

Canadian Nuclear  
Safety Commission

Commission canadienne de  
sûreté nucléaire

Public hearing

Audience publique

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Le 2 novembre 2015

Hope Fellowship Church  
1685 Bloor Street  
Courtice, Ontario

Église Hope Fellowship  
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Courtice (Ontario)

Commission Members present

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

M. Michael Binder  
M. Dan Tolgyesi  
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Secretary:

Secrétaire:

Mr. Marc Leblanc

M. Marc Leblanc

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Avocate générale :

Ms Lisa Thiele

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Courtice, Ontario / Courtice (Ontario)

--- Upon commencing on Monday, November 2, 2015  
at 2:29 p.m. / L'audience débute le lundi  
2 novembre 2015 à 14 h 29

**MR. LEBLANC:** Good afternoon, ladies and gentlemen. Bonjour à tous. Welcome to the public hearing of the Canadian Nuclear Safety Commission.

First, let us apologize for the change in the starting time of this hearing today, particularly to those of you who are presenting today who had already made some travel arrangements to be here this morning. So again, we are deeply sorry if it has caused any inconvenience.

My name is Marc Leblanc. Je suis le secrétaire de la Commission et j'aimerais aborder certains aspects touchant le déroulement des audiences.

The Canadian Nuclear Safety Commission will now conduct Part 2 of the public hearing on the application by Ontario Power Generation, or OPG, for the renewal of its power reactor operating licence for the Darlington Nuclear Generating Station located in the Municipality of Clarington, Ontario.

During today's business, we have

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

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

L'audience est enregistrée et transcrite textuellement. The transcript will be available within about two weeks on our website.

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

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

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

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

Mr. President...?

**THE PRESIDENT:** Thank you, Marc.

What is it? Good afternoon. I'm trying to keep track of time here. So let me also apologize on behalf of the Commission for this delay this morning.

We are really happy to be here again in this location. If memory serves, we have been here before not too long ago, so it's always nice to be back here and to thank the Hope Fellowship Church for accommodating us. So thank you for that.

I also would like to welcome all those who are joining us through the webcast. I'm hearing an echo here. From the technology people, maybe you can fix this echo that I can hear.

So let me start. My name is Michael Binder, I am the President of the Canadian Nuclear Safety Commission and I would like to introduