died early because of stress of the evacuation. Evacuation caused great hardship to 300,000 residents. The radiation dose levels ranged up to the level of high natural background radiation. So this level that initially was released did not really exceed background radiation that's found in the environment and special places.

And if you look at the highest annual dose integrated over a year -- this was in the location A, place A -- it did not exceed the upper limit range in Ramsar, Iran. So this is natural radiation that people are exposed to living in Ramsar.

So my conclusions are that radiation protection standards are too restrictive. Nuclear accident would not harm residents. There's no medical reason for evacuation. Fear of radiation blocks important medical treatments such as cancer. And we can treat Alzheimer's and Parkinson's disease with low doses of radiation. I have three cases that are successful in that.

So my recommendation comes down to we should examine the evidence and study the mechanisms; discuss revision of radiation protection policy with other people, other countries; find a way and inform Canadians about the real effects of nuclear radiation, the beneficial effects from low doses. We should be changing radiation
protection policy away from LNT -- linear no threshold model -- and ALARA. And we should go back to thresholds for the onset of harmful effects. This is what we had before the scare was brought in the 1950s.

We pay a very high price for fear of low radiation. We should have science-based radiation protection policy.

So that's my presentation. Thank you.

THE PRESIDENT: Thank you.

Who wants to start? Dr. Demeter, we're waiting for you.

MEMBER DEMETER: Thank you very much for the presentation. It was very interesting.

I'm going to ask my radiation oncologist whether they've ever used therapy for dementia when I get back, but.

One of the realities is in an industry which has a potential for very high dose risk, especially related to internalization of alpha emitters, from a regulatory point of view, you set the limits based on as a canary in a coal mine, not because of the health effects of that radiation but because it's a surrogate that looks at the system to stop high risk exposures.

So how do you feel about the use of -- it's not an LNT thing, it's a surrogate for reducing the
risks for higher risk exposures, understanding it's not a health risk limit, it's a regulatory safety limit. How does that philosophy work?

**DR. CUTTLER:** We had a problem with -- early on, I mean, when X-rays were discovered and radioactivity were discovered. Immediately, thousands of medical practitioners were using radiation to treat patients. They discovered that high doses were harmful, sure enough. In fact, they used to measure radiation by putting their hand in the beam and seeing when it got red. So they didn't have measurement instrumentation.

But they found out soon enough how to treat patients, and they were treating thousands and thousands of patients.

There were lots of publications and medical journals way back 100 years ago, 120 years ago, on treatments. A lot of these workers were getting exposed, and because whereas you treat one patient and another one comes, the radiation practitioner, he is getting repeated doses, so there was a big concern for the doctors so they set up protection standards. People were getting overexposed. They started putting shielding in, distance, time, all these factors, and they got it down, after about 28 years, to what is a safe level for practitioners. In fact, they even did studies, epidemiology studies. Smith
and Doyle did one on a British radiologist, and they found that after they brought in these protection standards these practitioners were having lower mortality and lower cancer incidents than their colleagues who weren't working in radiation, so they had a pretty good idea of what was a reasonable radiation protection.

Today, we've been treating patients -- not long ago, in fact, I have a colleague in Japan who treated my wife with low-dose radiation. He treated himself, in fact, but he also treated over 200 patients with a low dose of radiation. They got a better outcome than the traditional treatments with either a high-dose radiation local and chemotherapy. For example, for non-Hodgkin's lymphoma, we're getting a cure rate of about 50 percent, and when he introduced half body or full body low-dose radiation, fractionated, the cure rate went up to 84 percent, so they got a two-thirds improvement in curing patients. This is long term, 10 years.

We've been doing studies recently on patients with breast cancer that has metastasized, I've got papers on that I've published recently, prostate cancer, fractionated low-dose treatment, and I have a new paper that's coming out maybe in a week or two on arthritis, rheumatoid arthritis, using radon treatments. A radon dose every day, and after 15 months a complete reduction in the
markers for arthritis, rheumatoid arthritis, going down from very high levels, like 100 times normal, down to normal levels. This is after 15 months of treatment, so I've gotten results.

Now you'll say, "Okay, these are anecdotes, it's not 1,000 people." It turns out that this happens with everyone.

THE PRESIDENT: Are you doing those tests here, on people in Canada, because I want to know --

DR. CUTTLER: My wife was treated in Canada, yes, at the Credit Valley Hospital. The doctor prescribed it from Japan, and the radiation oncologist delivered it. This was in 2011. It's now 2018, and she is looking very good, my wife.

THE PRESIDENT: But I'm trying to understand which medical authority will allow you to do those tests in Canada.

DR. CUTTLER: The chief radiation oncologist at Credit Valley Hospital wrote the ethics case, and it went through the Research Ethics Board at the Credit Valley Hospital, and the treatment was approved and they delivered it.

I'm going through an ethics board now for -- remember I mentioned the slide on Alzheimer's disease? I'm trying to get it started here in Canada.
It's a big problem, Alzheimer's disease. You know that. I'm working with the Baycrest Hospital on Bathurst Street and Sunnybrook Hospital. Baycrest has lots of patients, and they're working on Alzheimer's treatments, but they cannot do low-dose radiations, so we're doing the radiations -- the proposal is to do it at Sunnybrook, so we've gone through the Research Ethics Board approval at the Baycrest. I've got Health Canada approval for using CT scans for treatment and not just diagnostic, and Sunnybrook, they've given me comments on the proposal. There are six intervenors. There's no funding. I'm paying the transportation of the patient from Baycrest to Sunnybrook. We're trying to make progress in Canada. It's very difficult because everyone is afraid of radiation. It's very difficult to get people to look at this to even fund it. I presented enough evidence to convince them to go ahead on a pilot study of three patients.

THE PRESIDENT: Good luck to you with the medical profession --

DR. CUTTLER: Thank you.

THE PRESIDENT: -- but we're still dealing with Pickering, and I'm more interested in your observation that we shouldn't worry about a rupture of a pressure tube.

DR. CUTTLER: We already had one in '83, and it didn't even break the calandria tube. The leak rate
that came out of that rupture, that was a two-metre rupture, and what came out was 17 kilograms per second. There was no concern, not for the public for sure, and not even for the workers.

**THE PRESIDENT:** But why was there a leak before a break being detected or was it --

**DR. CUTTLER:** These were old pressure tubes, the zirc-2 design. The pressure tube ruptured in 1983, and the operator shut down the plant and they replaced it. In fact, they replaced all the pressure tubes. They re-tubed all the Pickering A reactors from zirc-2 to zirc-niobium alloy, that's the alloy we now use. It's a much better material.

We've also had a pipe break at Pickering. I was there when it happened. The three-inch pipe broke because of a liquid relief valve that failed. I wrote all this up in my report and submission. We've had three-inch pipe breaks, no big deal, so we're overreacting to a lot of these concerns.

The safety analysis is very, very conservative. I mean they're postulating double-ended header breaks. We're very, very safe. The plant is very, very robust, and I personally am very confident that it's a safe plant.

**THE PRESIDENT:** I saw that you've stirred
some reaction from both CNSC and OPG.

Do you want to comment on that? Does anybody want to comment on what was just said or not?

**MR. FRAPPIER:** Maybe I'll start, and then we can move over to OPG for more details.

CNSC, Gerry Frappier, for the record.

Certainly, as mentioned, one of the design-basis accidents is to have a pressure tube fail. Although we're more and more talking about beyond-design-basis accidents and extreme circumstances for the design for things that are probable to happen or might happen, such as a pressure tube rupture, the design of the plant is such that that would not be of any kind of concern to the public or to workers. There's mechanisms in play, and the design handles that completely.

With respect to if the question is the failure of the pressure tube in the 1980s and what exactly happened, I'd ask Mr. Glenn McDougall to provide that data.

**MR. MCDougALL:** Glenn McDougall, for the record.

Yes, that was one of the only instances of break before leak in the history of Canadian reactor operation.

As Mr. Cuttler pointed out, that was an old fuel channel design and an old pressure tube design.
The pressure tube material has been replaced specifically because of that, that particular incident. The problem with that pressure tube was that it accumulated a lot of hydrogen in a relatively short period of time. The newer alloy that's been used since the mid-1980s in all Canadian CANDU reactors doesn't suffer from that problem.

The second difficulty was that the channels at that time had only two spacers separating the pressure tube from the calandria tube. The specific root cause of that particular event happened in Pickering Unit 2. The specific cause was that one of the spacers moved out of position, and at that time designers hadn't realized that that could happen with CANDU fuel channels, so at that point there was no inspection tooling to look for spacers that were moving, but as a result of that event two changes were made. CANDU fuel channels now have four spacers, and to take account of the fact that spacers can move during service, industry developed tooling that can be used during outages to look for the location of the spacers and to even move them back into position if need be.

There were a lot of lessons learned from that particular incident and, as a result, there hasn't been another incident like that or anything close to it since that time.

THE PRESIDENT: Okay. Dr. Lacroix?
MEMBER LACROIX: Dr. Cuttler, thank you very much for your presentation. I read your document, and I really enjoyed it.

What would be the consequences on the safety of nuclear installations if we were to abandon the linear no-threshold model today?

DR. CUTTLER: The stations would perform as before, it's just that our reaction would be totally different. I mean if we're looking at a threshold before people get harmed, if low doses are released, they're certainly not going to cause any harm, if anything a benefit, so you wouldn't have this fear.

At Fukushima there were 1,600 people who died prematurely because they were dragged out of their homes, I mean long-term care homes, hospitals, and they were put in evacuation centres and were sitting in cubicles on the floor, so many of them died of the stress and lack of care.

This is not the right way to react to a nuclear plant accident.

The workers in the plant didn't exceed the limits of what was acceptable to radiologists in the days before they brought out the radiation scare.

So, I'm saying we need to change the way we deal with nuclear safety. I know this is going to upset
a lot of people who work in this field, but if we're concerned about our nuclear technology and the energy for the future and a good environment, we really should change.

Now, there's a big problem, a lot of people in the world and many countries, international standards, there's a world consensus on the linear model and that's 60 years old. And I just can't understand how people can hold a model like that, 60 years old, when we've got all this evidence that contradicts it.

And when I go to meetings, we've had three meetings. We had one in Wingspread, we had one in Aerlie and we're going to have another meeting this year at the end of September in Pasco, this is in Washington State on the Columbia River near Hanford. We're going to be talking about the same problem is, when are we going to get rid of the linear model and start using models that are based on biology?

And there's a lot of radiation protection people coming there and it's going to be very difficult to persuade them to use a science-based model because they'll say this is conservative and we like this and it's easy to calculate. And I said, well, what's easier than having a threshold? And anyone exposed below that threshold is not harmed and may be getting a benefit. I don't know. It's difficult to argue with -- to reason with people like that.
And when I think of the medical benefits that are waiting; first we're having a problem with people getting diagnostic x-rays. I mean, they're trying to discourage people, people are frightened to go in and get diagnostic x-rays and dental x-rays, people are afraid of those and so -- and that's just very low dose.

Now we could use the proper doses for treatment, we could cure cancer and arthritis, a lot of these diseases, Alzheimer's, Parkinson's.

I have a patient who's been getting -- a Parkinson patient who's been getting CT scans of the brain every four weeks, been getting this for two and a half years and he's been examined by his doctor, neurologist and says, man's good, his eyesight's improved, his hearing's improved and he's no longer taking medication to stop the tremors.

So -- and his family doctor's prescribing the CT scans and he's asking me to write a case for him because he's getting nervous. Two years he's been prescribing CT scans. The patient's very happy. Every time he starts to get the shakes he goes back and that's for another prescription. This is in Michigan, in Midland, Michigan, a friend of mine.

So -- and I have three Alzheimer's patients who've shown positive results. One two and a half
years. She was in a hospice, she was a total vegetable and after she had the CT scan she began to eat by herself, began to talk a bit, recognize things. I even asked her to look at the camera and she turned and looked at the camera and I snapped her picture. In fact, that's the slide I showed you up there.

So -- and this happens on every person. The only difference is you'll say, well, this is an anecdote. No, it happens on every person because everyone has protection systems, everyone's breathing oxygen and low doses of radiation stimulate these protection systems.

Now, what is different is people have different genetics, so some have a higher degree of protection, some have a lower degree. So, you can -- the amount of stimulation will depend on the individual.

But the fact that there is stimulation is there. Now, you may argue, well, maybe the threshold moves a bit because different individuals. So, we can determine those things, but I'm not seeing a change in threshold going down less than half. So, if I see a threshold that's 500 mSv, then we can certainly set a limit at 300 and not be concerned that there's -- sensitive people might be compromised.

The other thing that's very interesting is, I done a study with -- people have done studies with
dogs and I've taken those studies and analyzed the data. And what we found was that weak, or short-lived dogs benefit more from low-dose radiation than a long-lived dog. And you'll say, well, why would that -- how can that be? Well, it turns out a short-lived dog has got a bigger margin for improvement for stimulation than a strong individual who's already at the limit.

So, if you're looking to improve the health with low-dose treatments, the weak ones get the bigger benefit.

**THE PRESIDENT:** So look, this was a fascinating reading and nice little history of what was, really enjoyed reading it, but we're not a medical authority.

**DR. CUTTLER:** I know.

**THE PRESIDENT:** So, until you get the medical authority to --

**DR. CUTTLER:** You told me that already.

**THE PRESIDENT:** -- to bless your findings and then get some from the ICRP and the UNSCEAR and all the rest of the bodies to go along --

**DR. CUTTLER:** Well, I'm working with the medical people as you recommended and Dr. Tubiana from the French Academy of Sciences warned me, he says, don't do anything unless you do it in a hospital with Ethics Board
approval.

So, I'm following his advice, and so I'm doing the best I can to change something, change what is to what should be. But my recommendation that was in this report is, I think the regulator should start to look at the data and start to talk with other people and not to -- you promised me we have science-based regulation and I don't think we're there yet.

THE PRESIDENT: I saw CNSC here, somebody jumping to make a comment?

MR. RINKER: Yeah, Dr. Binder, there was an element in the intervenor's presentation that I think brought up a question that was raised by Dr. Demeter yesterday that I wanted to clarify.

And the question was about the differences in the rates of thyroid cancer that observed around Ontario's nuclear power plants; namely, Pickering rate of thyroid cancer was observed to be higher than Darlington which is not statistically so, but observed to be higher than what is observed at Bruce.

And so, we know that the doses surrounding the Ontario nuclear power plants are consistently very low and they're very similar. And what I mean by that is, the public dose for the most critical person ranges from 2 to 4 microsieverts per year, very low doses, and we know that
the dominant contributors to dose are very similar and that
the dominant contributor to dose are the noble gases,
followed by various elements of tritium, tritium in water
vapour, tritium in water.

And what we also know is that iodine has
not been observed above detection limits in the
environment. This is confirmed by the CNSC's own
independent environmental monitoring program, it's also
confirmed by Labour Ontario surveillance where they look at
iodine in food stuff and in milk.

And so, what that means is any variation
in cancer incidence amongst the Ontario power reactors is
independent of the radiation dose and must be explained by
other factors.

And we can only speculate what those
factors are, but based on other studies around the world,
it's likely that the differences result from perhaps the
differences in intensity of surveillance for thyroid
disease.

And the Pickering Region being within the
GTA has a higher density of physicians and maybe better
access to ultrasound screening, as an example, and this is
supported by the observation that other parts of the GTA,
like York, Toronto, Peel, Halton have higher incidences of
thyroid cancer than Pickering. So, the more dense you are,
the higher the rate you get.

That's a correlation, we don't know if that's actually true, but certainly there isn't the idea that Pickering is higher than anywhere else in Ontario, it just happens to be higher than the rural areas around the Bruce area.

THE PRESIDENT: Thank you.

You have a final word.

DR. CUTTLER: Well, I can answer -- address his comment. Do I get to answer his comment?

THE PRESIDENT: We're dealing with -- go ahead.

DR. CUTTLER: I wrote an article here with Dr. Ludwig Feinendegen which we're going to present in September.

You know, because of the high incidence of cancer mortality, that's 25 per cent generally, is a broad statistical variation. So, the epidemiology alone is very limited in its ability to predict radiation induced risk at low doses because of this huge variation in, or statistical variation in cancer mortality.

So, risk assessment requires biology and they're not using biology. There's a whole spectrum of subspecialties. So, there's a wealth of data there in radiation biology that we have and it needs to be
considered. The people doing these epidemiological studies are not including biology in the study.

And on the matter of thyroid cancer, thyroid is a special type of cancer, it's self-limiting. It starts naturally in children, sometimes very early, and it grows to a certain point and it stops, and then later on it may continue again.

So, there's a new paper that came out, a review paper last November on the subject of thyroid cancer and the models that we've been having, it's not behaving like a normal cancer, it's a self-limiting cancer.

And if you do a screening you'll find lots of nodules in thyroids of -- a lot of them happen in children and you just can't take those screening results and start doing thyroidectomies, it's immoral because you're basically taking out the child's thyroid gland and he's on pills for the rest of their lives.

There are better ways of diagnosing when a surgery should be done.

I can send you that new article, review article on thyroid cancer and I'll send you my new article for Pasco conference in Washington, as I always do.

THE PRESIDENT: Thank you.

Any final thought? No?

DR. CUTTER: Well, I told you I would like
science-based --

THE PRESIDENT: Good. I don't want to speculate.

DR. CUTTLER: -- regulation.

THE PRESIDENT: Thank you very much.

I'm told that we have Health --

MR. LEBLANC: Canada.

THE PRESIDENT: Oh no.

MEMBER DEMETER: I just have to say one thing because this is a public record.

If you look really hard you'll find a lot of thyroid cancers that may mean nothing. The problem is, when you look really hard you can't tell the natural history of what you find. So, if you look really hard you can't -- some of these thyroid cancers are devastating and they're metastatic and they're very aggressive.

DR. CUTTLER: Yes.

MEMBER DEMETER: So, the problem is if you look really hard you'll find things that maybe don't have any natural history of progressing, but you can't tell the difference between them.

So, I don't want people to be left with the thought that all thyroid cancers are benign and self-limiting and self-correcting because I treat a lot of people with thyroid cancer that are metastatic.
So, I just wanted to clarify that, that looking hard finds -- you find things that you may not want to have to deal with, but then you have to deal with them and the problem is the looking hard part, not the fact that there's some benign cancers.

**DR. CUTTLER:** So, the point I want to make is it's different than normal cancers that many people are familiar with and you've got to look at it in a different way than normal cancers.

**THE PRESIDENT:** Okay. Thank you. Thank you very much.

So, I'm told that we have Health Canada on line and they want to make a statement on emergency planning.

Sorry?

**MR. BUCHANAN:** President Binder, it's Kevin Buchanan from Health Canada. And I just wanted to address something earlier on in the presentation on international standards and emergency standards as they're applied in Canada.

So, I just need to clarify our understanding and make sure everyone fully comprehends how Canada is aligned with international standards.

So, in Canada the current international standards are aligned -- or the current standards are
aligned with international standards. So, in the area of preparedness and response for a nuclear radiological emergency, International Atomic Energy Agency develops safety standards and technical tools to support its member states, of which we are one, in strengthening their emergency arrangements. This provides for capacity building in member states and performs at the request of member states peer reviews on established emergency arrangements.

So, these standards it's important to note recognize the findings of the United Nations Scientific Committee on the Effects of Atomic Radiation and the recommendations of international expert bodies; notably, the International Commission on Radiological Protection, and these are taken into account in the IAEA standards.

The standards, notably also recognize or are developed in cooperation with other bodies in the United Nations system and other specialized agencies. So, this includes the food and agricultural organization of the United Nations, the United Nations Environmental Program, the International Labour Organization, the OECD Nuclear Energy Agency and the Pan American Health Organization and the WHO, the World Health Organization.

So, I just want to make everyone aware that this year and leading into this year, Canada has
requested that the International Atomic Energy Agency
conduct an emergency preparedness review, commonly referred
to as an EPREV, and this is a review of the nuclear
emergency arrangements in Canada and those nuclear
emergency arrangements are assessed against the standards
that I had mentioned before in those contributing
organizations to those standards all support those
standards.

So, EPREV, if it's not clear, it's a peer
review service by international experts, sorry, it's
provided by the IAEA to appraise the level of preparedness
for nuclear radiological emergencies in member states.

So, nuclear emergency preparedness, as you
know, and response in Canada is a shared responsibility.
The scope of the EPREV in Canada will implicate federal
authorities, provincial authorities and nuclear reactors.
This is being done in Ontario and New Brunswick.

So, what we expect is that the findings of
the EPREV, based on currently conducted self-assessments,
will be largely favourable as we're rating ourselves
against those current standards that I spoke of above.

The EPREV will serve to identify any
remaining gaps within Canada's overall current preparations
in the event of a nuclear emergency occurring on Canadian
soil and will help increase Canada's level of preparation
to protect public health and safety.

So, that's a statement, President Binder, that wasn't well timed. It did feed into some of the discussions that were recently presented and some of the discussions earlier on, but I just -- I was recognizing the need to put out the message of the EPREV and our alignment with international standards.

THE PRESIDENT: No, that's very useful and I understand that the actual visit will be in 2019.

MR. BUCHANAN: That's correct.

THE PRESIDENT: So, we look forward to get our international expert's view about whether Canada has a good emergency plan.

So, thank you for that. And we are going to take a break for 15 minutes, coming back at four o'clock.

--- Upon recessing at 3:43 p.m. /
Suspension à 15 h 43
--- Upon resuming at 4:02 p.m. /
Reprise à 16 h 01

THE PRESIDENT: We are ready to proceed. Could we have everybody sit down, please?

The next presentation is by Mr. Dan Rudka,
as outlined in CMD 18-H6.28.

Mr. Rudka, the floor is yours.

CMD 18-H6.28

Oral presentation by Dan Rudka

MR. RUDKA: Thank you, Mr. Binder.

Thank you, Members of the Board, for listening to me today. I must start by saying after Mr. Cuttler's version you might wonder what rock I climbed out of if you're not familiar with me, but anyway, here I go.

In my written statement I mention the concerns of a nuclear power plant having eight reactors in one vacuum building and the possible trouble with one vacuum building and a multi-reactor incident, and this is just one of many concerns of a 47-year old reactor if it fails.

We are very aware of the many scenarios. We've heard many of them today. There is too many possibilities.

Now, recently in Scotland they put all reactors built in the same period as Pickering on alert as cracks in the reactors' concrete became of obvious concern and due to old age and deterioration. Escaping radioactive emissions are at an increased risk over time due to
deterioration, which we have heard today, and with that a very increased possible risk to the health of the population.

In fact, a serious emergency situation which has been discussed in this very old facility and requiring the public alarm will set off a secondary emergency and that of evacuation. Both in their own accord, no matter the extensive planning, will result in a disaster, the nature of which I have already presented.

But most important of all is the exposure to the population. Now, on this alone I will mention medical costs. I am an example of an exposure victim from Port Hope nuclear facilities, exposed by way of inhalation, ill for 20 years, a double lung transplant survivor. Since initial exposure my continuing health costs the Canadian taxpayer has been around $2 million. Now, one exposure victim -- you know, take 5,000 at one-quarter the cost; it's $2.5 billion. The overall cost of a disaster at Pickering, the medical costs alone would financially destroy Ontario and, further, be very adverse to the country as a whole.

Now, my largest concern after what I have learned since suffering from radiation exposure is the safety of the health of the population. Recently, the CNSC decided not to further study radionuclides as a chemical of
mutual concern.

Now, I will mention tritium released into Lake Ontario waters and the air somewhat regularly. It does cause genetic mutations, birth defects; cancers. It is proven in lab animals. We humans are another species. Our DNA, 97.5 percent similar to that of a lab rat. So around these facilities, not of our own knowledgeable choice, we have become unmonitored, untested lab specimens. Breathing in radionuclides, inhalation is 200 times more dangerous than any other method of exposure and people can't avoid this if there is a release.

KI pills, I mean seriously, folks. You're worrying about the thyroid and you're inhaling this into the lung. It's past the thyroid. It's into your lungs. It's the worst place to be putting it. You know, all this talk about KI pills just -- it's a false flag. It's false protection.

You know, the population around these facilities everywhere need to be tested for exposure and what have we got? Urine analysis testing for nuclear workers, a method that is not efficient nor does it go far enough into analysis. The public has nothing but predictions based on cancers, and that's the end count. That's not good enough because after exposure there are many symptoms prior to cancer, and this I know personally.
These symptoms can be easily misdiagnosed and confuse physicians.

My concern about exposure around nuclear facilities are initially based around personal experience from the incident in Port Hope, and observations since. For example, you know, just in Port Hope, right off the battalion, extensive nuclear background, community of 16,000, and has seven pharmacies. I live in a community of about 10,000. We have two pharmacies and there is no nuclear facilities or anything like that in the area. There is a reason for this. There really is.

You know, health studies in Canada, well, they're not real time. A lot of them have been disputed. Now, an example of a more picture of health would be taken and could be taken if an inventory of all drugstores within an area were inventoried like Port Hope, for example. I lean on that because it's my experience. We can do this here in Pickering.

The inventory of the drugs prescribed would include a number of clients, medications they require; what these medications are intended to treat. This would be expensive or inexpensive, non-invasive to the population, taken on a monthly basis calculated over a year. Possibly more detail could be put into it later, but meanwhile the same could be done on a similar demographic
that is absent from anything nuclear and compare the findings. Maybe more concerning is why has the CNSC and nobody else ever done this?

Now, I have a bit of a negative. Excuse me -- expressed feelings often with the CNSC and with the regulatory committee, but it results from the history. For example, you know, some years when I asked my epidemiologist to please take a look at my skin, and show, you know, remark on the damage and they had no comments. I have given the Commission pictures today of a Nagasaki victim that has very similar skin damage to me.

With that in mind, you know, what can I ---

**MR. LEBLANC:** Just for the record ---

**MR. RUDKA:** Yes.

**MR. LEBLANC:** --- there is two things. The Commission did not accept those pictures. They are not on the record and they have not been accepted nor are your working notes.

Thank you. I just wanted to be clear.

**MR. RUDKA:** No, and I can understand and it's for your own personal inspection then, okay.

Okay. But those pictures you can see that we have the same damage, and I will leave it at that.

Now I have tested positive for uranium
inhalation and something is very wrong if our regulators through the testing and through the evidence and the years I have given you in the past, just do nothing at all with this situation.

Now, immediately after my inhalation exposure, I had symptoms. Prominent was the decline in my hemoglobin, okay? The red blood cell count was low within a few weeks after exposure and it was not expected as part of exposure. I wasn't expected to be exposed at the time.

Radiation, as we know, travels to the bone where the blood is produced. This requires time and thought to appear too soon in my case but since I've required medical intervention, struggle to keep a blood count but never returned a normal count. It's remaining low, requiring constant effort just to stay at a low level. It's difficult.

In 2015, almost immediately after my lung transplant, my hemoglobin went up better than was my normal count. It was not immediately understood, thought to be relevant to the transplant but nobody knew how, and the blood cell count eventually, though, unfortunately, went back and settled to the previous low level.

What happened was I got fresh lungs. They were clean. The blood count went up. I'll tell you why in a moment. The lungs got re-contaminated from my body and
things went down again.

In 2017 -- and the speaker before me had no idea of this information -- a remarkable medical finding was shown and proven that lungs actually produce blood. I have given you documents on that. I hope that you will accept them. It was also discovered that considerably more platelets leave the lung than actually enter. This is also explains how contamination spreads throughout the body from the lungs, transfers in the blood immediately throughout the organs, throughout everything. Those findings are included.

Now next there was a study on Fukushima monkeys. I know this is not about Fukushima but this connects. The study started in 2008 before the Fukushima disaster, had no intent of being part of the incident. It was a study of the monkeys in general. Because of the situation the study director was asked and did a study of the exposed monkeys. Sometime after the incident, the newborn of the exposed were found to be underweight, smaller bodies, smaller heads and brains, but also the monkeys were found suffering from anemia, a reduction in blood components, red and white blood cells.

In tests in 2002 to 2017 there has been no change. The problem is chronic and will not change, as in my situation. What is most immediate is that the nuclear
exposure victims are exposed by -- that are exposed to inhalation, will most likely -- the most likely method -- will suffer immediate anemia, red blood cell loss and white blood cells; lower hemoglobin count. The effect is immediate and does not repair itself.

Now, with this new information, testing the public over a large demographic is possible for liable indications. Quite obviously nuclear inhalation victims will show low hemoglobin in a very short period. In Port Hope, for example, blood testing for low hemoglobin should be very informative without waiting and waiting on cancer findings. Without expense or much personal intrusion, it can be done around Pickering. Low blood indicators around these facilities should be a concern, could be an indicator but nobody has ever looked at it and checked into it.

And nuclear energy workers, the first and most likely exposure victims, they should have more time or better, more accurate, immediate -- I wanted more time -- testing regularly upon request or concern. A more immediate a method for detecting exposed compromised workers is needed and then properly acknowledging and responding responsibly to these individuals.

There are few that are recognized, if ever at all, after exposure and conveniently the industry lacks the proper accurate methods to test. And without any, many
ills will slip through the cracks of convenience as I have.

And also to this, nuclear energy workers need special compensation recognition for nuclear exposure and the many illnesses caused by exposure, just as fire fighters have due to their work as it is dangerous.

That’s why we have the CNSC and they should be doing all they can.

But without true independent medical oversight I doubt that this will ever occur. And the idle unions, they should be damned ashamed of themselves just for not fighting for such simple rights under this type of dangerous work for years.

In the end OPG Pickering is asking to operate longer than intended, longer than agreed, to decommissioning. That time has passed and add another ten years to the lifespan, six years, whatever you want to, is to go back in the standing and in doing so risking the public.

Unfortunately and ultimately in the past, the CNSC I expect will give a ten-year licence. The Board will retire Pickering. Port Hope, Bruce, Chalk River will continue to be problematic with a ten-year licence and shut down upset public.

Nothing lasts forever, you, me, highways, buildings, reactor, concrete, nuclear incident, total
destruction of a large central area of central Ontario’s business, the population gone, health damage to the population. The plant will not last forever, nor will the components. None of us do.

The money to repair that can never be returned to the same that is being wasted. You are throwing money into something and wasting it away and the extension of the life is no longer worth the risk. It’s no longer needed medically for isotopes. Quebec can supply our power.

We need to decommission this plant and regardless of what you do, you need to start testing the people around these facilities because this is what it’s all about: is our public health.

We are doing all this for the safety but nobody has done any real significant studies.

I’ve suggested a couple of possibilities that I hope you will take most seriously today.

I thank you for your time.

**THE PRESIDENT:** Thank you.

Questions?

Dr. Demeter.

**MEMBER DEMETER:** Thank you very much for your intervention.

The one question I had that timely came up
in this is more of a plant safety issue you brought up.

There is one vacuum building for the facility and I would like to know its capacity, how many reactor units worth of venting will that one building hold? What is its capacity?

To OPG, sorry. Staff can comment if they see fit, after that.

**MR. MANLEY:** Robin Manley, for the record.

First off, I would like to thank the intervenor for bringing his intervention today. You know, regardless of the cause, we obviously have empathy for anyone who suffers from serious illnesses, like we would for any member of our own family.

He expresses a great interest in nuclear safety and the safety of workers. We share that interest and I will just speak briefly, before we get on to the vacuum building issue, if I may.

The radiation protection of workers is one of our commitments, the public workers and the environment, and we have an extensive Radiation Protection Program whereby we have to make sure that we understand what the dose consequences are to our workers at all times.

We can talk further about that, if you like, but I’m going to next turn it over to Steve.

**MR. GREGORIS:** Steve Gregoris, for the
The containment system in the vacuum building structure specific to Pickering is an excellent example of what we discussed yesterday as a robust design of our CANDU multi-unit plant.

Just to describe containment, each reactor building is surrounded by a containment structure. It’s concrete. It’s about one metre to two metres thick, so it’s very robust.

Each of those reactor buildings is connected to a pressure relief duct which is then connected to the vacuum building. The pressure relief duct, as well as the vacuum building, the same size, the same thickness in concrete structure.

All of the containment is kept sub-atmospheric, under negative pressure. So anything is drawn into containment.

And under an accident condition where there is a release from a reactor, everything is drawn towards the vacuum, which is kept almost at perfect vacuum, maybe 5-7 kPa.

So everything is drawn in there in an accident scenario and it’s held in there. And it’s held in there for a long time.

I would say that’s again a unique design
for us because it can hold everything in there and allow any kind of protective actions to be taken. In fact, it can be held in there and in a lot of accidents there is no release required because that vacuum building has a dousing capability so that the pressure is continuously reduced. And as long as the dousing is available, it will continue to douse and release pressure as pressure builds in that building.

Eventually, though, if in some accidents venting may be required to maintain containment negative, the filtered air discharge system is there to do that. What the filtered air discharge system does, it ensures not only that we keep containment negative but whatever release we control it, we filter it and we monitor it.

So with all that said, what I would say is for all our design basis accidents, the vacuum building and the containment structure I described is fully effective.

For beyond design basis accidents, including multi-unit accidents, containment in the vacuum building is also fully effective.

MEMBER DEMETER: Remind me if I’m wrong. In the Bruce hearing I think they talked about an additional safety factor of filtration technology for venting that would reduce.

It sounds like this is more than adequate
for a single reactor vessel, for venting it. But beyond that, it may require some venting in addition to the vacuum building.

So maybe you can talk about mitigation of venting.

MR. FRAPPIER: Gerry Frappier, for the record.

Yes, the Bruce does have a bit of a different design as to how they want to move forward. But in principle it’s the same idea.

You have a big vacuum building that, as was just described, is a feature that allows for all the products coming out of an accident to be contained into that building.

One of the features of it, though, of course is that you’ve got to maintain that vacuum. So it’s very important to be able to do the venting as in the case you are talking about beyond design based accident where there’s more than a single unit that would require at a certain point that the venting occurs so that you can maintain the vacuum in the vacuum building.

It’s one of the things that’s different than other designs but it’s not necessarily a problem.

For a little bit more detail on how that works I would ask Mr. Noreddine Mesmous to give us a sense
of how the accident progression would go.

**MR. MESMOUS:** Noreddine Mesmous, for the record, Director, Reactor Behaviour Division.

It’s already well explained for the containment, including the reactor building, the vacuum building and the pressure relief duct.

What I would add is the improvements as part of the Fukushima specifically for OPG for Phase 2. So they have large power supply so they can restart the system, the filtered discharge system, and also they can start the main vacuum bank.

So it ensures any release would be thorough controlled venting. This is mainly for a severe accidents where you have multi units.

**MR. JAMMAL:** Ramzi Jammal, for the record.

Just to transform it at a high level, post Fukushima we put requirements in place on the licensee to ensure that the emergency mitigation measures and equipment are in place.

What my colleague is saying is that -- your question is: What is the capacity of the vacuum building?

If you are able to control the filtered venting and you are able to maintain the power for the vacuum pump, it’s indefinite.
In other words, as long as you have controlled filter venting, you are controlling the contamination so that it’s filtered.

So as long as the pump is in place and you have the power, and as long as you have power for the controlled filtered venting, the volume capacity is irrelevant because you are maintaining that vacuum building as is.

With respect to the design itself, I’m just going now by more or less memory.

If you do nothing and it can be corrected, the vacuum building is approximately one and a half reactor capacity more or less.

But the key point here is post Fukushima if you maintain power to maintain the vacuum capability and the filtered venting, it’s indefinite with respect to the capacity.

MR. GREGORIS: Steve Gregoris here.

Can I just add to that because I want to make sure that the whole picture is clear around accident progression, the likelihood to have to vent and then all the different things we’ve done to ensure venting capability is available.

If we go right back to EME Phase 1, so EME Phase 1 adds additional ways to cool the fuel. You can add
it to the heat transport, steam generators or the calandria vessel. That’s there to prevent accident progression to the point where the likelihood of venting would be required in a severe accident case.

On top of that we did EME Phase 2. So in the unlikely event we progress to the need to vent, then EME Phase 2 adds to the current capability of FADS. So FADS without EME Phase 2 has the ability to vent, keep containment negative through many operations.

That’s without power and for multi units. EME Phase 2 then gives power to FADS and you can use FADS in additional diverse ways with power. So you have a couple of different venting paths and pieces of equipment, fans and valves available, so that you have more different ways to use FADS if you should need to vent.

On top of that, then we are committed to installing the PSR mods. Those PSR mods are part of the Periodic Safety Review. In the Integrated Implementation Plan there’s specific actions which will allow fire water to be added to Units 1 and 4, again to the heat transports, steam generator, or calandria vessels. Again, that is proactive, it’s to prevent the accident from progressing to the point where you should have to vent.

Then, lastly, there’s one additional
action, it’s a PSR and IIP action, and that is to give power to the main volume pumps along with cooling supplies to the main volume pumps for yet an additional way to use FADS.

So in all of this, what I’d like to describe is multi different ways to cool the fuel and prevent accident progression to the point where you need to vent, and multiple different ways to vent, filter, and monitor through FADS should you have to vent.

THE PRESIDENT: Okay.

MEMBER PENNEY: I have a quick question.

Thank you for your intervention.

You said recently the CNSC decided to stop studying radionuclides. When I look in your written presentation, page 3, I think it says, “Recently, the CNSC has decided that radionuclides are not chemicals of mutual concern in the Great Lakes.”

The question is for CNSC to clarify that. What does that mean?

MR. FRAPPIER: Gerry Frappier, for the record. So, just to be clear, there’s two questions in there. One, has to do with whether we’re doing research or not, and the second one has to do with a very specific thing, in the context of the Canada/U.S. management of Great Lakes, what we wanted to do with radioisotopes. In
both cases, I’d ask Mr. Mike Rinker to explain that for us.

**MR. MCALLISTER:** Andrew McAllister, Director of the Environmental Risk Assessment Division. I am also the CNSC representative on the Great Lakes Executive Committee under the Great Lakes Water Quality Agreement.

What the intervenor has made reference to was a nomination by a group of non-governmental organizations for radionuclides to be considered chemicals of mutual concern under Annex 3 of this agreement. Environment and Climate Change Canada, through their memorandum of understanding with the CNSC, reached out to us to do an assessment of that nomination.

We undertook that assessment, have posted it on our website, and it’s correct, in that we have concluded or have recommended that it not be considered chemicals of mutual concern given that the science related to the health and environmental risk is well developed, it’s continuously evaluated by international and national scientific organizations, there’s a robust regulatory framework, and that the risks to humans and the environment are very low.

Likewise, the U.S. Nuclear Regulatory Commission undertook a similar assessment at the request of the United States Environmental Protection Agency. So both
assessments have been provided to the parties to the agreement.

Environment and Climate Change Canada and the U.S. EPA have not rendered a decision yet on this nomination, and are anticipated to do so later this year.

THE PRESIDENT: I'm very surprised. We’ve got Environment Canada and Climate Change in the room here, maybe it’s a good time for you to come forward. Because I thought that the council itself already decided that -- in fact the radiation level has been decreasing in the lakes over the time. So what am I mixing up here?

MR. RINKER: Mike Rinker, for the record. So the CNSC did an assessment and we published our assessment online, and that included data that was collected by Environment Canada in our report, collected by many other agencies across the Great Lakes Basin.

So what you’ve heard was the results of the CNSC assessment which was provided to Environment Canada.

THE PRESIDENT: Environment Canada, anything to add?

MS ALI: Nardia Ali, Environment and Climate Change Canada. So just to give a little bit of context. On March 2nd, 2016 a number of non-governmental organizations submitted to the Great Lakes Executive
Committee a nomination for radioactive substances to be added as chemicals of mutual concern, which is one of the annexes under the Great Lakes Water Quality Agreement.

Environment Canada is still evaluating the nomination but, as Mr. McAllister said, through our MoU with the CNSC, because they’re experts in this area, we asked them to do the assessment and give us some advice. So that was done and the CNSC actually did a lot of work for us, helped us and provided a document. That is the document that’s referred to on your website, it’s posted. But that document’s been provided to the people who manage the Great Lakes Water Quality Agreement.

We’re still evaluating the nomination and Environment and Climate Change Canada is developing transparent decision-making criteria to facilitate the decision on the nomination with a target to have a decision by December 2018.

Now, both the CNSC and the U.S. NRC submitted to us that there is no evidence to suggest that radionuclides pose an unreasonable risk to environment, health or safety within the Great Lakes Basin ecosystem.

Activities are already in place federally which would satisfy all Annex 3 commitments for designated chemicals of mutual concern, therefore designating radionuclides as a CMC, or chemical of mutual concern,
would not lead to or enable any additional action on the part of the Canadian Federal Government.

So the signatories, just for the benefit of people who aren’t familiar with the Great Lakes Water Quality Agreement, the signatories are Environment and Climate Change Canada and the U.S. EPA.

**MEMBER PENNEY:** I had a question --

**THE PRESIDENT:** So just to finish this. Did the EPA also submit and publish their report?

**MS ALI:** Well, just like how we went to the CNSC, they went to the U.S. NRC. So we have the CNSC’s submission, and they have the EPA, and all of that information is being considered, and they hope to have a decision by December.

**MR. McALLISTER:** Dr. Binder, the U.S. NRC assessment is posted as well on Binational.net, which is the website associated with the Great Lakes Water Quality Agreement.

**THE PRESIDENT:** Okay. Ms Penney?

**MEMBER PENNEY:** If you are a chemical of mutual concern, what does it mean?

**MS ALI:** Nardia Ali, Environment and Climate Change Canada, for the record.

So the criteria under which the nomination was evaluated, so the criteria that are being used: Is the
chemical present in the waters of the Great Lakes? Is the chemical considered to present a potential threat to the ecological or human health in the Great Lakes Basin? Are the sources of the chemical entering the Great Lakes well-understood? Is the current management regime for this chemical, regulatory or voluntary, considered effective? Are the management efforts regarding the chemical warranted?

So those are some of the criteria that were used in the assessment done by the CNSC.

MEMBER PENNEY: Sorry, my mistake for asking the wrong question. If you are a chemical of mutual concern, does it mean you’re monitored for more often or there’s more research done into you, like...?

MS ALI: Nardia Ali, for the record. Yes, it means that more of the limited resources that are now available for work under the Great Lakes Water Quality Agreement would have to be put into those chemicals. So for a chemical that is already well-understood, that money could be spent, you know, elsewhere, yes.

MEMBER PENNEY: Thank you.

MR. FRAPPIER: Gerry Frappier, for the record. So, like I said, there was two questions in there. So I think you’ve got the answer to one of them with respect to the agreement between Canada and the United
States and how that affects things.

But I think it’s important that we not conclude therefore that we’re not interested in research in radioisotopes or in tritium and that. So, for that, I’d just ask Mr. Mike Rinker to confirm that.

**MR. RINKER:** Mike Rinker, for the record. Yes, tritium behaviour in the environment, other radionuclide behaviour in the environment, has always been a focus of our research and support program, and we’re going to continue to do so.

When the new impact assessment comes into play there’s a need for regional study, so there’s a really good candidate; thermal loads to the Great Lakes, other types of loading to see how -- whether that behaviour that we’ve observed in the past has continued, and we’ll collaborate with our federal partners on that.

Similarly, outside the Great Lakes, tritium cycling in a marine environment, like at Point Lepreau, is on our list of future research projects.

So I guess what we’re saying is there’s perhaps not a need to have a joint bi-national management plan for something that is unregulated. As an example, one of the first chemicals of mutual concern was phosphate, where phosphate loads to the Great Lakes were causing nutrification, big problems in Lake Erie.
There was no regulator in charge of that. So there was a need for U.S. and Canada to work together for something that’s unregulated being put into the lakes and causing harm.

In this case, there’s two regulators responsible. Nevertheless, we do continue to work on it, just not under this agreement.

**THE PRESIDENT:** Questions? Ms Velshi.

**MEMBER VELSHI:** Mr. Rudka, in your written submission at the bottom of page 3 and the beginning of page 4 you raise some concerns about lack of transparency. You say, “In Canada we’re expected to believe that nothing ever happens and the situation is mostly unknown to the public.” Then you talk about the CNSC needing to make itself more available within the community and getting a better pulse on concerns.

So I was a little surprised to read that. We’ve heard from the licensee and CNSC Staff that even very low levels of incidences get reported, they’re posted on their website immediately. So from your experience, what more would you like to see?

Even as far as being more available in the community, I mean, we’re here today, CNSC Staff are there at community meetings, and CNSC 101 and I know the licensees are out there all the time. What more would you
like to see?

MR. RUDKA: I thank the Member for the question. I am on the other side of the coin of all this. Like I said, I’ve come out from under a rock, I guess, compared to everything else that promotes what’s safe and good. I don’t disbelieve their promotions of safety and whatnot, but things do happen.

Now, with everything that we’re looking at today, we’re studying risks, possibilities, all sorts of model scenarios and, you know, we’ve pounded this and tested that, and everything else, can you tell me how much actual real testing has been done to the population of workers and to the populations of people around?

We are talking about all this to protect the people. And we heard earlier how this radiation can actually enhance us. Now, I don’t believe that for a moment. I know that some 95 percent of cancer treatment patients eventually die from cancer anyway, a return of or whatever.

My point is we need to be studying the people and not the damn plant, no offence. But I mean we have studied it, we have beat it up, we see all these assurances, but who has studied the population? That’s what I’m trying to present to you today.

You know, one scenario that we discussed
about the vacuum building was very well covered. You know, I appreciate the expertise involved, but there is a measure there that could go wrong. But that was one example.

So we hear all the people saying that, you know, we hear things, good things, everything is safe, and I hear all these studies about, but I find otherwise. There is an underside. There's people like me that are exposed, they won't come here. They have been threatened. I have been threatened. I have been assaulted over this. People don't want us here. I just find that this is more important than me, it's about other people.

Now, you don't get all the upfront -- because I know, I can give you an example of Port Hope, what I have gone through. I mean they basically chased me out of town for being so vocal. What happens then is people become reserved, they become frightened, okay. They start to listen to the fact that we are fearmongers. This is not about fear. Fear is the unknown.

What I would like to see is more public education about not the safety and not all the precautions, about the actual risks and the actual dangers of what happens to people. Because I think that that will also ensure that the plant managers, the CEOs and everything, not from the back rooms, get a forward face on what's happening. They need to meet people like me.
I came here years ago very angry with you people. I wanted to tear you people apart. Today I want to help, okay. I have had the gift of life again, so I don't want anybody else to go through this. I mean you have talked about all these other things with thyroids and that. My thyroid is fine. Everything else is messed up. You know, it's these false flags we have to get past and get to the public the actual truthful knowledge, not wait for Fukushima to happen for God sakes and then say, guess what we have learned. Thank you.

THE PRESIDENT: So you have mentioned that nuclear energy worker is a dangerous job. We are going to have -- Thursday we are going to have Dr. Kyle, who is the Health Authority here. So I'm trying to understand if there was something peculiar healthwise with the nuclear energy workers. The Health Authority, the Cancer Care Ontario, all of the studies that were done surely would have detected that this is an unhealthy profession. There were literally dozens of such studies. So what more studies do you need to verify what you said is right?

MR. RUDKA: Thank you, Mr. Binder. Initially I was studied. Your analysis studies, they do that at the plant, but they don't go deep enough, they don't go far enough. As you know, mine were done from the Uranium Medical Research Centre, they were extensive. I
won't get into it. We have gone on beyond those studies even to this day, we are working on other information. Now, the thing is with the studies that they do are quick, accurate to a point, but they do not break down isotopes. They found spent reactor fuel in my system, which we found the company was not supposed to be working with, but they were. There is no excuse for that.

Now, if these people had a breakdown they would see what's in their body. And also, as I mentioned to you about, you know, the anemic situation, I bet you you would find a majority of workers have low hemoglobin just from being in the atmosphere of it, okay. Now -- please go ahead.

THE PRESIDENT: Maybe some of the experts here that have done some of those studies, I think the energy workers have been monitored for years now, maybe you can shed some light as to what you are actually finding that would suggest that you need to get further into the studies.

MR. RUDKA: Excuse me, Mr. Binder, before they do. People get missed, okay. I got missed. No matter what they tell you, people are slipping through the cracks. I did not have a high dose, as they said, from the company figures, but it was higher than the company initially let on. They said not high enough to be
effective. However, I inhaled it and there is part of the thing I want you to consider. This is just not an exposure of wherever, it's inhaling it, getting it into the body. And as I told you, the most important thing is discovery of blood being produced in the lungs. This is new and this should be considered by the CNSC. I think you may have to do it more extensively eventually yourselves. I hope you do.

THE PRESIDENT: Staff...?

MR. FRAPPIER: Gerry Frappier, for the record.

So I would ask -- I mean I think there is a specific question with respect to a specific sort of research, but there was also a broad statement as far as, you know, we certainly do a lot of assessments on safety and we are going to continue doing that. But we do a lot of assessments associated with people as well and in particular workers and I would ask Dr. Rachel Lane and Lydia. Yes, I'm just going to say Lydia because -- anyways, Rachel...?

DR. LANE: Dr. Rachel Lane, for the record.

Yes, there have been many, many studies of workers over the years. There have been Canadian studies of nuclear energy workers, there have been studies of MAYAK
workers, atomic veterans, U.S. radiological tests. There is a U.S. million person study right now looking at nuclear workers. There is an international collaboration study right now referred to as INWORKS that looks at nuclear workers. There are also studies, there is a whole multitude of different studies looking at the effects of radiation.

As CNSC's epidemiologist, I have been involved in looking at the health of Canadian nuclear energy workers, Canadian uranium miners and Canadian uranium processing workers. Dr. Zablotska has worked on these studies with me and I will leave it with her to talk more about those studies as well as the Chernobyl cleanup workers.

DR. ZABLOTSKA: Lydia Zablotska, for the record.

I empathize with Mr. Rudka's story and I am very grateful that he came here to tell us about his story so we are not missing these experiences and they are on the record. And I wanted to tell him that I was the external expert hired by CNSC, among many individual researchers who competed for the project, to analyze the data from several reports. So CNSC hires an external radiation epidemiologist to conduct independent research analysis.
I am the first author of the analysis of Port Hope workers and just to explain this particular example, the way it was done is that we got all the records of exposures of all workers from Cameco Corporation. An external expert was hired to do dosimetry, to evaluate the annual dosimetry for each worker. We then worked with Health Canada and Statistics Canada to link the records of employment to mortality in Canada and also mortality in the U.S. to make sure that we didn't miss any worker who died so we know their causes of death, and we also looked at the incidents in Port Hope workers. This was published -- this work was published in 2014 and CNSC asked me to come to Port Hope and speak to the community, where workers and people who live in the city could come and ask me questions about this analysis. And the main finding was that the doses from radon exposures were very low. They had doses from external exposures, gamma rays, but we didn't find any specific increase in any cancer, either mortality or cancer incidence.

The cohort in Port Hope is not very large, so since 2014 I have been working on trying to combine these data with the data from Germany and many other countries. And again, we haven't seen any increase in any particular cancer. So this is just to demonstrate how we take care to make sure that we don't miss any workers, any
exposures, any outcomes.

THE PRESIDENT: Okay. Go ahead.

MR. RUDKA: Thank you, Mr. Binder. I would like to respond to that and just state that here we are playing again the cancer game. I don't have cancer right now folks and I hope never to but I probably will or expecting it. This is not the way to be doing it, is calculating on cancers. They may have information on cancers, but could they tell me how much information they have on people with low hemoglobin, anemic workers? That might be another route to go.

And as far as Ms Rachel Lane, no offence, but that's the epidemiologist I asked in Ottawa to look at my arms and she had no statement of no effect as to what happened to me. As the picture you will not release, you will see I look very much like a Nagasaki victim. And I want to tell you, the first qualified physician, his exact words, walked into the office, took one look at my face and arms and said -- "That's secondary to radiation exposure. What happened to you", were his exact words. No offence to her credentials, but obviously there is a conflict there.

And I will tell you, you asked me why people won't speak out, these doctors have a great deal of trouble putting that actually in writing for the Worker's Compensation Board and it's because of the underlying
repercussions of industry, of government. They need funding to continue their work, so they are protecting their butts too. So I needed to answer with that. And I also think that really, again, waiting on workers, checking them out for cancers at the end, that's just ridiculous. Why are we totaling deaths? Thank you.

THE PRESIDENT: Okay. Thank you.

MR. RUDKA: Thank you very much.

MR. LOCKWOOD: Randy Lockwood, for the record.

While I empathize with the intervenor, there are a couple of comments. This is a hearing about Pickering relicensing and there are a couple of comments I cannot leave on the table, I feel very strongly about. I feel sorry that the individual was assaulted, but I want to assure the Commission and members of the public that we have a very healthy safety culture at Pickering, an engaged workforce, and we encourage our employees to come forward with any concern or low-level event, and this is pulsed more or less daily, as well by our management quarterly. And in addition to that, we have a full review of our safety culture every three years, with surveys plus focus groups. In addition, the safety culture is evaluated by external evaluators such as WANO, OSART, our Nuclear Safety Review Board. And lastly, there's a number of things that
would touch on this, the safety culture of the plant
through inspections by the CNSC staff.

THE PRESIDENT: Okay. Thank you. Thank you for sharing with us. Any final thought you want to share with us?

MR. RUDKA: Yes. Thank you, Mr. Binder. Just that this is -- to me, it's all about risk assessment for health, for population, for people, for unborn children. But, you know, let's not burden our medical system, let's not produce any more people like me. You know, I am happy that I can speak to you because many others that have been in my shoes have passed, they can't speak to you today.

And I will just end with saying that I didn't want to do this today, but a lady yesterday ran into me, her daughter just got a job at a mill in Port Hope and she asked me to speak to you today because she's worried about her daughter, okay. So as much as the people are on the floor and, as this gentleman says, the people on the floor, his office, no offence to that, they have a different view, a different understanding, a different take on it and we need to go there. Thank you very much.

THE PRESIDENT: Okay. Thank you. Thank you for your intervention.

I think that the next intervention is
coming to us via teleconference and it's a presentation by the Provincial Council of Women of Ontario, as outlined in CMD 18-H6.64. I understand that Ms Janes -- Ms Janes, can you hear us?

**MS JANES:** Yes, I can.

**THE PRESIDENT:** Okay. Go ahead.

**CMD 18-H6.64**

**Oral presentation by the Provincial Council of Women of Ontario**

**MS JANES:** Yes. Good afternoon. I am presenting today on behalf of the Provincial Council of Women of Ontario, which was formed in 1923 with the mandate to work together towards the betterment of women, families and society. Currently our membership includes many thousands of Ontarians through our nine provincially organized Society members, four local councils and a study group. We develop policies through the circulation to members and voting in these groups and then adoption by majority vote at an annual general meeting. We are one of six provincial councils of women who are members of the National Council of Women of Canada which was established in 1893, and the others being Ontario, Quebec, Manitoba, Saskatchewan, Alberta and British Columbia.
The first National Council of Women precautionary nuclear policy was adopted in 1955 and PCWO's first policy in about 1980. We have used these policies to intervene in such nuclear-related procedures as the 1996-97 Seaborn Commission hearing on the burial of high level nuclear waste in the Cambrian Shield and we were cited in the panel's final report as saying:

"The public at the end of phase II {technical hearings} was left with a feeling of grave unease. The best that could be said in favour of AECL's concept was stated by SRG—that it could, might, should be doable."

We were also involved in other interventions in 2000, 2007 and 2008. We had intervenor status at the Ontario Energy Board hearings on the Ontario Power Authority's integrated power system plan that the Board delegated responsibility to deal with the lifecycle costs and risks of nuclear waste management. Before the hearing was halted by the provincial government in the fall of 2008, our expert witness was Dr. Marvin Resnikoff, the top nuclear waste expert in the United States. In 2008 PCWO commented to the Ontario Drinking Water Advisory Committee on the need for Ontario to update the regulatory
standard for releases of tritiated water to reflect the 1994 recommendations of the Advisory Committee on Environmental Standards, that these be reduced from 7000 Bq/L to 20 Bq/L by 1999. In 2017 we intervened in the CNL application to build a dump for the burial of low and intermediate nuclear waste at Chalk River, on the shore of the Ottawa River. In 2018 we had a presentation to the Ontario Fire Marshal and Minister of Public Safety on corrections to their Provincial Nuclear Emergency Response Plan. And most recently we commented to the Toronto Board of Health regarding our support for Toronto's declaration to be a nuclear-free city.

So to begin our brief, in 2013 the Provincial Council of Women of Ontario presented a brief in opposition to Ontario Power Generation's plans to lengthen the operational life of the Pickering B nuclear reactors to 2018 as they were based on faulty assumptions, lacked independent and convincing scientific validation, and neglected the strong public interest and concerns at the time. OPG's current application to extend its deadline for shutdown even further to 2024 and its other plans for stabilization to 2028, leaving its nuclear waste in place on the shores of Lake Ontario rather than securing it and storing it in a safe dry place away from the lake, exacerbates our very strong opposition.
Additionally, we are aware that there is little if any need for the plant to continue operation as its output can be replaced from Quebec sources, alternative energy and energy conservation and efficiencies, and the surplus power it produces is often sold into the American market.

At the 2013 CNSC hearing on the Pickering life extension, many individuals, community groups and broad-based public interest organizations, including us, made strong arguments against the five-year Pickering B life extension and Commission Members raised serious concerns, such as Chair Binder's insistence that OPG must look at the worst-case scenarios and ensure the residents were notified properly and regularly about the potential for such a nuclear event. Up to that time the usual notices didn't even mention the possibility of a nuclear emergency.

Nevertheless, rather than follow what we and many others felt were less than an adequate plan for operation and shutdown of Pickering B nuclear stations by 2018, OPG is here again asking CNSC to ignore the huge risks of operating this aging plant with a track record of nuclear incidents as it presents its current application for a 10-year extension. It is also disturbing that OPG has admitted at a recent Ontario Energy Board hearing that
investments in safety upgrades to counter the known risk may not be affordable and, as Dr. Gordon Edwards has noted, Bruce and Darlington are being refurbished at a huge cost, but Pickering was judged early on not to be worth this kind of investment, so it forges on at a great risk to the people of Pickering, Toronto and further away, even to those in my tiny town of Niagara-on-the-Lake just 69.2 kilometres due south across Lake Ontario.

As thousands of new residents move into Pickering and the Toronto area each year, encouraged by the requirements of the provincial places to grow intensification policies, legitimate concerns for public health and safety, environmental protection and risks of damage to livelihood should there be a disaster are growing even stronger. This is evidenced by the public's significant participation in the 2013 Pickering hearing, the recent public review and comments on Ontario's nuclear disaster plan, Durham and Toronto requests for strengthened nuclear emergency planning, Durham's plans to mitigate negative social effects of station closures and very recently Toronto's reaffirmation of its nuclear-free status and the comments of the Toronto Board of Health public meeting on this issue on April 16th which drew attention to the added danger of 400,000 irradiated fuel bundles in its spent fuel pools which could provide a target for any
planned hostile attack. It is also evidenced most recently by a request to the Commission from Durham Nuclear Awareness, CELA and Greenpeace to mandate that OPG establish the Nuclear Emergency Preparedness Awareness Campaign in the GTA; from Northwatch, CELA and Greenpeace that the Commission ask the federal government to subject OPG's closure plans to an environmental assessment; and by CELA and Greenpeace requests that if the Commission does approve a licence that it remove wording from OPG's licence that gives CNSC staff the power to allow Pickering to operate past 2024 without a public hearing. PCW supports all of these requests.

PCW is hopeful that such grave public concern and municipal awareness, backed by the evidence of unbiased, independent experts will be recognized by the Commission and just perhaps for once will outweigh pro-nuclear evidence of OPG experts, support from nuclear-related businesses and various program-funded organizations such as hospital auxiliaries, counselling centres, Chambers of Commerce and nature groups, and even staff advice that gave credit to inaccurate, out-of-date information to justify CNSC's extension of the earlier Pickering B licence in 2013.

A clear example of the latter issue can be found in the CNSC background rationale for its decision,
which disregarded evidence cited by PCWO from a lengthy 2003 study by Dr. Mohajer and E. Neyles. This documented the steadily increasing numbers of clusters and intensity of earthquakes near the Pickering nuclear station, which lies directly above an active fault line. This opinion was also supported by J. Robert Janes, a degree in geology and author of "Geology and the New Global Tectonics" and co-author of "Airphoto interpretation and the Canadian landscape". Instead, in the background to its decision CNSC cites an in-house OPG review and a Natural Resources Canada argument based on a one and a half day study with very old 1940 references.

It is notable that at the 2013 licence hearing, CNSC expert Dr. Adams admitted the study was extremely short. In fact, when one reads an article later, Dr. Mohajer said it's just a couple of hours. Dr. Adams summarized his position by saying, on page 431 of the hearing transcript:

"So we are left with an estimate together with uncertainty which is effectively an extrapolation of a 180-year record which, rather than providing a good rationale for keeping Pickering in operation, underlines again the kind of risk
that OPG and CNSC staff are willing to accept." (As read)

Questions that need to be answered are these:

Is it socially, environmentally and economically responsible to allow an operating life extension for Pickering B reactors when they are well past their initial planned lifespan, having an old and flawed operational design and a history of significant events?

Are the astronomical costs of a disastrous nuclear event, for example environmental damage, death, injury, sheltering, evacuating, business lost over a potential lengthy time, rebuilding homes and businesses worth a life extension for nuclear plants that provide such a small fraction of Ontario's energy demand and most of which is sent to the United States?

How can the public trust OPG's promised plans given its failure to date to comply with the 2013 CNSC licence requirement, the main one being to cease operations by 2018?

We would add that contrary to staff assurances that operational safety standards are very high now, Northwatch cautions for instance that it is troubling that the irradiated fuel pools at Pickering have been performing poorly for over a decade and even at this late
date Ontario Power Generation appears lax in their maintenance and unable to address fundamental operating issues.

Our conclusion. To conclude, we believe there are three underlying issues for the Commission to consider. These are:

First, that there are no valid reasons for life extension, but rather, it appears to be in front of you once more, as noted by OPG, to satisfy their principal shareholder, i.e. the province;

Second, a contract was made between the Commission and OPG in 2013 that Pickering would close in 2018. And if a new licence is granted, will it be back here in a few years to extend it further? The evidence I heard today makes this as clear as mud.

Finally, what rationale can the Commission give to ignore the evidence of qualified independent CNSC-funded intervenor experts for groups such as Northwatch and well respected expert Dr. Gordon Edwards and others that a licence should most certainly not be granted and that Pickering should be shut down immediately.

Therefore, PCWO reiterates our view that it's time to close OPG's aging and troubled Pickering nuclear reactors which lie on the edge of Lake Ontario over an active geological fault and close to millions of people
on both sides of the border. Their continued operation will pose unacceptable risks to the health, safety, environment, and economy of millions of residents in Pickering and Toronto which is the urban heartland of southern Ontario as well as further afield. If there is a nuclear disaster, whether it be through failed operating systems, human error, nefarious actions, or natural events, we sincerely hope we will not have to repeat these much-stated but futile-to-date words at a future hearing on this issue.

THE PRESIDENT: Thank you.

MS JANES: Thank you.

THE PRESIDENT: Questions?

Dr. Lacroix.

MEMBER LACROIX: Yes. Thank you for your presentation.

I just discovered a new issue here. Might be interesting to discuss this matter. Pickering is sitting on an active fault line. Could staff comment on this.

THE PRESIDENT: We may have the person that was referred to, Dr. Adams. I don't know if he's on his way or he's here or he's online. Anybody knows?

MR. LEBLANC: We're trying to reach Dr. Adams. He was flying, but he will only be available by
THE PRESIDENT: Okay, thank you. Go ahead.

MR. FRAPPIER: Gerry Frappier, for the record.

But I could get Chris Cole, who's in Ottawa, to answer the -- where we are with respect to the work we've done with NRCan on seismicity around the Pickering plant and the conclusion on a statement that would suggest there's a fault line.

MR. COLE: For the record, this is Christopher Cole. I'm the director of the Engineering Design and Assessment division at the CNSC.

I'd like to state emphatically from the beginning that there is no evidence of a fault line directly underneath the Pickering Nuclear Generating Station. We work closely with NRCan and the Geological Survey of Canada, and we consider the Geological Survey of Canada to be the authoritative expert on seismic hazards in Canada. So therefore we have full confidence in their analysis.

What we see around the Pickering site is there's a minor fault line that runs along the bottom of Lake Ontario. And there has been some activity recently. In fact, in April there was a 3.0 moment magnitude
earthquake that took place. That earthquake, at 3.0, was considered to be very, very small and was not even felt at the nuclear power plant. The nuclear power plant did not undergo any damage whatsoever and, in fact, it didn't even shut down.

Overall, there are some opposing theories with respect to fault lines in that area, and the intervenor has mentioned a couple of people such as Wallach and Mohajer, and these are well known to us and to the Geological Survey of Canada. They have opposing views that, as I mentioned, we stick our confidence in with the National Research Council of Canada.

So overall, we'd like to indicate that there is not a major fault line underneath Pickering Nuclear Power Generating Station. The seismic activity in the area is considered low to medium. And I'd like to emphasize that the nuclear power plant in Pickering has been designed in accordance with CSA standard 289 to withstand such earthquakes and is considered safe.

MEMBER LACROIX: Thank you, Mr. Cole.

THE PRESIDENT: Thank you.


MEMBER DEMETER: Thank you. I think, if I misheard this, forgive me to the intervenor. I think you
talked about the City of Toronto Board of Health reconfirming the nuclear-free zone. I think the -- if I have misheard that, it's declared as a nuclear weapons-free zone. There's quite a difference in that. It would affect the practice of medicine in radiation oncology significantly if it was a nuclear-free zone.

Anyways. The question I have is based on the comment that was just made about seismic qualifications. Is there any difference in the seismic qualifications for the Pickering units compared to the rest of the fleet of nuclear power reactors in Ontario?

**MR. FRAPPIER:**  Gerry Frappier, for the record.

I'll pass it to Chris Cole in a minute, but certainly every design has a very customized assessment. Although they go through the same processes, each design does have different features with respect to seismic response. But with respect to the standards that they have to meet, they're the same.

But perhaps Mr. Cole would like to add to the Pickering seismic design.

**MR. COLE:**  Christopher Cole, for the record.

There are subtle differences between the Pickering A and the Pickering B seismic evaluations.
Pickering A was built much earlier and it was designed to the *National Building Code* of Canada and it was fully qualified to that standard. Pickering B was built at a later date, and by that time there was a new CSA standard that had come into play, CSA 289, and it is built and designed to that standard.

We've gone back to Pickering A to evaluate it against a larger earthquake known as a review-level earthquake. And it has shown to have the capacity against that earthquake. So in accordance with CNSC opinion, we believe that the earthquake -- or the nuclear power plant is seismically qualified and is safe to operate.

**MEMBER DEMETER:** Thank you very much.

**MS JANES:** Mr. Chair. Mr. Chair?

**THE PRESIDENT:** Go ahead.

**MS JANES:** Yeah, just wanting to read just a tad just to respond about the -- I may have not -- I stated it rather broadly about being right under the actual plant. But this is what is from the article written by Mr. Mohajer here, just a response he made to Dr. Adams at one point.

"Wallach and Mohajer (1990) noted that if the St. Lawrence rift system extends upstream through Lakes Ontario and Erie, as proposed in
three different papers by Adams and Bascham (e.g., 1991), then an earthquake of $M = 7$ in western Lake Ontario must be considered to be a credible event."

And they stick by their position that there is a possibility, and it's more to do with, according to Mr. James, the clustering. And there have been earthquakes of 4, magnitude 4 in and around Pickering through that area. So that we're seeing more of it.

But the main thing is that the -- is the clustering plus the evidence that they're dealing with is just 125 years of history. And it's all very big in Dr. Adams' explanation. But if you go back further than that, this reference person, this Dr. Mohajer and his compatriots who wrote this paper and other papers and did the long study -- not the couple of hours' study -- they're talking about the history that goes way back, and they are sticking with their position. They've written other articles since then.

So I'm sticking with our position that there is this danger. And I'm not sure of the security of Pickering.

I will note that in Ottawa on the Chalk River, the mound that is being proposed there by the
private sector group that is running it now, that's an area
that is -- everybody admits is geologically active. It's
extremely active. And yet they think it's fine to, you
know, put something there.

So I'm not sure how much we pay attention
to the issue of the earthquake potential and the disastrous
results. Surely there, there should be considerable
concern. But there doesn't seem to be. And here, I can
understand why one can sort of slip it under the radar, but
one can't -- you have to look at the worst-case scenario.
And you have to look at the potential and can't rule it
out.

And so that's my last word on that.

THE PRESIDENT: Okay, so let's deal with
your worst-case scenario. So let's assume there is a
seismic level disaster level 7, whatever that might be.
What will happen to the plant? Tell me about what will
there be, all the provision you put in for severe accident
to shut it down. Who's going to take it on?

MR. FRAPPIER: Gerry Frappier, for the
record. I'll start, and ...

So it's very important to understand the
gеology to have an understanding of what are the potentials
for seismic activity. And that's as Mr. Cole mentioned, we
rely on the Geological Survey of Canada. That is one of
the primary functions in the Government of Canada is to understand the geology and to provide advice to other government departments such as ourselves with respect to seismicity.

So if we go by that, the plant, as Mr. Cole has mentioned, has been assessed against we believe it's the worst-case scenario from -- for a seismic event and has demonstrated that it would be able to shut down safely and maintain the fuel cooled.

THE PRESIDENT: OPG?

MR. GREGORIS: Steve Gregoris, for the record.

I'm going to ask Jack Vecchiarelli to expand on my answer.

But I will start by saying that specific system structures and components at the plant are designed to seismic requirements. They are also qualified to seismic requirements, and those requirements meet CSA standards.

The probabilistic safety assessment is also done with a wide range of seismic events, and I'll let Jack speak to that assessment. I can tell you that, as Mr. Frappier mentioned, in a seismic event, the components chosen as seismically qualified are there to ensure that for the reactor systems the water stays in the reactor. We
have seismic systems to add water to the reactor so that the fuel is cooled at all times. And that's really the key function is to ensure that we continue to top up the water and cool the fuel.

And so that's the basic design for a design-based accident. And I've described the many ways that we can add water through EME and eventually through PSR mods that would add to that as well.

But I'll ask Jack to expand now.

**MR. VECCHIARELLI:** For the record, Jack Vecchiarelli. I am the manager of Pickering Relicensing.

Just like to build on what Mr. Gregoris mentioned regarding the probabilistic safety analysis or PSA. In compliance with the regulatory requirements for PSA, we have included for the Pickering plant a comprehensive assessment of seismic hazards and quantified the associated risk. The risk associated with seismic hazards for Pickering is very low. The plant is very robust to deal with seismic hazards as well as other external type of hazards.

The seismic hazards that are considered cover a wide range of frequencies and magnitudes. The underlying scenarios, or postulated seismic events, consider information that dates back to hundreds and thousands of years based on paleoseismological evidence, so
it encompasses a wide range of information, both empirical and expert judgment-based. The resulting risk metrics, in particular severe core damage frequency and large release frequency, they meet the safety goals. This is a very strong indication of the robustness of the plant for seismic hazards.

**THE PRESIDENT:** Thank you.

Any other questions?

**MR. LOCKWOOD:** Randy Lockwood, for the record.

I'd just add to maybe simplify all those comments and speak to your question directly, President Binder, and to add to Mr. Gregoris, the systems are chosen such so that we can shut down the reactor, right, cool the fuel, and contain the reactivity and ensure monitoring.

**THE PRESIDENT:** Okay. Thank you.

**MS JANES:** Mr. Binder, again, can I --

**THE PRESIDENT:** Just a sec. Just a sec.

You'll have your chance. Just a sec.

Do you have a question?

Okay. Over to you.

**MS JANES:** I just wanted to mention something that came from the Northwatch brief to you, you funded them for intervention, and it --
THE PRESIDENT: Northwatch will be with us after dinner, so you're welcome to join us.

MS JANES: Yes. You will perhaps hear there about their comments that:

"Additional safety, maintenance and / or operational issues with the irradiated fuel bays and associated systems include:

- seismic capacity of the current spent fuel basket stacking arrangements in the Pickering IFBs not being adequately documented
- seismic capacity of the Pickering 058...conveyor not being adequately documented"

So when they come, perhaps you could ask them about their comments on seismicity.

THE PRESIDENT: I'm sure Northwatch can speak for itself, so thank you for that.

MS JANES: I'm sure they can.

THE PRESIDENT: Any final comments you want to share with us?

MS JANES: Yes, I would like to say something here.
I've carefully read many of the presentations to this hearing, and it's clear that those of the public who support the life extension of Pickering are groups who legitimately fear for the withdrawal of all that Pickering offers to this community, that is, jobs, and support for important activities in many areas of their lives.

We would argue that not only would closing Pickering make theirs and millions of other lives of those living as far away as my hometown safer, but the many years it will take to dismantle, clean up, and in some cases solidify nuclear waste, as well as monitor and keep the site safe will help mitigate negative social effects of the station closures as it is being worked on their behalf by the Municipality of Durham.

We join with Ms Tilman and others in arguing again that the Commission should take the important mandated step of helping ensure public health, safety and security to persons and the environment by turning this application down.

Let's not have to come back again. Let's move forward to the status where we are stewards of this waste and we're going to keep it safe forever.

THE PRESIDENT: Thank you.

I'd like to move now to the next
presentation by the Durham Chapter of the North American Young Generation in Nuclear, as outlined in CMDs 18-H6.79 and 18-H6.79A.

I understand that Ms Urrego will make the presentation. Go ahead, please.

**CMD 18-H6.79/18-H6.79A**

**Oral presentation by the**

**North American Young Generation**

in Nuclear, Durham Chapter

**MS URREGO:** Dianna Urrego, for the record.

Good afternoon. I am the current public relations chair of the North American Young Generation in Nuclear, Durham Chapter. I have more than three years of experience in the nuclear industry.

I am here today with my colleagues to share our professional and personal reflection of what a Pickering licence renewal means to young professionals supporting the nuclear industry.

NAYGN is a non-profit organization whose purpose lies in bringing together young professionals working in the nuclear industry by providing opportunities to develop leadership and professional skills. The NAYGN Durham Chapter is, today, the largest and most active
chapter in Canada, and was awarded the best overall NAYGN chapter in Canada as well.

We support the Pickering operating licence renewal, as this facility has been safely operated since its construction. Currently, Pickering provides 14 percent of the province's clean and reliable electricity. Also, Pickering has been supplying the world with valuable radioactive isotopes used in global medicine, sterilization, food preservation, and fusion research.

With a Pickering licence renewal, OPG will continue to demonstrate its ability to safely operate nuclear reactors, with public and personnel health and safety as the overriding priority. The province will continue to benefit from this source of clean and reliable electricity, which not only supports the Canadian economy but also contributes strongly to our fight against climate change.

**MR. SALIBA:** Michael Saliba, for the record. I am the Durham Chapter VP, as well as a worker in the energy industry for four years, three of which have been with the nuclear industry.

For more than three decades, Ontario Power Generation has demonstrated its commitment to the community, environment, and safety. As young professionals, we have witnessed and been a part of this
first-hand. Due to their design, multiple safety systems and barriers, CANDU reactors are a proven, robust, and safe technology.

Pickering Nuclear has received the highest possible safety rating of “fully satisfactory” from the CNSC in the most recent safety report. A periodic safety review was performed by OPG in 2016, and subsequently was reviewed by yourselves in the CNSC. The evaluation took into consideration 15 broad safety factors. The report concluded with the following statement:

"OPG is committed to [the] continuous safety enhancement at its nuclear facilities and has robust comprehensive programs in place aligned with industry best practices. The PSR identified no safety issues for [the] continued...operation of Pickering [Nuclear Generating Station] through [until] 2024...."

Furthermore, the International Atomic Energy Agency's operational safety review team independently arrived at the same conclusion following a 19-day review in September 2016, that Pickering Nuclear can be safely operated until 2024. This team was comprised of international nuclear safety and operational experts, with
a total of almost 400 years experience.

The report highlights a number of good practices, one of which is especially pertinent in today’s hearing. The report stated that OPG’s plant obsolescence program is very thorough, giving confidence that the plant’s systems, stations, structures, and components will reliably operate with the same efficacy as when they were initially commissioned.

Personally, I grew up in the Durham Region with a father who was a plant manager at the Pickering Nuclear Generating Station, and I recall during my first job, my first day at work at the car manufacturing plant at Chrysler, he pulled me aside and handed my lunch pail and said, "Don’t forget your lunch, but also work safe, home safe", an OPG mantra that stuck with me throughout time and I believe I will pass on to my children.

Our personal experiences, as well as the evidence provided by industry leaders, leads NAYGN Durham Chapter to trust in a future lead by Pickering Nuclear, and we are advocating for its continued operation until 2024.

**MR. GOODCHILD:** Good afternoon. I'm Mark Goodchild, for the record. I'm the current NAYGN Durham Chapter treasurer, and I have just over two years of experience in the nuclear industry.

Today, it is my absolute pleasure to
highlight the importance that Pickering Nuclear has to the environment.

First, as you've probably already heard, Pickering Nuclear is a key contributor to reducing Canada’s greenhouse gas emissions. It is estimated that keeping it open until 2024 will reduce emissions by 17 million tonnes, which is the equivalent of keeping 3.4 million cars off of our roadways each year. When we look around the world at other jurisdictions that have made the decision to close down their nuclear power plants, such as California, Florida, and Germany, this generation has been replaced by fossil fuel generators. In Germany, for example, key places like the Hambach Forest, are being demolished to get the fuel they need to power their country. It is likely that if Pickering Nuclear were to close today it would be replaced by fossil fuel generators. These have a greater environmental footprint, as well as higher costs. Pickering's contribution to helping Ontario reach its carbon dioxide reduction targets cannot be understated.

The next point I'd like to highlight is nuclear power has a very efficient land footprint when compared to other forms of generation. Nuclear power can generate 30 times more power when compared to solar power, and 15 times more when compared to wind per unit area. This means nuclear power delivers more power with a smaller
footprint, allowing more liveable space for our communities, our friends in the wildlife, and vegetation.

Thirdly, OPG and Pickering Nuclear have been excellent stewards of the environment around their sites. For example, in 2017, Pickering was recognized by the Wildlife Habitat Council for its biodiversity and conservation work. The programs that were recognized include the peregrine falcon nesting and monitoring initiative, involvement in the bring back the salmon program, and wetland and woodland conservation work done around their sites.

All around the world regions are facing the impacts of climate change, and until a reliable green source of energy has been implemented nuclear power will have a role to play. Keeping Pickering open will reduce our carbon emissions, optimize our land use, and continue great environmental programs at OPG.

NAYGN believes that shutting down Pickering prematurely will cause irreparable harm to Ontario's environment.

Thank you.

**MS PALINKA:** Karissa Palinka, for the record. I am the current membership and networking chair at NAYGN Durham. I have a Bachelor of Science degree in Chemical Engineering. I'm proud to say that I was raised
right here in Durham Region. I have two years of experience working in the nuclear industry.

Having grown up in Oshawa, I'm very familiar with Ontario Power Generation and the impact the company has on the surrounding community.

Aside from the economic benefits of having such a large technical employer in the region, Pickering Nuclear has been an engaged member of the Durham Region community for over 40 years.

Today, OPG Pickering provides charitable not-for-profit support to over 140 grassroots community initiatives annually in Pickering, Ajax, and Whitby.

Last year, Pickering Nuclear employees raised over $35,000 to support established local charities such as United Way Durham Region, Grandview Children's Centre in Oshawa, the Humane Society of Durham Region and Nova's Arc.

Other community initiatives connect Pickering Nuclear employee volunteers directly with community members. Operation Clean and Sweep which is co-hosted by NAYGN Durham is a semi-annual initiative that links volunteers with elderly homeowners to assist in yard maintenance in both the spring and in the fall.

I've personally attended this event for the past two years and it's always a delight to see the joy
on seniors' faces after helping them clean up their yard.

As an engineering-based company, OPG recognizes the importance of education and developing strong communities. Pickering Nuclear fosters scientific curiosity by partnering with scientists in schools to send engineers and scientists into classrooms at both the elementary and high school level.

At the post-secondary level, Pickering Nuclear has strong ties with local schools such as Durham College and University of Ontario Institute of Technology and provides co-op and internship opportunities for numerous students every year.

In conclusion, we believe that Pickering Nuclear is an excellent corporate citizen and neighbour who consistently demonstrates a strong connection with the host community.

Pickering Nuclear through its charity support, volunteer initiatives and commitment to educational excellence directly improves the well-being of Durham Region. As such, NAYGN Durham Chapter is advocating for continued operation of Pickering Nuclear through to 2024.

**MS URREGO:** Diana Urrego, for the record. As young Canadians seeking to continue to enjoy the high quality of life Ontario affords, we rely on clean,
dependable electricity supply power to our fast-paced lives, from charging our phones and computers every day, to powering advanced life-saving medical equipment to eventually replacing carbon fuels as the primary vehicle fuel source.

NAYGN Durham Chapter strongly advocates for the continued operation of Pickering and its license renewal to 2024.

We believe continued operation of the plant is in the best interest of the residents of Pickering and the surrounding community as an excellent neighbour and corporate citizen, Ontarians in general, and as an inexpensive, dependable source of baseload power and Canadians at large, as a 99 per cent carbon-free energy source that will help us meet our Paris Agreement emissions target.

Thank you for considering our statement in your decision.

**THE PRESIDENT:** Thank you. Question? Dr. Lacroix?

**MEMBER LACROIX:** Well, thank you for this dynamic presentation. I really appreciate it.

You’re the future of nuclear power in this country, you're the future of the industry. Are you concerned about this industry? Are you concerned about
knowledge transfer? Are you concerned about the recruitment of a new generation in nuclear power?

**MR. SALIBA:** Michael Saliba, for the record. It's funny you speak to that. As you were asking some of the previous interveners, you've asked for the biggest risk you saw to the nuclear industry, and the question that came to my mind was definitely knowledge retention and we have a very skilled, technical taskforce that we've built up in Canada by choosing the CANDU technology and we have individuals, designers, individuals who have committed themselves to the industry. And I believe knowledge transfer is the key focal point, the pivot if you may, and OPG does hire new graduates from UOIT and is partners with these universities to continue that focus.

And as long as OPG can continue to provide that and have that knowledge transfer, I believe there is no threat to the industry and I am looking forward to not only having CANDU through to 2024, but also small modular reactors or other future CANDU Gen 4s in the future of Ontario and Canada as a whole.

Thank you.

**MEMBER LACROIX:** Thank you. Thank you.

**THE PRESIDENT:** Ms Penney?

**MEMBER PENNEY:** Thank you very much for
that presentation. Very interested in the scientists in schools. You said that your organization supports or works with promotion of STEM science, technology, engineering, and maths. Is that correct?

**MS PALINKA:** Karissa Palinka, for the record. Yes, we are working to get members of NAYGN Durham into schools. Maybe Diana can speak more to that, but just within our Executive and our membership base, we're very engaged to have lots of female representatives on our Executive Committee and in our membership base as well.

Diana, do you want to speak to the school initiative?

**MS URREGO:** Diana Urrego, for the record. Currently, NAYGN Durham Chapter is planning on an initiative for high schools and elementary schools. We are preparing a presentation to explain to young generation, young kids how nuclear power is made.

We are very interested in targeting the elementary schools and high schools because we believe that from understanding and education we can actually make more women to come into engineering, more young generation to come and work in our nuclear plants.

So, that's something that we are working on and we believe strongly that education is the power that we need for bringing new generation in engineering and STEM
as you were asking.

**MEMBER PENNEY:** Thanks very much.

**MR. LOCKWOOD:** Randy Lockwood, for the record. I appreciate the Commissioner calling out that they are the future of the industry. I, too, agree and I would just like to acknowledge that I feel our industry's in good hands and our company's in good hands.

**THE PRESIDENT:** Go ahead.

**MEMBER BERUBE:** Yeah, I love what you're doing actually, it's really critical that you sit together and get organized and figure out what you're going to do with your future.

To that end, because of the fact you're starting in your careers and we have a lot of people over here that are maybe a little later on in their careers with a whole lot more experience in this particular technology and area.

Have you actually considered a structured mentoring program? Is there anything on the books with OPG, for instance, or with employers that you might be working with in the nuclear industry where you've actually got something that's absolutely set up firm and being monitored?

**MR. SALIBA:** Michael Saliba, for the record. When I was hired on by Ontario Power Generation I
was -- went into the mentor/mentorship program. So, we do have something in place at our facilities, both Pickering and Darlington, to have the new graduates come in, have someone who's kind of been in there, not for too long, but for five or so years to mentor the individuals on how to get attention from your supervisors to how to escalate and advocate for issues in the plant.

So, there is a structure already for those items, however, sometimes being a new employee you're kind of shy to the industry or you may be shy to having higher powers above you.

So, there is a program in place right now and I'm transitioning now to becoming a mentor for the mentees that are coming in, the new generation.

**MS URREGO:** Diana Urrego, for the record. In addition to the support that we receive from OPG in regards to mentoring, NAYGN promotes that networking among new hires and senior management in regards to that to have mentors, to have that relation and to establish those relationships from the very beginning of their careers or our careers. Presently, I have a mentor as well in the company and I agree that it's something that is very powerful and helpful.

Thank you.

**MEMBER BERUBE:** So, one of the biggest
concerns you brought up was that of knowledge transfer. One of the most effective ways to transfer knowledge is senior mentorship, junior upcoming leaders and to tag them very early, as you are probably well aware.

So, if you have something structured as people are leaving, thinking about leaving, certainly that would help bridge that gap fairly effectively.

**MR. GREGORIS**: Steve Gregoris, for the record. I'm going to ask Jason Wight, our Director of Engineering, to speak to mentoring and the knowledge transfer program.

**MR. WIGHT**: Jason Wight, Director of Engineering for Pickering Nuclear.

First of all, I do agree our future is in good hands. I would like to comment first on STEM because that came up.

We actually do incorporate STEM in a lot of different activities and we talked earlier about our X-Lab and our Innovation Centre.

We had STEM come to the Innovation Centre. One of our employees, part of the X-Lab and the innovation Centre is female and had a great experience exposing everyone to what we can do in nuclear power and it was a really great experience for everyone.

With knowledge management, so we
understand its importance, we understand its importance for nuclear, we understand its importance for the future of engineering, especially as well, and knowledge retention.

So, the approach we take is very systematic, it's very multi-disciplinary. Mentorship is a key part of that, whether it's a new employee or whether it's an employee that's been there a while. There's different types of mentors. There's mentors for engineers and there's mentors for leaders, as well. And, we treat that very seriously.

We have a qualification process for every role, which is part of the knowledge retention. We do have knowledge retention matrices. So, basically, based on the technical expertise of each individual and what we expect of them, we put a matrix together to make sure that we understand their critical role and how that knowledge is being transferred as time goes on because throughout the business we like to move people to different positions, get different experiences and it's important that we capture that retention plan.

We do a broad scope interview. We actually use external vendors to come in to take a look at our knowledge retention; where we're weak, where we can help transfer information to protect the critical information in our business.
We do incorporate it in business and succession planning. It's very important for us to make sure that that's captured and we also use that in talent and recruitment, as well. The UOIT diploma program -- so, we talked a bit about the partnerships with the UOIT and I do want to talk a bit about it, it means a lot to me as well.

What it is, it's a four-course diploma program, a graduate diploma program. So, once an individual has graduated from university, they come working for OPG and, as an engineer, you are required to take a graduate diploma program in either design or in operations in order to keep your job. It's one of those activities that we use to actually promote experiences and a higher understanding of nuclear energy and nuclear power, and what it takes to be a nuclear employee.

We've had great feedback from everyone that has taken that course and part of that development we've used, you know, former chief nuclear engineers at Ontario Power Generation, we've used externals at the Bruce Power plant as well. Some very good experiences in that opportunity.

We also have for mentorship an accelerate program. An accelerate program is identifying high potential individuals that could be future leaders in the
organization and put them through kind of the paces and different experiences to help them stretch themselves and we give them some education, some leadership opportunities, some teaching opportunities to help them accelerate in their career. I think that is very important.

So, as you can see, there is a lot that we do with regards to knowledge retention and management because we do care quite a bit about it.

**MR. SALIBA:** Michael Saliba, for the record.

Just to add to that, I am a graduate of that graduate diploma program and if you haven't gone to it maybe you're not sure, but UIT does hire individuals who were past shift managers and ANOs, so the knowledge retention is also from that aspect. Although they are retired, they come in, have education training; not so much for themselves, to be able to teach students, but once they have that, then they are able to transfer their own knowledge not just by the books but in the field, and have that knowledge given down to new graduates as well.

**THE PRESIDENT:** Comments? Go ahead.

**MEMBER DEMETER:** Thank you very much for your presentation. I always appreciate the opportunity to learn from others and how they approach problem solving or communication, especially risk communication.
So when you're with your colleagues of your generation and you say, "I work at a nuclear power plant" and they want to know about radiation risk, what phrases or how do you approach risk communication to your generation about radiation?

**MS URREGO:** Diana Urrego, for the record.

I have had those questions and I have mentioned that before for my family they are really afraid of nuclear and here as well with the people that I relate that are not in the nuclear industry. They always come with that question. That's why our purpose of education.

I think that everything -- the way I usually approach it is by informing people with facts, with real facts. I think that that is the key. That's the way I approach it. Obviously I don't go in details, in technical details, but it is important the people understand what nuclear power is, how it is generated, and all the risks that are around it but, at the same time other things -- there is more things that we have done to actually contain all that risk and prevent and mitigate that risk.

So that's the way I approach it.

**MS PALINKA:** Karissa Palinka, for the record.

Just to add on, I have several family
members that are in the medical industry as well as one of my cousins is actually an airline pilot. I find it useful to just compare in terms of dose. The OPG lives by the mantra like as low as reasonably achievable. So we track dose and it's -- the amount that I have taken like the past two years of working in the nuclear industry is minute compared to those experienced in the medical industry or in aviation.

So I think just putting it in context for people, really helps understand better.

MEMBER VELSHI: You talked about having courses at UOIT. So approximately what percentage of your time is spent on training and development?

Or maybe OPG, you can answer it.

MS PALINKA: I'll take a stab first. As a new employee coming, I didn't have a background in nuclear. I studied chemical engineering, and I found the training program that OPG puts their new employees through, amazing. At the beginning, obviously, there is a lot more of a learning curve. So they do send you on more training initially. However, the continuing training through the graduate diploma program and just the opportunities to take various training courses of interest is fantastic.

I wouldn't be able to put into a percentage, but I know that my personal goal is to do at
least one day of training per month, in addition to the graduate training diploma, which is about three hours a week during a semester.

**MR. SALIBA:** Just to add to that -- Michael Saliba, for the record -- I know OPG mandates 40 hours of continuing training per year for an individual. However, I know of colleagues of myself far exceed that.

From NAYGN we are able to bring in continuous learning, lunch and learns from our partnerships with the CNL, with the CNSC, with other individuals in the nuclear industry, as well as opportunities that come and arise. Our measurement is definitely very responsive and it is onboard with us going out and receiving some new training.

**MS URREGO:** Diana Urrego, for the record.

Maybe I will not be able to, as like my colleagues said, put it in a percentage or hours, but the thing that I know and I have learned since I started working at OPG is training is priority number one. That's the way we take it.

**MEMBER VELSHI:** After safety, though, I hope?

**MS URREGO:** Yeah.

--- Laughter / Rires

**MEMBER LACROIX:** Yes, I cannot help
observing that you've contaminated this Commission with your enthusiasm. Thank you very much.

This morning or earlier today, we had a presentation by the Member of Parliament, Mr. O'Toole, and he mentioned to us that he created a caucus on nuclear, so you should contact him.

**MR. SALIBA:** Michael Saliba, for the record.

Thank you. He has actually come to our facilities and done one of our lunch and learns. And he is in contact with our Canadian Affairs Chair, Matthew Mairanger, for internal meeting between each other.

**MEMBER LACROIX:** I have a question for you. Is there an age limit to join your organization?

**MR. SALIBA:** Michael Saliba, for the record. There is no age limit to join the organization. However, you must be under 35 to hold a position of leadership.

**MEMBER LACROIX:** I just missed.

--- Laughter / Rires

**MR. SALIBA:** But feel free. I'll send you an invite later. Thank you.

**THE PRESIDENT:** Anything?

Okay, back to real business here now. On page 4, I forgot all about the OSART mission that you
mentioned -- maybe for staff also -- and I wasn't aware that the OSART people actually commented on the feasibility of going beyond 2024. Is that true, and how come nobody talked about that?

So thank you for that little observation here.

I mean that's a peer -- this is the IAEA peer review, right? Maybe OPG can start?

**MR. LOCKWOOD:** Randy Lockwood, for the record.

Specifically you're asking -- your question, did OSART look at us going beyond 2024?

**THE PRESIDENT:** Well, the intervenors claim that IAEA after 19 days of review, commented about the obsolescence of management, the challenge of maintaining the components -- structural.

So nobody mentioned the fact that an international group of experts taking a look at your plan here and have some comments on this.

**MR. LOCKWOOD:** Yeah. Randy Lockwood, for the record.

OSART came as you said, back in September of 2016, 19 members from all over the world. They did an extensive review for anyone that's been involved in an OSART. In the end, they concluded that our management was
focused on improving operational safety. They left us with 10 recommendations, 11 suggestions and eight good practices in 13 different focus areas. All but two are closed at this point, one of which if you're about to ask me, was the fitness for duty associated with drug and alcohol testing. As the Commission knows, we are working our way through a plan to implement that.

**THE PRESIDENT:** Did they talk about the fitness of the fuel channel?

**MR. JAMMAL:** Its Ramzi Jammal, for the record.

The OSART mission did not look at the technicality with respect to the OSART mission. The OSART mission looked at -- it's operational safety. In addition to the report itself, we had staff who were observing it, but it was a logical extension with respect to leadership, management, capability, procurement, process, and so on and so forth. But they did not technically review the periodic inspection program, the testing with respect to pressure tubes or fuel channels.

The key point here is the OSART and the international missions, what they do is they compare the operations or the regulator against the safety standards of the IAEA. But there was no -- for the record, there was no discussion associated with the fuel channel or life
extension of the fuel channels.

**MR. FRAPPIER:** Gerry Frappier, for the record.

I have the OSART report here. So if you can give me -- there is three good practices that the IAEA team noted. One was:

"The plant sponsors a community-based education and leadership development program that engages partners such as local universities and theatre groups. The long-standing program which includes mentoring for high school students and other components provides a form for the plant to educate the public on its operations while also promoting environmental awareness." (As read)

The second good practice was:

"The plant has developed an effective program to manage the supply of spare parts ... [So that's against the aging management.]...for aging equipment, which takes into consideration long term operations and transitions to decommissioning." (As read)
And the third good practice was:

"The plant is ensuring that new residents who move to areas near the plant are included in the distribution of iodine pamphlets."

(As read)

So those were the sort of three good practices.

I'll let you add that.

Alex is going to add something here as well.

MR. VIKTOROV: Alex Viktorov.

Again, OSART's focus is mainly on operational aspects of plant performance and there are some recommendations and suggestions, and also good practice is noted. In particular, with respect to aging management, there was a good practice noted that bears on long term operation. I will read it:

"Obsolescence management taken into consideration, the long term aging management assessments and transition to decommissioning requirements."

(As read)

So that was, as I mentioned, as a strength in Pickering.
THE PRESIDENT: Okay, thank you. I just wanted to know what that was all about.

You have the final thoughts. Do you want to share with us?

MS PALINKA: Yes, just thank you for this opportunity. This is a unique experience for all of us and it's great to be able to promote nuclear power for the young generation.

THE PRESIDENT: Thank you. We are going to break for dinner. Okay. We are coming back at 20 to 7:00.

--- Upon recessing at 5:47 p.m. /
Suspension à 17 h 47
--- Upon resuming at 6:45 p.m. /
Reprise à 18 h 45

THE PRESIDENT: Are we ready to go?

The next presentation is by Northwatch, as outlined in CMDs 18-H6.55 and 6.55A.

Ms Lloyd, the floor is yours.
Oral presentation by Northwatch

MS LLOYD: Thank you, President Binder and Members of the Commission.

My name is Brennain Lloyd and I am presenting on behalf of Northwatch.

Northwatch is our regional environmental non-governmental organization in northern Ontario.

I want to begin by acknowledging that we are on the territory of the Haudenosaunee Confederacy, including the Mohawks of the Bay of Quinte, who you’ve heard from earlier, and also of the Mississaugan Anishinabek.

Our interest in the Pickering Nuclear Generating Station is with respect primarily to the short, medium and long-term management of the radioactive waste that will be generated through continued operation and are already on site.

Northwatch’s three key areas of focus in the licensing review are: OPG’s management of the irradiated fuel, including while in the irradiated fuel bays; OPG’s preparedness for the transition from preliminary decommissioning to actual decommissioning; and OPG’s overall approach to the management of radioactive
waste that generates over various timeframes.

With the management of radioactive waste of irradiated fuel, this is the lasting legacy, the most lasting legacy of using nuclear reactors for the generation of electricity. In the case of the Pickering Nuclear Generating Station there are definite concerns around the waste in condition in the irradiated fuel bay.

There have been, at least since as far back as 2007, chronic leakages from the irradiated fuel bays and despite multiple instances of being directed by the CNSC to correct issues associated with the irradiated fuel bays, Ontario Power Generation continues to lag in repairs and in addressing these issues.

And these include, to date, uncompleted repairs and issues identified with associated equipment and also with availability of space in the irradiated fuel bays.

In the Periodic Safety Review there was a corrective maintenance backlog across all bays and systems identified and this, President Binder, I think is an issue that you pursued in the Day One hearings. And it is certainly an issue that we share your concern about.

In particular, the review noted that the IFB leakages from the IFB to collection sumps had been increasing since 2007.
In the April 2018 CMD H6 by OPG they indicated that in 2013 OPG initiated repairs -- and this is I believe to the sumps -- and they were expected to be completed by the end of 2017.

By the June CMD, H6-1B, they indicated that the repairs would be completed by September 2019.

So I think it’s still very much a work in progress, or we hope progress is part of that description.

In more than one instance the CNSC Staff or OPG documents emphasized that there is no off site -- oh, sorry, I missed an item.

One of the concerns that flows from this is the contamination of groundwater, tritium contamination of groundwater in the vicinity of and, as we understand it, coming from the irradiated fuel bays and associated workings.

In more than one instance CNSC Staff or OPG documents emphasized that these groundwater contaminants are not going off site. But I think that we have to look at that in context. It’s a relatively large site and it doesn’t mean that there’s not extensive contamination just because it’s not going off site. And there are indications that there is tritium in the perimeter wells.

So it’s difficult to accept that it’s not
going off site when it’s in evidence at the perimeter wells. Logic sort of doesn’t fit with that.

In the age of impending closure decommissioning, and I think OPG’s vision is site release, there will be no off site.

So I think the groundwater contamination and the chronic problems with the irradiated fuel bays travel together, and I think that it is really quite disturbing that they have been so long standing and the date for repair resolution appears to still be moving off into the future.

The irradiated fuel bay capacity I think needs further examination. We did raise this. We’ve heard from OPG that there is sufficient capacity but we’re not actually yet confident of that.

From the number crunching that we did, it was difficult to determine. But even if under normal conditions there is sufficient capacity, there are other conditions where that capacity, different scenarios where that capacity might be reduced.

I think one is impingement on fuel bay capacity. Another would be upset conditions where one or multiple reactors had to be emptied rapidly. Another is upset conditions which would require the return of dry storage containers to the irradiated fuel bay.
We haven’t had discussion of that in the context of this licensing but there has certainly been discussion of that in other reviews when we were looking at licensing, for example, last year of Pickering Waste Management Facility. And we have at various times posed the question of: What happens when the dry storage containers, when there’s a failure?

And OPG has said well, we just do it backwards. We just put them back in the irradiated fuel bay. Well, I think that raises issues around capacity.

But returning to that first one, impingement on fuel bay capacity, according to the Periodic Safety Review there is already existing impingement on fuel bay capacity.

I will just quote from the Periodic Safety Review: Recent field walk-downs have identified unusable space in each of the bays.

And it goes on and it counts up to equivalent of five reactors’ worth of unavailable space.

And this is, as I read the document, basically due to clutter.

So I think there is already impingement.

We have heard from OPG that yes, there is capacity. I can’t really say confidently that their quick answer on that addresses these additional concerns around
impingement and upset conditions.

There are continued concerns with irradiated fuel transfer, and these are issues that we raised in the Pickering Waste Management Facility licensing review last year. I know not all of the Commissioners were there at that time, but I think they continue and are perhaps even elevated, having read the Periodic Safety Reviews for this station.

Dave Lochbaum from the Union of Concerned Scientists had flagged for us last year the risks, the concern around fuel drop as the fuel is being transferred out of the irradiated fuel bay. At that time we didn’t contend that it was an elevated risk. We just weren’t confident that the risk was properly evaluated and identified.

As we read the Periodic Safety Review and came to get some window into the world of equipment, spare parts not being available, equipment breakdowns, equipment being basically just not up to snuff, that risk of fuel drop raised for us again.

And as we said last year, Dave Lochbaum said we weren’t contending it was elevated. Well, maybe it’s a bit more elevated now, having read the Periodic Safety Review and having got a little sense of the state of disrepair of the associated equipment.
We make a number of recommendations with respect to that.

And I see that I am down to less than a minute once again.

I just want to say that in terms of preparedness for closure and decommissioning, we think that both OPG is not in a state of readiness nor is our regulatory framework in a state of readiness.

In terms of radioactive waste management, OPG continues to rely on the “it will go away” strategy. And I think that there are uncertainties with both the proposed geological repositories.

I would be happy to discuss that at whatever length you would tolerate.

In terms of the radioactive waste management more generally, we continue to have some of the same deficiencies around information available.

And additional issues include continuing issues around the safety control areas and how they are expressed and calculated and issues around the overall acceptability and the non-acceptability of OPG having applied for a ten-year licence and applied to extend to 2024 when clearly in 2013 the discussion was all about 2020. And it was a stretch to let them go that far.

Thank you.
THE PRESIDENT: Thank you.
Questions?
Dr. Lacroix?

MEMBER LACROIX: Yes. Now I would like to hear about the irradiated fuel bay from OPG, safety concerns, management problems, challenges.

MR. LOCKWOOD: Randy Lockwood, for the record.

I would like to address a number of these items. But first and most important is the backlog made reference to by the intervenor.

I completely disagree. We’ve reduced the deficient backlog by over 90 per cent, and I will come back to that.

Most important is the CCs and CNs, most critical work order backlog across the site: zero. Not per unit, not some things on fuel handling. Across this site, zero.

And it’s been like that since the start of this year.

That’s industry best, by the way.
The second category is deficient.
We set a target this year across the station of driving the backlog and deficient down to 15 per unit, work orders per unit.
We are about ten or 11 per unit now already, only halfway through the year.

Associated with fuel handling there is no CCs, as I said. There’s none across the site. There’s nine DCs, second priority, and only one associated with the fuel bays.

And it is assessed, meaning it has parts and people assigned, and scheduled to be completed by September of this year.

In terms of fuel bays water leaking to the groundwater, absolutely incorrect.

I will say in front of the Commission there is no water leaking from the IFBs to groundwater.

MR. MANLEY: Robin Manley.

I’m just going to add a couple of quick points and then I’m going to pass it back to Lise Morton.

As the intervenor herself has pointed out, many of these issues were already spoken to in the 2017 Pickering Waste Management Facility hearing and addressed at that time. So a lot of this is repeated, such as, for example, the irradiated fuel transfers and the dry storage container drop, and also the question about sabotage and the security of these containers while in transit.

Maybe Lise can speak to the kinds of things she’s responded to in the past.
**MS MORTON:** Lise Morton, for the record.

To continue with what Robin Manley is saying, and the intervenor noted, Pickering Waste Management Facility has its own licensed facility, and we discussed that facility at length last year in the ten-year licence renewal for that facility.

So just on a couple of the items.

We did discuss last year and I will just reiterate that with respect to the transfer of dry storage containers on site, they occur within the site boundary of the Pickering site. Therefore it never travels on public roads. It’s always at all times accompanied by a nuclear security escort.

We have a very robust transportation security plan which is submitted to the CNSC, and we produce a design basis threat document which complies with requirements in the *Nuclear Security Regulations*.

With respect to the drop of the DSC, again we discussed that last year at the Pickering Waste Management Facility licence. I’ll give just a little bit of information and then Carlos Lorencez can certainly speak to that further with respect to the drop in the pool.

But with respect to a drop of a DSC during transfer again, that’s one of the modelled scenarios for a DSC drop during transfer across site, and the dose
consequences are acceptable on that and less than 1 percent of the limit.

But, again, Carols Lorencez can certainly speak to the drop of the DSC in the IFBs themselves.

**MR. LORENCEZ:** Carlos Lorencez, Director of Nuclear Safety. That is correct, the safety analysis that we have for Picking includes the drop of DSCs inside the irradiated fuel bay, several metres above the level of water. Also the other accident is dropping the DSC on top of the pool deck. In both cases the consequences, the releases, the dose is very well within the regulatory limit.

So those accidents have been deeply analyzed and we are ensuring that the safety of the employees and the public is assured.

**MR. WIGHT:** Jason Wight, Director of Engineering, for the record. I’d also just like to talk a bit about the IFB and the reviews that we’ve done for the IFB itself. So as part of the PSR review a Safety Factory 2 report, which is actual condition of structure, systems and components important to safety, we have concluded that the programs in place and that the IFBs and supporting equipment are in good condition.

Action came out of that, is complete, and that is the IFB condition assessments. The action plans
are implemented and incorporated into station health reports. That’s important to know.

We’ve also had that integrated in to our aging management plan. That includes inspection, includes maintenance, monitoring, to manage any vulnerabilities and maintain their operating margin with regards to the IFB, and that’s also included into system health reporting and system health monitoring.

With regards to the one concern of the PSR and the documentation, it is not a safety issue, it is specifically an administrative issue, a documentation issue, which will be updated into the safety report for the next revision.

THE PRESIDENT: Can somebody tell us, did you have any fuel drop recently. Staff, I assume that would be a reportable event. So can somebody give us statistics? Does it happen? Does it happen often? Did it happen at all?

MS MORTON: Lise Morton, for the record. We have had no fuel drops.

THE PRESIDENT: Not ever or the last few years, or what?

MS MORTON: Lise Morton, for the record again. I’ll speak for during the transfers of DSCs. We have never had a fuel drop, and I’ll just get Carlos
Lorencez to confirm in the bays.

**MR. LORENCEZ:** Carlos Lorencez, for the record. That is correct.

**THE PRESIDENT:** Staff, do you want to add?

**MR. FRAPPIER:** Gerry Frappier, for the record. We would concur with that.

**THE PRESIDENT:** Ms Velshi?

**MEMBER VELSHI:** So I’ll ask the intervenor, how do you reconcile what you have told us about these chronic leakages, increasing since 2007, and repairs that are not completed, and then we hear from OPG categorically incorrect?

**MS LLOYD:** Well it's difficult to reconcile. I mean, I can only go by the documentation that I had available before I walked into this room. So it’s difficult. I mean, Mr. Lockwood seems upset, I’m sorry for that, for him, but I can only say what I know for the records that are before us.

I find it very difficult to reconcile him making an absolute categorical statement there are no leaks when the documents say there’s been chronic leaks and there are outstanding repairs.

So I don’t know how to reconcile that. I would wish that when they’re going to make those categorical statements it was referenced, it was
documented. You know, we see this happen in the hearings over and over again where OPG can make statements, sometimes they make statements that I will then go back and look and check, and I think, ah, not quite.

They made statements in Bruce about the inventories that are available in the preliminary decommissioning plans. They were not the comprehensive inventories that they implied were there. I look and they’re not there.

So it’s a challenge, it’s maybe one of the most difficult things as an intervenor, is that we do our best, there are thousands of pages, we do our best to read them, summarize them, identify the issues that we think are most important for your consideration, and OPG can come and say whatever categorical statement they like to make.

It’s not referenced, it’s not documented, and it won’t be even when we leave this room. I don’t know that you’ll ever get the documentation. I don’t think you will get the documentation that follows up his statement, that there are no leaks from the fuel bays to groundwater.

THE PRESIDENT: Okay. Well, you raised a very good question, and that’s what gave us reason to ask those questions.

So I’d like it to be reconciled right here and now. So we have inspectors, we have Staff that are
supposed to tell us who is right in this discussion. Staff?

Mr. Frappier: Gerry Frappier, for the record. So, as usual, nuclear power plants have some complex designs. So, in a sense, they’re both right. So there is leakage from the IFB, but because the designers envision that, there is an area after that that leads down to a sump where that water can then be collected and processed and put back into the pool. So the water, although we consider it a leak from the radiated fuel bay, it’s not a leak outside of the plant, it’s a leak within things.

Still of concern though for Staff, and so we have been looking into it because we do believe that it’s not supposed to be there or should be minimized.

In fact, just recently we had done an inspection on the irradiated fuel bay at Pickering, and I would ask perhaps Mr. Steve Cook, who was on part of that team, to give us a little bit of a sense of what we found.

Mr. Cook: Steve Cook, for the record. Yes, last week we did inspection of the fuel bays. The focus was on the epoxy line or repair work that was being done. But we also wanted to follow-up on some other issues, you know, that were looked at in the past.

For example, in 2015 an inspection was
done of the bays, there were a number of action notices that were -- two action notices that were raised with respect to maintenance backlog. Those have since been closed.

We also wanted to go and have a look at the EME equipment, so we did that.

As far as the bay goes, we just want to be clear that there’s a difference between the epoxy liner leakage and the concrete structure integrity. So OPG has in place an epoxy liner repair program, we’ve completed Phase 1 of that repair. They’re into Phase 2 now, and Phase 2 should be completed by December 2018.

The leak rate, we have seen it come down. It was originally around 2,000 litres per hour, it’s now down to about 200. We verified that through sampling, sample data.

Also so we want to make sure it’s clear that that leaks is to the interspace between the inner bay and the outer bay, the IFB. There’s two structures, and so any water coming from the liner leakage goes to the sump and can be re-circulated back into the bays or through their decontamination sump.

**THE PRESIDENT:** So I understand what is being said here is no leak to the groundwater, but there is a leak that is being contained. So that why you’re saying
both right?

**MR. LOCKWOOD:** That’s correct, and I was very clear to say there was no leakage of irradiated fuel bay water to the groundwater --

**THE PRESIDENT:** But it’s still of a concern to you, why? Why is it a concern if it’s still being captured?

**MR. FRAPPIER:** Gerry Frappier, for the record. So as part of our compliance program, we are always looking to ensure that the design is working as it was intended to, and certainly the liner is intended to keep the water in the irradiated fuel bay, and we would like to see that repaired so that we don’t have such a leakage.

Although, it perhaps is not a very high safety significance, and that’s why we haven’t increased our enforcement action, if you like, beyond doing inspections, getting some action notices. We still think that the overall maintenance program has to be such that it’s --

**THE PRESIDENT:** So just to close this. So the intervenors say that this is chronic, it’s been around for a long time. Why is it taking so long to fix it?

**MR. FRAPPIER:** I think OPG would be in a better position to answer that.
THE PRESIDENT: Well, it was an action item that you suggested they do, so why wasn’t it done? I’m trying to understand who’s overseeing what.

Go ahead while they’re thinking about it.

MS LLOYD: Brennian Lloyd. While they’re conferring, I’ll just add in. I think -- I can see now that the categorical statement comes from the irradiated fuel bay, and I think that we should consider the irradiated fuel bay as a system. So if the way of dealing with leaks from the irradiated fuel bay, there was an intended strategy to maintain water levels in the collection sumps below groundwater level so that any leakage is inward rather than outward.

I considered that to be a fairly makeshift approach. So I don’t think it’s helpful to you or to us for OPG to make these categorical statements which they can technically make because he was saying the IFB not to the liner, not to the pump. I just don’t think it’s helpful.

Thank you.

MR. FRAPPIER: Gerry Frappier, for the record. So perhaps I’ll ask Mr. Ed Leader, who’s the Site Supervisor for the inspectors, to talk a little bit about when we started putting some pressure on with respect to repairing the liner.

MR. LEADER: Ed Leader, for the record.
I’m the Power Reactor Site Office Supervisor within the Pickering Regulatory Program Division.

We did initial inspections in 2014 and 2015 of the bay. We identified that there was equipment deficiencies, the corrective action backlog was high and that there was a liner repair that was required. OPG had a project in place, Project Number 1340703, to repair the liner. They were aware of it. Perhaps they could provide more detailed information on why it took so long to get the repair completed. We understand the tooling that was required to fix the epoxy liner had some problems with the original equipment manufacturer and the testing of that equipment had to be done outside the bay, they could not do the testing inside the bay, so it did take longer than they expected to make the final repairs. But as Steve Cook indicated, the repairs have now been completed for Phase 1 and Phase 2 is in progress.

MR. JAMMAL: It's Ramzi Jammal, for the record. I would like to complement what Ed has said.

The repairs for a fuel pool or the IFB is not trivial. As mentioned, they require special equipment. In addition to this special equipment, the Commission recalls that when repairs had to be done at Gentilly-2 they had to sometimes move the fuel so that the work is exported to the individual or the workers. So at G-2 they had
divers, they had equipment, they had everything else, so there is manipulation of the fuel. So why it took so long, that would be OPG. Staff kept an eye on it, but I would like to go back to the fact that with respect to risk, with respect to risk from the design itself, risk, is it being contained and recycled, is there impact offsite? The answer is no. So we apply the risk-informed decision-making, but the repair is delayed for multiple reasons, maintenance of the machine itself and the volume and the fuel in the pool that has to be managed accordingly, but it is up to OPG to determine how they are going to fix it.

THE PRESIDENT: Go ahead.

MEMBER BERUBE: Staff, maybe you can bring me up to speed. I mean when I was with Pickering they had two IFBs in service. Have they decommissioned one of them, is that what's going on, one of the main bays in operation or are both bays still functional?

MR. LEADER: Ed Leader, for the record.

There are actually three bays, IFB A, IFB B and the auxiliary irradiated fuel bay, and they are all in service.

MEMBER BERUBE: So which bay are we talking about here in terms of leaks then?

MR. LEADER: IFB B.
MEMBER BERUBE: Okay. Which is where?

MR. LEADER: It's on the B side.

MEMBER BERUBE: Okay.

MR. LEADER: It's 058.

MEMBER BERUBE: Okay. I know where it is now.

THE PRESIDENT: Ms Velshi...?

MEMBER VELSHI: So if there is a leak from the sump, presumably it will contaminate the groundwater, and if it's from the IFB, it's not elevated tritium levels that you would expect to see. So what are the groundwater levels around the IFB contamination levels in there?

MR. GREGORIS: Steve Gregoris, for the record.

So we are going to go and look up the information. Raphael McCalla is going to get you the exact numbers. We don't have that handy.

Just for perspective, I think Mr. Jammal gave an excellent summary of really what's happening here. So there was leakage from the liner in -- from the bay into the liner, it went to the sump. Those sumps are repaired, they are leak-tight now. Prior to those repairs we did see a change in our groundwater monitoring program, a change from baseline, and Raphael will talk to those numbers, but I can assure you that as soon as that was determined -- and
it gives I will say some credit to our robust environmental monitoring program -- as soon as we saw that change we went and looked, determined that the sump needed repair. We were able to immediately put in place an operating procedure to ensure the level stayed below the place where repairs were required. So we stopped anything from going to groundwater immediately. We then went in to repair both the sump and the liner. As you can appreciate, those are difficult repairs. Some of them are underwater, there was remote tooling using a crane, we had to move baskets around, and so that's why it took some time to do all those repairs. I can assure you in all that time we were not leaking to groundwater and we worked through those repairs. In doing the first phase of repairs, which took care of most of the liner leakage, there was some discovery work. So, you know, as we went and did the initial set of repairs, we saw that discovery work. In some cases there is some leakage and some of it is proactive to ensure no leakage going forward. So we see that as obviously prudent to do for the health of the bay liner and we will continue to do that.

I will just see if Raphael has the data now. You do? I'm going to pass it over to Raphael.

MR. McCALLA: Raphael McCalla, for the record.
So, first of all, I would like to assure the Commission that Pickering has a very well-established groundwater monitoring program. The program has been in existence for over 20 years and the program is designed to do three things: to confirm the predominant onsite groundwater flow characteristics at the site, monitor changes to the onsite groundwater quality to ensure timely detection of inadvertent releases, and also to ensure that there are no adverse offsite impacts from contaminants into the groundwater.

With respect to the actual value around the IFB, the tritium concentration, the maximum tritium concentration as measured in 2017 with 5.48 times 10 to the 5th Bq per litre, and I would like to assure the Commission that there are no offsite impacts. When you look at the perimeter wells for the site, the highest value that we see is around 5000 Bq per litre and that is in the southwest corner of the site. But if you look at the actual graph that the intervenor presented on Slide 5, what you see is you see a cluster around the actual reactor units themselves and the groundwater is actually localized in that area. The groundwater travels north and it actually is discharged through monitored pathways, but based on the values that we see in terms of tritium at the water supply plant, which was mentioned earlier, which is between 4 and
8 Bq per litre, we can demonstrate that there are no offsite impacts as a result of groundwater leaving the site.

**MEMBER VELSHI:** So I want to get to one of your reasons you gave was to see if there was anything abnormal happening. So when did you start seeing elevated levels in the groundwater monitoring around the IFB?

**MR. McCALLA:** If you can give me just a few minutes to actually pull that out of my report here, I can tell you.

**MR. JAMMAL:** Ms Velshi, it's Ramzi Jammal here, for the record.

From the CNSC perspective and in fairness to the intervenor, we do analysis and we do the trending. I will ask Mr. Mike Rinker to provide you with the information with respect to the tritium in the groundwater and the historical levels that existed at that site.

**MR. FRAPPIER:** I just want to be clear here because I know what Mike's going to be saying. So far we have been talking about groundwater coming from the IFB and I think we do have, as we mention in our CMD, concerns about groundwater contamination, but it's not because of the IFB. So I think Mike is going to give a wider scope of groundwater and where we are at with that. I just don't want to make it as a one-to-one connection to the IFB.
MEMBER VELSHI:  So I just want to make sure you understand why I'm asking this. The intervenor has raised concerns that there are issues with leakage from the IFB into the liner, into the sump, and I just want to make sure how proactive OPG has been in trying to address that issue.

THE PRESIDENT:  And just to piggyback on this, I understand they have all kinds of monitoring wells. Where is the data and do you -- like in many other sites you are monitoring the plume migration all the way from the site to the environment. Do you do it here too?

MR. RINKER: Mike Rinker, for the record.

So tritium is a bit different than many other constituents. First of all, the tritium that is released to the air becomes entrained in precipitation and moisture and so often you see the shape of what is in groundwater influenced not by groundwater plume migration but by aerial plume migration and entrainment to deposition. So that's very important for understanding the concentrations of tritium in the perimeter wells near residential -- in the direction of residential areas around the Pickering site, because the prevailing wind direction is what would influence those wells. Those wells are generally less than 100 Bq per litre around the perimeter. There is one well that is in the order of 6000 Bq per litre
to the southwest of the facility, so not in the prevailing wind direction, more influenced by site activities than what is being transported offsite.

And secondly, there is some historical groundwater contamination that dates back to the 90s and that is why you saw the intervenor presented a graph of monitoring locations. There's more than 140 locations for monitoring groundwater at that Pickering site, which is extremely intensive. Most of the monitoring locations are in and around the facilities because there was multiple sources of tritium leakage at that time. We have been monitoring the groundwater. There are annual groundwater monitoring reports that are submitted from OPG to us. The tritium levels in the groundwater have been stable for many years, on the order of decades, and so the mitigation measures that were put in place back in the 90s we're confident are not continuing to cause increases in tritium concentration in and around the facility and we're confident through our monitoring and the assessment of tritium in air concentrations that there isn't a significant load through aerial deposition that is going more towards the residential areas.

THE PRESIDENT: Go ahead.

MS LLOYD: Yes. Brennain Lloyd from Northwatch.
So, Mike, you said that it's been stable, tritium has been stable over many years, but now I am two years out of date, but the 2016 staff environmental assessment report said that in many cases concentrations have remained nearly constant or decreased, in a few cases tritium concentrations increased unexpectedly over recent years. That to me was another flag that there is an issue. I associated the tritium with the irradiated fuel bay. If there are other sources, that would be very interesting to know. We have requested the groundwater sampling results from OPG and they have declined that request, so it's difficult for us to understand what is actually happening at this site. So it's difficult to reconcile stable over many years with what's in your 2016 EA report.

MR. FRAPPIER: Gerry Frappier, for the record.

I will get Mike to add some characteristics to this, but there's sort of the actual groundwater itself as the major body of water that's under there and then there's responses that are measurements that are taken at the wells. You will remember that a little while ago we brought to the Commission concerns about some of the well -- the sampling that was elevating and actually OPG started an investigation and found some leaks with respect to the construction joints within Pickering itself
and those were determined to be the source of it and there has been a repair program for that. But perhaps I would ask Mike to give some more details around what the intervenor is talking about.

**MR. RINKER:** Mike Rinker, for the record. So those events that Mr. Frappier is talking about were described in the CNSC staff's supplemental CMD. What I want to make sure that is clear, I don't want to give the impression that we are trying to minimize the issue of tritium in groundwater, we see this as a concern as well.

None of the samples that we are talking about the monitoring locations are drinking well or source of drinking water, they are monitoring wells to look for performance. And at the time of closure, moving into decommissioning, that reservoir of tritium is going to be something that is going to be very important to ensure safety when the decommissioning plans are put forward.

Now, the tritium reservoir is being maintained and contained by hydrodynamic isolation where drawdown, much like a tailings facility, you lower the water level so water flows into it, but eventually you're going to have to decide when you are going to stop that and we will be taking that into consideration, that that containment must be maintained in place until we are
satisfied that the groundwater reservoir is safe to do so.

**THE PRESIDENT:** Okay. Other topics?

**MR. McCALLA:** Raphael McCalla, for the record. I just wanted to provide the information that was requested.

So in 2013 is when we discovered elevated tritium concentration in the IFB and at that time the maximum concentration was 3.96 times 10 to the 6 Bq per litre. So the actual concentration has gone down by tenfold dilution, gone down by a factor of tenfold.

**MEMBER VELSHI:** And just before we leave this issue, so the intervenor said she has asked for this information from OPG. Is there a reason why that hasn't been disclosed?

**MR. McCALLA:** Raphael McCalla, for the record.

So in terms of -- we have talked about our environmental monitoring program -- environmental management program and one of the things we talk about is to ensure that we keep the risk to the public and the environment as low as possible. With respect to groundwater, our goal is to demonstrate that as well and the way we see best to do that is to provide the data for the perimeter wells because that is where the interface is between what's happening on the site and where it actually
impacts the public and the environment, so to speak. So in
terms of the perimeter data, we have actually started
posting that information and that was actually -- that
actually was as a result of the Pickering waste management
relicensing last year, where a request was made for
information and we took that away to see if we could
actually provide additional information. So we started in
March of this year to provide perimeter data for monitoring
wells and we have actually provided that information for
2016 as well as 2017 to the intervenor in response to the
request.

MR. GREGORIS: Steve Gregoris, for the
record.

I just want to restate for the Commission
here. So our commitment specific to impacts of operation,
so impacts of plant operation to the public, the workers
and the environment are low risk and will continue to be of
low risk and adequately mitigated. So we are committed to
do that. And Raphael McCalla has outlined our extensive
environmental monitoring program and with that our
extensive program for monitoring groundwater on the
Pickering site. We have demonstrated that there is no
adverse impact offsite from groundwater and that we have an
extensive program. The pertinent data that the public
would want to know about, we publish that, we put it on our
website, we make it available. We also are sensitive to any changes and will respond to those changes in a quick manner to ensure that we address any pathways and we will continue to do that going forward.

THE PRESIDENT: Just -- and again, this is a commentary. You are measuring the impact on the environment and the perimeter and I think that's the right thing to do, but everybody knows that you also measure -- you have onsite wells and by refusing to release it you always get into this conspiracy theory, maybe you are hiding something, blah-blah-blah. So if your perimeter number is okay, I don't know why you are afraid to publish the whole thing, but I leave it up to whether it's a regulatory requirement or not, I'm not sure if it's a regulatory requirement as long as the perimeter figures are okay.

Let's go into another topic, please. Dr. Demeter...?

MEMBER DEMETER: I just -- I need to talk about it. This is going to come up again on Friday with the groundwater. So if you look at -- for staff, if you look at the presentation from the intervenor on Slide 5 and you look at all those purple dots, I take it that OPG shares with you the results for all those dots. Is that information protected or privileged in any way when you
receive it?

**MR. FRAPPIER:** Gerry Frappier, for the record.

So we do receive it, we have access to the information we want, but it is considered OPG information and they have asked us not to release it to the public.

**MEMBER DEMETER:** Okay. So Mr. Rinker had talked that in the end game with this, this is still going to be an issue of how to manage this reservoir, so it's not inconsequential and I think it would lead to some degree of certitude by intervenors and the public that if you are sure that there have been decades of stability in some of these, then it's a reasonable risk to manage. If it's a performance indicator, it's also a potential safety indicator. So I really disagree with this information not being shared, especially if it benefits your case. And if it doesn't benefit your case, I even want it more so shared. So I have to say I respectfully disagree with OPG's position on this and I'm not sure how they can compel CNSC to not release it if it's not security-related or privileged in another way, but that's my opinion.

**THE PRESIDENT:** Okay. I think we got the messaging here. Let's change the topic now. Ms Penney...?

**MEMBER PENNEY:** Thanks for the presentation. So I want to turn to one of your
recommendations, actually two of them. So I'm looking at your presentation here and I'm looking at Slide 11 and Slide 14. So I will just go back to 11 where you recommend that the OPG's decommissioning planning process be subjected to strategic environmental assessment under the Impact Assessment Act currently under revision. And you say to assess the various options using a science and evidence-based method that is transparent and participatory, knowing that OPG is going to have to come back to the CNSC for a decommissioning licence, because we are not -- that's not what we are being asked to consider here now, and knowing that under their Act, the NSCA Act they do, they currently do an environmental assessment, there would be a public hearing somewhat like this, like this, and there would have been an environmental assessment done in advance of it.

So my question to you is doesn't that meet your science and evidence-based method that's transparent and participatory and why do you feel that it needs to be subject to the currently under review IAA, Impact Assessment Act? And then I will ask the CNSC to comment.

**MS LLOYD:** Brennain Lloyd from Northwatch.

A strategic environmental assessment is different from a project assessment. A strategic environmental assessment typically would go before a
project. So if we had a strategic environmental assessment on OPG's decommissioning planning process or approach, that would develop the framework for decommissioning projects more generally, not just Pickering Nuclear Generating Station but Pickering Nuclear Generating Station Waste Management Facility, the other stations. So that is how a strategic environmental assessment is different from a project, and so the project -- and then there would have to be a determination made at the conclusion of that strategic environmental assessment whether there would also be a project-specific environmental assessment required or whether licensing could deal with the remaining -- the site-specific issues. That, you know, neither I nor I think my colleagues are down to that level of detail yet.

So a strategic environmental assessment has the benefit or the advantages of it's science-based, it's participatory, it's early. Now we're getting a little late to be early in the planning process for a Pickering decommissioning project, but --

**MEMBER PENNEY:** Well no, but that's 10 years out; right?

**MS LLOYD:** It should be early. It should be early in the process.

I think it would be of assistance to the CNSC because I think you've got a number of different
moving parts in terms of your decommissioning framework.

When someone asked -- and I apologize, I don't remember which intervenor's presentation it came up in -- but there was a discussion about the decommissioning framework yesterday. And Ms Glenn answered from the Ottawa office and she referenced the *Nuclear Fuel Waste Act*, which doesn't deal with decommissioning; the *Radioactive Waste Policy Framework*, which doesn't deal with decommissioning; the *Joint Convention Report*, which describes the decommissioning (sort of what I would call the ad hoc process used for Gentilly, Gentilly-2. It describes that, and it describes that there is decommissioning -- preliminary decommissioning plans required for the stations. But it doesn't -- it's not a substantive discussion.

The substantive discussions, to the degree that they are, are I would say G-219, the discussion -- the 2016 discussion paper on radioactive waste and decommissioning, which dealt only in a really limited way with decommissioning, and the *CSA standard*. And there are differences among those documents. Even the language is different. The CSA piece uses different language than the CNSC uses, and they're -- you know, I'd have to go back to my notes, but in one of those three pieces, end states are to be defined in preliminary, and in the other two pieces
end states are defined later. There's no real substantive direction around end state determination.

So there's a whole bunch of moving pieces. And I think a strategic environmental assessment can assist with that as well as providing a good framework for this very important first OPG decommissioning. I know we had Gentilly-2, but Gentilly-2 was very, very limited. There was no public hearing. The documents, all except one CMD, were in French. So it was very limited, you know, from my parochial Ontario, northern Ontario perspective, it was limited.

So a strategic environmental assessment could serve the CNSC very well, as well as providing that platform for future work on decommissioning.

THE PRESIDENT: I actually don't see -- just listening to you with all the moving parts, until we get a decision on DGR, until MPMO made their own determination of a particular fuel DGR, what a strategic thing will bring to the table that can facilitate beyond the preliminary decommissioning plan that exists now?

MS LLOYD: Because I think those potential or conceptual DGRs, they're about end disposition of the waste. There's a lot more, by my expectation, to decommissioning and decommissioning planning than end, you know, end disposition of the waste. Yes, there will be
fuel waste. Yes, there would be decommissioning waste. But there's a lot more to decommissioning. I mean, there's the -- I think a fundamental question is characterization of the site. What's the end state objective, which I think certainly those framework documents that I referenced, CSA I think most clearly says there should be public participation in the determination in the development of those end state ... that end state is, you know, that's the really big-ticket question. How much ... 

Now, there was one of the documents, I think it was CSA made -- no, it was the discussion paper made an odd separation between decommissioning and remediation. To me, decommissioning and remediation -- decommissioning is all about what's that site going to be like when you're done. To get there, you need -- and that's why I think they're late in the day, because certainly maybe OPG and CNSC have some sight of the -- sense of the site, how to characterize it. I don't think the Commission or the public do.

And so how do we start thinking about the end state, what's achievable, what are the steps towards that when we -- that information isn't even part of the discussion? In mining, you develop the closure plan before you open the mine, and there is progressive rehabilitation
throughout. This isn't a mine; I know. But I think the principle should remain, should be in play as well.

So how they deal with the groundwater contamination might be -- might be, I don't know -- but it might be affected by what the end state objectives are. And what's achievable at the end might be affected by how they did -- what they did or didn't do around the groundwater contamination.

And you know, the tritium is just one. I think Commissioner Velshi asked what the other contaminants were, and I don't think we heard. But that's -- you know, that's one that's in the documents so we refer to it. I don't know what the other groundwater contaminants are.

But we need all that. That's all part of decommissioning planning.

MR. JAMMAL: It's Ramzi Jammal, for the record, sir. If you'll allow me, please, with all due respect here.

Allegations are made by comments made by staff. And I would like to have -- give an opportunity for staff to really set the record straight. Because what Ms. Glenn spoke about is the framework. What's being presented here with respect to the understanding of the CSA go back to the fact that the decommissioning and the options -- sorry, the CSA provides option. And it's the
responsibility of the proponent to propose what option they're going to do.

So I don't want to mix apples and oranges and I do not want to take away from the fact that the decommissioning and its decommissioning activity is the responsibility of the proponent, not the CNSC. I'll get into the plan afterwards. And it's really unfair to really state that if a document proposes and allows an option to be presented, it's not being presented as there are gaps or uncertainty.

But since Mrs. Glenn made the comments yesterday about the framework and the regulatory oversight for the decommissioning, she should be given a chance to really clarify what she said yesterday on the record.

With respect to the future element of the decommissioning, as we said it today, refurbishment and the enhancement or even the going into safe shutdowns layup or the GSS state of the reactors is part of normal operations. So we are going -- we are still in the operational phase. We have not even come close to decommissioning.

But the record should be set straight with respect to what Ms Karine Glenn described to the Commission yesterday with respect to what we have as a policy in the Government of Canada, what there is exist with respect to the framework that establishes the requirement. In
addition, we go out in consultation for regulatory documents. We go out for consultation on discussion papers. So we welcome the input through the process.

I'm not sure if Karine is in Ottawa.

THE PRESIDENT: Ms Glenn, you still with us?

MS GLENN: Yes, I am. Karine Glenn, for the record. I am the director of the Waste and Decommissioning division.

And Mr. Jammal is absolutely correct. The statements I made earlier was with respect to the CELA intervention this morning was describing the regulatory framework that is currently in place in Canada. And under that framework, it is up to the licensee to propose one of four preferred decommissioning strategies that are outlined in both the CNSC document G-219 and also found in the CSA N294 standard.

OPG, in their preliminary decommissioning plan, which is available to the public on OPG's website, does describe which is their selected decommissioning strategy, which is deferred decommissioning. But it also does a benefit-detriment analysis and justification as to why they selected that strategy. And that is available in the PDP. It's actually in section 3.4 of their preliminary decommissioning plan, and that is available to the public.
Ms Lloyd is correct, the CSA standard does speak about public input and public information requirements for the licensees with respect to decommissioning. And it does mention that we expect, as is the CNSC requirement for all of our Class 1 facilities, that the licensee have a public information program, make the preliminary decommissioning plan available to the public, which OPG has done so, and further states that they are to communicate what the objectives, the end states, the preferred strategy is. All of that is found in the decommissioning project -- decommissioning plan, pardon me. And I'm sure that OPG would be more than happy to entertain any feedback that any of the intervenors would provide to them directly about their preliminary decommissioning plan.

And for just to set the record straight, also, the end state for the facility is that they would remove -- at this point in time, they propose to remove all hazardous materials and radioactive materials to levels that are below those that require regulatory oversight and return the site over for reuse as a brown field site.

THE PRESIDENT: Go ahead.

MEMBER PENNEY: My follow-up question was to CNSC staff about the need for a federal assessment, strategic environmental assessment for either the long-term management, which is already underway, but I guess the
decommissioning -- the decommissioning process.

**MR. FRAPPIER:** Gerry Frappier, for the record.

So I think as has been noted, there's lots of different words that are put together. And sometimes they sound like it's the same thing, but it actually is not. So what I'd like to do perhaps to start with is to ask Mr. Rinker to explain a bit of what a strategic environmental assessment is as opposed to an EA.

**MS CIANCI:** Candida Cianci, for the record. I'm the director of the Environmental Assessment division.

So under the current regime, there is a cabinet directive, and the cabinet directive outlines that a strategic environmental assessment is for a policy, program, or a plan --

**MEMBER PENNEY:** That's under CEAA 2012?

**MS CIANCI:** No. It's a cabinet directive. It's not within the legislation. It's just a higher-level document.

Given the earlier comments that we discussed when we were talking about CELA, it's not within the CNSC's purview to develop policies. That's the responsibility of other federal and provincial governments. As such, given that our focus is on regulation and not
developing policies, the requirement to conduct strategic environmental assessments is limited for the CNSC.

THE PRESIDENT: Let me jump in again. We're talking about hypothetical things that don't yet exist. There's no impact assessment legislation as of yet.

MR. RINKER: Mike Rinker, for the record. Strategic environmental assessment has been around for a long time.

THE PRESIDENT: I know. I'm getting there. Just give me a chance.

There's no impact assessment, so the question is what is the big urgency right now for us to have a detailed decommissioning plan for all those facilities where there's so many unknowns into the future as to where the fuel is going to end up, where is the DGR? What's the big urgency right now? Is there an urgency?

MR. FRAPPIER: Gerry Frappier, for the record.

What we're talking about today is an operating licence to continue the operation of Pickering until 2024. They'll then move through a shutdown phase and move into a safe storage phase. None of that requires any of these decommissioning decisions, if you like, that are being talked about.

We do require them to have a preliminary
decommissioning plan so that there is something about where they're going to be going to. As Ms Glenn has alluded to, we have that in place. It meets all the requirements.

I think that perhaps this discussion is one where we're getting into the decommissioning licence that perhaps will be asked for like in 10 years from now.

**THE PRESIDENT:** Thank you.

Other questions? I think the intervenor raised a couple of other questions.

**MEMBER VELSHI:** I wanted to give OPG an opportunity to talk about concerns raised about IFB capacity. I know in your submission you had said that that wasn't seen as an issue, but if you can focus around this unusable space and is that really an issue for you.

**MS MORTON:** Lise Morton, for the record.

With respect to bay capacity, as was noted earlier, there are in fact three bays at Pickering, the IFBB, the IFBA, and the AIFB. I realize that's a lot of acronyms. In total, those three bays have a capacity of well over, about 496,000 bundles, and even I believe in the intervenor's submission there was information about bundle calculations and forecasts out to end of life, et cetera. Again, when you compare it to that capacity of 496,000 bundles, there is certainly sufficient capacity right now. There is sufficient capacity.
The intervenor raised concerns about, for example, unloading a dry storage container if for some reason you needed to. A dry storage container only holds 384 bundles, so obviously that would not impact on that kind of capacity.

So, in summary, there is sufficient capacity in the bays.

**THE PRESIDENT:** Let me ask you, now your policy is to keep it in water for how long before it goes into dry storage? Secondly, there's nothing preventing you from speeding up reducing the number of years in water and speeding up that going into the dry storage. Did I get it right? I don't understand how capacity gets into the equation here.

**MS MORTON:** Lise Morton, for the record. I'll answer a little bit, but I'm sure Robin Manley also would like to talk about six-year-old fuel as an example.

Yes, currently, fuel is kept in the bays for 10 years prior to being transferred to dry storage.

The issue of six-year-old fuel, and could that be used, has been looked at before, and again I'll let Robin speak to that, but also, as we noted in last year's Pickering waste management facility licence, the capability exists to -- we sought approval for the construction of an
enhanced processing building that would increase the capacity for processing of dry storage containers, with an in-service date of 2024. With that, we will have sufficient processing capability to fully empty the bays by the required date in the mid-to-late 2030s.

I'll let Robin speak to the other issue.

**MR. MANLEY:** Robin Manley, for the record.

Just briefly on the six-year-old fuel question, OPG gave an update a couple of years ago at the regulatory oversight report meeting where we reported back to the Commission on the status of the fuel. To sort of just briefly recap, our assessment is that the fuel is safe in the bay for periods of time longer than 10 years. There's no safety reason that requires us to take it out at 10 years, it can stay there indefinitely. Obviously, we do transfer it out into dry storage as part of our overall program, and it is safe as dry storage as well.

We have done some preliminary assessments as to whether we could leave the fuel in the bay for a shorter period of time, toward six years. While that work is indicative of the fact that it could be removed sooner, we have not completed all of the analysis to support that argument, so at the moment our strategy is at least 10 years.

**THE PRESIDENT:** Between six and 10 there's
all kinds of options. Right? I don't know where six came as a number. I thought at one time I heard about seven as the number that I think staff were talking about.

**MR. MANLEY:** Robin Manley, for the record.

President Binder, you're correct. I mean you would do analyses over a range of different parameters, and heat capacity is one of the issues.

**THE PRESIDENT:** Okay. Other questions?

Ms Penny.

**MEMBER PENNEY:** One last small question to CNSC staff.

Is groundwater monitored in your integrated environmental monitoring plan?

**MR. FRAPPIER:** Gerry Frappier, for the record.

I'd ask Mike Rinker to talk about how we do independent monitoring of groundwater.

**MR. RINKER:** Mike Rinker, for the record.

How we do it? We don't. We don't have the facility for drilling, and so on, so we rely on the licensee's environmental monitoring program.

**MS SAUVE:** Kiza Sauve, for the record.

I would add on that one of the reasons we don't is that we're doing publicly-accessible areas, so places where you would swim, drink, play, so we don't
expect to see the public in the groundwater, but we do
surface water, and we have all those results posted online
as well.

**MEMBER PENNEY:** Thank you.

**THE PRESIDENT:** You have the final words.

**MS LLOYD:** Thank you. Brennain Lloyd, for Northwatch.

A couple of wrap-up points.

I think that one of the things that I
found really troubling about OPG's application was the
sense that they were telling you rather than asking you
that they were going to 2024. When I went back to the 2013
transcript, and when I looked at your record of decision,
the discussion was really pretty firmly fixed on 2020.
Then their letter -- was it in 2017, I think it was, I've
lost the date now -- where they wrote to inform you that
they were going to 2024, I didn't really feel that was
within their jurisdiction to do that. I think that's your
decision, not theirs.

I want to really comment on the 10-year
timeframe. A 10-year licence, it's the wrong timeframe. I
think in five years you could direct OPG to have a detailed
site characterization. It could be a milestone or a launch
of detailed decommissioning. I don't think I have your
agreement yet, President Binder, that detailed
decommissioning planning should start sooner than 2050 or 2045, but I really firmly believe that it should.

I think you should also consider a site-wide licence for the next stage. A site-wide licence, we talked about this at the Pickering waste management facility. I think we're moving into the time of decommissioning, and I think that there would be real benefits to looking at this as a single site for decommissioning.

I just want to note again that the NWMO program is conceptual. Their design continues to evolve. Every three to five years the design changes in a significant way. It is conceptual, and their siting process continues to evolve and to change, and I just would caution you to not be too confident of that particular outcome.

I think there's also real uncertainties with OPG's DGR. I know that it was characterized as, "We're waiting for information from Saugeen Ojibway Nation around their spiritual and cultural." I think it's much bigger than that. When you look at the Minister's letter to OPG or SON's letter to the Minister, it's much bigger than that. Saugeen Ojibway Nation is involved in a community process to consider project acceptability. It's much bigger than that.
I think there's many uncertainties, as well as all of the uncertainties that are going to punt forward into the licensing process, unresolved design issues with that. I think that you've got a lot to consider, and I wish you well with that.

President Binder, I wish you a relaxed retirement.

**THE PRESIDENT:** I'm going to miss you.

Really.

--- Laughter / Rires

**MS LLOYD:** I'm sure you will.

Commissioner Velshi, I wish you a happy presidency. I hope to see you in five years at the next Pickering licensing hearing.

--- Laughter / Rires

**THE PRESIDENT:** Thank you. Thank you very much.

The next presentation is by the Canadian Nuclear Society, as outlined in CMD 18-H6.40.

I understand that Mr. Gammage, will make the presentation. Over to you, sir.
CMD 18-H6.40

Oral presentation by the Canadian Nuclear Society

**MR. GAMMAGE:** Thank you.

Good evening, ladies and gentlemen of the Commission.

My name is Daniel Gammage, past president of the Canadian Nuclear Society.

With me here today are Peter Easton, our Communications Director of Communications, and Colin Hunt, Secretary of the CNS.

The CNS is Canada's learned society for the nuclear industry. We are a not-for-profit organization representing more than 1,000 scientists, engineers, and other nuclear professionals who are engaged in various aspects within Canada's nuclear industry.

We do not represent any company or any organization within the industry. The CNS believes that the views of Canada's nuclear professionals, as embodied by its learned society, may provide useful assistance to the CNSC in its deliberations.

Our submission addresses three areas of interest with respect to continued operation of the Pickering station: the strong, continued safety record of all CANDU reactors; the consistent, strong safety
performance at Pickering, and the importance of continued operation beyond 2018.

Knowing that you've read our written submission and the fact that I am between you and the end of your day, I only want to indicate here our principle observations and conclusions regarding the proposed licence renewal for the Pickering reactor station.

I will start by noting that the six power reactors constitute the world's largest nuclear electric generating facility which operates under one roof within the world. For more than 40 years, the facility has been producing electricity safely and reliably.

As we noted in our main submission, performance of the Pickering reactors has been rising steadily in recent years. Last year alone, five of the six reactors had capacity factors of more than 80 percent; one of them, Pickering Unit 6, had an annual performance exceeding 98 percent. These performance indicators are important. For many decades now, it has become axiomatic within the Canadian nuclear industry that high performance can only be achieved with a high degree of safety performance as well. It is both safety and production for the nuclear industry, not either.

The importance of this facility to the province of Ontario cannot be understated. Today,
Pickering provides about 14 percent of all electricity used in Ontario. With respect to safety the long term record of CANDU reactors is second to none. Throughout its more than 50-year operational history, no worker at any CANDU plant has been killed or injured by exposure to radiation. A very large part of this safe operation has been the safety procedures, protocols and worker training implemented at Pickering.

The CNS notes that like other Canadian nuclear reactor facilities, its loss-time accident rate was 0.6 last year. A rate this low constitutes only 8.7 percent of the average Canadian's electricity industrial LTA rate of 0.7. The CNS considers the low LTA rate of Canada's nuclear facilities, and specifically that of Pickering, to be highly significant and an important statistic for the Commission to consider.

With respect to the matter of the licence renewal, Ontario Power Generation commenced its refurbishment of the Darlington nuclear power station in 2016. Bruce Power will be commencing its major component replacement program in 2020.

It is the view of the CNS that continued operation of the Pickering station will be essential to provide electricity to Ontario during the years ahead as Bruce and Darlington reactors are under refurbishment and
they will, therefore, be unavailable.

Therefore, in conclusion, the CNS agrees with the request to renew the Pickering operating licence. The CNS agrees with the proponent that the licence term is appropriate. The CNS notes that Pickering has demonstrated consistent improvement in its nuclear safety and workplace protocols and performance. These are what have permitted Pickering to perform so strongly in electricity production in recent years. They can be observed that the operating reactors at Pickering these days are performing better than nearly any time since their start-up in the 1970s and '80s.

The CNS observes that the CNSC has confirmed publicly the high safety performance of Pickering in recent years by giving it the Commission's highest safety ratings.

And, finally, the CNS believes that approval by the CNSC of the renewal of the Pickering operating licence will ensure that the refurbishment plan of Darlington and Bruce can be completed without risking the stability of the Ontario electrical grid.

Thank you for your time, and I'd be happy to take any questions that you may have.

THE PRESIDENT: Thank you.

Questions? Dr. Lacroix...?

MEMBER LACROIX: Yes, one quick question.
What's the difference between the Canadian Nuclear Society and the Canadian Nuclear Association?

**MR. GAMMAGE:** The Canadian -- I'll let Colin talk about this. This is something that he is quite interested in. But I'll give you the brief history as well.

So the Canadian Nuclear Society is who we represent. We are a technical society representing individuals, the scientists and engineers of the industry.

Canadian Nuclear Association is an organization representing the companies within the organization.

Very different mandates, I would say, and Colin can add some points to that as well.

**MR. HUNT:** Colin Hunt, for the record.

Thanks, Daniel.

The Canadian Nuclear Association originated approximately in the year 1960 as a gathering of institutions within Canada interested in the development of nuclear technology and nuclear science, writ large.

The Canadian Nuclear Society originated as the technical branch of the Canadian Nuclear Association and then went its own way, becoming an incorporate not-for-profit corporation in 1998. I could expand but I think you understand there is a clear difference. They are
a gathering of institutions. We are a gathering of individuals.

**MEMBER LACROIX:** That's great, and now my question.

How do you define performance? Is it the utilization factors?

**MR. GAMMAGE:** The performance that we're talking about here, we're talking about the capacity factor of the units over the year.

**MEMBER LACROIX:** Okay, that's great. Thank you.

**MR. GAMMAGE:** The amount of electricity that the unit is putting out versus what it's rated to put out.

**MEMBER LACROIX:** Yeah, okay. Thank you.

**THE PRESIDENT:** Dr. Demeter...?

**MEMBER DEMETER:** Thank you for your presentation.

So I noted in your conclusion, understanding that there is the current licence and the proposed licence, there is a difference of four years of operation. So in your conclusion you use very strong language that the station must continue, that it's essential for energy, a central part of the base load; a premature shutdown cannot be met in the short term.
So you have some confidence in that four years that all these problems will be solved by something else?

I'm just curious, like the fact you say that you're going to have a real issue if this closes in 2020, but you're okay if it closes in 2024.

MR. HUNT: Colin Hunt, for the record.

We haven't said anything that we can avoid future problems in 2024. What we have said is if there is premature closure in 2020, there will be problems.

MEMBER DEMETER: Okay, thank you.

MR. HUNT: President Binder, if I could just expand on that briefly, that analysis -- that conclusion is based on our understanding of what are the available sources of electricity either from within Ontario or that can be imported into Ontario over the next five to 10 years and they are far more limited than they were 15 years ago.

THE PRESIDENT: So I have only one question. Do you do anything -- you know, you hear about level of understanding or ignorance about nuclear. Are you doing anything to outreach into the community to people, to organizations, about your mandate?

MR. GAMMAGE: Thank you for that question. We actually do a fair amount in order to do that. The main
thing that the CNS does as part of its yearly activities is conferences and courses. A lot of those conferences are geared toward the industry itself and they are very technical in nature.

But there is also other aspects that the CNS is offering which are geared directly toward the public. One such example is our Nuclear 101 course and our course for -- nuclear for the non-technical individuals that are interested in gathering information. We take it very seriously that it's part of our mandate, part of our role to talk to the public, get public engagement, to have them understand what nuclear technology and information is, and to have them become comfortable with the fact that these facilities are operating and are present within our community.

So as I had mentioned, there is the courses that we do. We also have another program that we operate, which is the Geiger program, we like to call it. This is a program where we put Geiger kits together and we put them into schools.

The goal here is to have students that are part of the -- young in their scientific careers perhaps -- actually be able to put their hands on low level radioactive items, see the Geiger counters and how they respond to that, and become comfortable with radiation and
see that it's a part of the environment that's around us. It's not just in nuclear facilities. It's everywhere you look.

So that program is where we actually put together simplistic Geiger counters, put them together with a kit and we give them out to high schools and train the teachers on how to use those kits so that the students can be part of that. I think at the moment we have over 250 kits in circulation all across the country and that's a program that we're currently actively expanding. That's, I would say, one of the key points of the education and communication part of the CNS.

**THE PRESIDENT:** You don't know how much this is music to my ears where CNSC, I understand, were promoting this idea of explaining this technology or the environment we live in. So all the best with that program because that's where the education of the kids is about what radiation is all about. Good luck with that.

Anything else? OPG...?

**MR. LOCKWOOD:** Randy Lockwood, for the record.

President Binder, if you would allow me, I'd like to go back to the performance piece, looking down the chart here.

I would like to say that this does speak
to what we have been talking about during Part 1 and Part 2, and in our CMD, and on the record that performance at Pickering is really improving.

The backlog is going down. The equipment reliability index is going up. In fact, it's the highest it's ever been in the history of the plant. That speaks to record runs in 2017. The intervenors called out 2017. Unit 1, 622 days continuous, and I will point out to the Commission that's our oldest unit, as well as record run on Unit 5 of 632 days. And if I look down that list, Unit 6 was the third amongst everyone else.

THE PRESIDENT: Okay, thank you.

MR. HUNT: Colin Hunt, for the record.

President Binder, if there is just one additional remark I could make right in train with this. I have been tracking performance statistics of Canadian nuclear reactors for nearly 30 years. It has been a case of -- and we can see this occurring time after time. The patterns only start to appear when you have many years of data to work with.

One of the symptoms of an improving facility or a fleet of facilities is that you start to see the annual performance consistently exceeding the lifetime performance. This is something that when you look at past years of data you can see that this is consistently the
case for Ontario’s nuclear facilities and in specific Pickering for now quite a number of years, at least half a dozen years where all reactors have generally had their annual specific performance higher than their lifetime.

THE PRESIDENT: Okay, thank you.

Any final thoughts?

MR. GAMMAGE: I think I would like to wish you well in your retirement and let you know that there’s always a place for you within the CNS if you don’t want to go off into the sunset too early.

THE PRESIDENT: Thank you. That’s the best offer I got so far.

--- Laughter / Rires

THE PRESIDENT: Okay. I think this ends our oral presentations for today.

Marc, you are not going to let us go before we do some.

MR. LEBLANC: No. We are going to do about 30 minutes of written submissions and we will re-assess at that time.

Is that okay for the Members?

THE PRESIDENT: Yes.

MR. LEBLANC: We are going to change the approach a little bit in terms of my going through the list.
The only change is I’m going to start now with numbers. As you have noticed, except for the President and myself, we are all using electronic means now. So it’s easier to search by number than by name. It’s more logical.

So in that context, I will start with CMD numbers and then we will name the intervenor.

The first submission to be considered by Members tonight is the submission CMD 18-H6.46, which is from E.S. Fox Limited.

You’ve done it? Okay.

Yes, sorry, I had the wrong day. I think William Shore, that’s right.

That’s why I thought we were not very advanced.

CMD 18-H6.100

Written submission from William Shore

MR. LEBLANC: We will start with CMD 18-H6.100, which is a submission from William Shore.

I have also agreed to wait at least ten seconds between each to allow Members to really get a good look.
CMD 18-H6.102

Written submission from Maimuna Hafiz

MR. LEBLANC: The next CMD is 18-H6.102. It is a submission from Maimuna Hafiz.

CMD 18-H6.103

Written submission from Sonit Nangia

MR. LEBLANC: The next CMD is 18-H6.103, which is a written submission from Sonit Nangia.

CMD 18-H6.104

Written submission from Harald Simon

MR. LEBLANC: The next CMD is CMD 18-H6.104, which is a written submission from Harald Simon.

CMD 18-H6.105

Written submission from James Ronald

MR. LEBLANC: The next CMD is CMD 18-H6.105, which is a written submission from James Ronald.
CMD 18-H6.106
Written submission from
Joe Dickson, MPP, Ajax-Pickering

MR. LEBLANC: The next CMD is 18-H6.106. It is a submission from Joe Dickson, MPP, Ajax-Pickering.

CMD 18-H6.107
Written submission from Bruce Power

MR. LEBLANC: The next CMD is CMD 18-H6.107, which is a written submission from Bruce Power.

Dr. Demeter.

MEMBER DEMETER: It’s been alluded to a couple of times during the interventions about the importance for Pickering to backfill energy when Darlington and Bruce are down.

Maybe someone could just put that in context for me, the importance of filling that gap and how this licence application will achieve that.

I think that was one of the statements that Bruce Power said.

MR. GREGORIS: Steve Gregoris, for the record.

That statement comes from the Long-Term
Energy Plan and that plan discusses the Darlington refurbishments and the Bruce major component replacements.

Between the years of 2020 to 2023 there are five units simultaneously down in one of those states, refurbishment or major component replacement. So that’s about 4,500 megawatts.

And in that time Pickering is seen as a very important supply of electricity.

MEMBER DEMETER: Thank you very much.

CMD 18-H6.108
Written submission from
The Wildlife Habitat Council

MR. LEBLANC: The next CMD is CMD 18-H6.108 from the Wildlife Habitat Council.

CMD 18-H6.110
Written submission from
The Greater Oshawa Chamber of Commerce

MR. LEBLANC: The next CMD is CMD 18-H6.110 from the Greater Oshawa Chamber of Commerce.
CMD 18-H6.111
Written submission from Jacquelynn Tanner

MR. LEBLANC: The next CMD is CMD 18-H6.111, which is a written submission from Jacquelynn Tanner.

CMD 18-H6.112
Written submission from The Ajax-Pickering Toastmasters Club

MR. LEBLANC: The next CMD is CMD 18-H6.112, which is a written submission from the Ajax-Pickering Toastmasters Club.

CMD 18-H6.113
Written submission from James Scarrow

MR. LEBLANC: The next CMD is CMD 18-H6.113, which is a written submission from James Scarrow.
CMD 18-H6.114
Written submission from Boyd Reimer

MR. LEBLANC: The next CMD is CMD 18-H6.114, which is a written submission from Boyd Reimer.

CMD 18-H6.115
Written submission from Énergie NB Power

MR. LEBLANC: The next CMD is CMD 18-H6.115, which is a written submission from Énergie NB Power.

CMD 18-H6.116
Written submission from B.C. Instruments

MR. LEBLANC: The next CMD is CMD 18-H6.116, which is a written submission from B.C. Instruments.

CMD 18-H6.117
Written submission from Natasha Vaney

MR. LEBLANC: The next CMD is CMD 18-H6.117, which is a written submission from Natasha
Vaney.

CMD 18-H6.118

Written submission from Don and Heather Ross

MR. LEBLANC: The next CMD is CMD 18-H6.118, which is a written submission from Don and Heather Ross.

CMD 18-H6.119

Written submission from Jasmine Bruce

MR. LEBLANC: The next CMD is CMD 18-H6.119, which is a written submission from Jasmine Bruce.

CMD 18-H6.120

Written submission from Sherry Brown

MR. LEBLANC: The next CMD is CMD 18-H6.120, which is a written submission from Sherry Brown.
CMD 18-H6.121

Written submission from Bertie D’souza

MR. LEBLANC: The next CMD is CMD 18-H6.121, which is a written submission from Bertie D’souza.

CMD 18-H6.122

Written submission from Janine Carter

MR. LEBLANC: The next CMD is CMD 18-H6.122, which is a written submission from Janine Carter.

CMD 18-H6.123

Written submission from Fernanda Sierra

MR. LEBLANC: The next CMD is CMD 18-H6.123, which is a written submission from Fernanda Sierra.

CMD 18-H6.124

Written submission from Katie Weston

MR. LEBLANC: The next CMD is CMD
18-H6.124, which is a written submission from Katie Weston.

**CMD 18-H6.125**

Written submission from Cameco Corporation

**MR. LEBLANC:** The next CMD is CMD 18-H6.125, which is a written submission from Cameco Corporation.

Dr. Demeter.

**MEMBER DEMETER:** Thank you very much. I was just curious for OPG, supply chain issues, and if there are forest fires in Northern Saskatchewan Cameco ceases operation. What’s the sort of time sequence before you would see any effect from mining operations would just stop? Like, the supply chain, how volatile is it or is it pretty elastic?

**MR. LOCKWOOD:** Randy Lockwood, for the record. We have contingencies for such things. I know that to be true. I don’t have those numbers off the top of my head. We could bring that back though.

**MEMBER DEMETER:** That's okay. Just if it’s not an issue, you’ve got contingencies, then it won’t be an impact on your operations. That’s just what I was curious about.

Okay, thank you.
MR. JAMMAL: Ramzi Jammal, for the record. Dr. Demeter, the issue is McArthur is not shutdown because of the fire, it was a planned shutdown due to the abundance of uranium in the market. So it was a commercial decision. So the fire happened to be coincidental. So I’m pretty sure the industry and the supplier already have in place an arrangement. But the fire and McArthur are not linked together.

MEMBER DEMETER: Thank you for the clarification.

CMD 18-H6.126
Written submission from the
Ontario Federation of Anglers and Hunters

MR. LEBLANC: The next CMD is CMD 18-H6.126, which is a written submission from the Ontario Federation of Anglers and Hunters.

CMD 18-H6.127
Written submission from Mackenzie Floyd

MR. LEBLANC: The next CMD is CMD 18-H6.127, which is a written submission from Mackenzie Floyd.
CMD 18-H6.128
Written submission from I-Ping Wong

MR. LEBLANC: The next CMD is CMD 18-H6.128, which is a written submission from I-Ping Wong.

CMD 18-H6.129
Written submission from
University of Ontario Institute of Technology

MR. LEBLANC: The next CMD is CMD 18-H6.129, which is a written submission from the University of Ontario Institute of Technology.

Madam Velshi.

MEMBER VELSHI: Question for OPG. There’s a statement in here about UOIT students providing insights into the repurposing of the Pickering Nuclear Station upon decommissioning.

I’m just curious on what kind of ideas did they come up with and share with you?

MR. ROB: Art Rob, VP of Decommissioning, for the record. So there was a study completed by an outside agency that OPG hired and they conducted a series of workshops. Through their workshops there was a number
of different options that were looked at for the Pickering site at the end of its life.

The students from UOIT and a series of other students, high school students, a whole series of different outreach was conducted in the community to get input. There was about 27 different ideas generated from that report, and they were sort of short-listed into about five or six different themes.

So they varied from repurposing the site for additional power generation, movie sets, UOIT itself actually looked at it as a technical campus opportunity where they might want to use some of the facilities for training. So a host of different ideas like that, storage areas, recreational facilities, and the like.

THE PRESIDENT: I'm actually disappointed that the dean of this university, where a lot of the workers are getting supplied, is not here, particularly since he was a co-author on a book on Fukushima and some of the observations. It’s too bad that he’s not here. I would have liked to hear from him. So maybe next time.

MR. LEBLANC: Dr. Demeter.

MEMBER DEMETER: Thank you. As I gather from the intervention, the UOIT is Canada’s only undergraduate nuclear engineering program. From a supply point of view to the nuclear industry in Canada, do you
have other alternatives to people training elsewhere that would also fit your needs versus sole source?

Mr. Manley: Robin Manley, for the record. I’m going to start and then Jason Wight will expand on that.

So myself, I graduated from Queen’s, but our previous Chief Nuclear Engineer was a Queen’s engineering physics graduate, and obviously we draw upon the university resources from across the country and beyond.

Jason.

Mr. Wight: Jason Wight, for the record. The previous of the previous CNE was an engineering physics graduate from McMaster University. I am also an engineering physics graduate from McMaster University that has a nuclear stream, in fact has a nuclear reactor on campus.

So there is, I guess, a very diverse technical expertise within the university community and we deal with them all in many different ways. McMaster and UOIT, and UNENE, we have a nuclear engineering shared program. But we deal with all of them, and we’re not worried about a diversity or an influx of talent from the university system.

Member Demeter: Thank you very much.
CMD 18-H6.130
Written submission from Rena Ginsberg

MR. LEBLANC: The next CMD is CMD 18-H6.130, which is a written submission from Rena Ginsberg.

CMD 18-H6.131
Written submission from Arielle Lefang

MR. LEBLANC: The next CMD is CMD 18-H6.131, which is a written submission from Arielle Lefang.

CMD 18-H6.132
Written submission from Doug Rylett

MR. LEBLANC: The next CMD is CMD 18-H6.132, which is a written submission from Doug Rylett.

CMD 18-H6.133
Written submission from Elaine Munro

MR. LEBLANC: The next CMD is CMD 18-H6.133, which is a written submission from Elaine Munro.
THE PRESIDENT: So, again, I think we discussed it many times, but this particular intervenor puts it differently. She says, “CNSC should require that OPG inform everyone within 50 km of Pickering that they should order KI pills.”

What do you think about that?

Now, informing is not necessarily very difficult. You know, you can have it with a new information telecommunication system, you may be able to actually reach and tell them, why don’t you go and get your KI pills.

Anyhow, it’s an observation. I just thought it was kind of an interesting spin on it.

MR. LOCKWOOD: Randy Lockwood, for the record. I appreciate your observation and pointing it out for consideration. I particularly like the idea about using modern means to communicate this information the way that people want to receive it now. I appreciate that.

CMD 18-H6.134

Written submission from Cathy Tafler

MR. LEBLANC: The next CMD is CMD 18-H6.134, which is a written submission from Cathy Tafler.
CMD 18-H6.135
Written submission from Roger J. Short

MR. LEBLANC: The next CMD is CMD 18-H6.135, which is a written submission from Roger J. Short.

CMD 18-H6.137
Written Submission from Tracy MacCharles, MPP, Pickering-Scarborough East

MR. LEBLANC: The next CMD is CMD 18-H6.137, which is a written submission from Tracy MacCharles, MPP, Pickering-Scarborough East.

CMD 18-H6.138
Written submission from Lingzhi Xia

MR. LEBLANC: The next CMD is CMD 18-H6.138, which is a written submission from Lingzhi Xia.

CMD 18-H6.139
Written submission from Brotech Precision CNC Inc.

MR. LEBLANC: The next CMD is CMD
18-H6.139, which is a written submission from Brotech Precision CNC Inc.

CMD 18-H6.140
Written submission from Plug’n Drive

MR. LEBLANC: The next CMD is CMD 18-H6.140, which is a written submission from Plug’n Drive.

CMD 18-H6.142
Written submission from Steps for Life, Durham Region

MR. LEBLANC: The next CMD is CMD 18-H6.142, which is a written submission from Steps for Life, Durham Region.

CMD 18-H6.143
Written submission from Pickering Rouge Canoe Club

MR. LEBLANC: The next CMD is CMD 18-H6.143, which is a written submission from the Pickering Rouge Canoe Club.
CMD 18-H6.144
Written submission from
Ontario Shores Centre for Mental Health Sciences
and the Ontario Shores Foundation for Mental Health

MR. LEBLANC: The next CMD is CMD
18-H6.144, which is a written submission from the Ontario
Shores Centre for Mental Health Sciences and the Ontario
Shores Foundation for Mental Health.

CMD 18-H6.145
Written submission from the Abilities Centre

MR. LEBLANC: The next CMD is CMD
18-H6.145, which is a written submission from the Abilities
Centre.

CMD 18-H6.146
Written submission from Earth Rangers.

MR. LEBLANC: The next CMD is CMD
18-H6.146, which is a written submission from Earth
Rangers.
CMD 18-H6.147
Written submission from
Big Brothers Big Sisters of South-West Durham and Northumberland

MR. LEBLANC: The next CMD is CMD 18-H6.147, which is a written submission from Big Brothers Big Sisters of South-West Durham and Northumberland.

CMD 18-H6.148
Written submission from PineRidge Arts Council

MR. LEBLANC: The next CMD is CMD 18-H6.148, which is a written submission from PineRidge Arts Council.

CMD 18-H6.149
Written submission from the
St. Paul’s on-the-Hill Community Food Bank

MR. LEBLANC: The next CMD is CMD 18-H6.149, which is a written submission from the St. Paul’s on-the-Hill Community Food Bank.
CMD 18-H6.150

Written submission by Community Care Durham

MR. LEBLANC: So we’ll do just one last written submission, it’s CMD 18-H6.150, which is a written submission from Community Care Durham.

CMD 18-H6.151

Written submission from Kelly Clune

MR. LEBLANC: I’ll just verify one more because it’s unsure whether we did the submission yesterday, It was CMD 18-H6.151 from Kelly Clune.

MEMBER LACROIX: Yeah, we did the oral presentation and 152, the next one.

MR. LEBLANC: No.

MEMBER LACROIX: No, no, no, 152, the next one on the list --

MR. LEBLANC: Yes?

MEMBER LACROIX: -- it’s a copy, cut and paste, from 151 that we did yesterday. It’s essentially the same text, but this one is written.

MR. LEBLANC: Any questions on H6.151, Kelly Clune?

So we said it would be half an hour, so
we’re going to stick to that time, and we’ll finish the written submissions another time.

Good evening, safe travel, we’ll start again tomorrow morning at 8:30. We have several oral presentations tomorrow and the plan is to also finish the written submissions.

Thank you.

--- Whereupon the hearing adjourned at 8:40 p.m., to resume on Wednesday, June 27, 2018 at 8:30 a.m. / L'audience est ajournée à 20 h 40 pour reprendre le mercredi 27 juin 2018 à 8 h 30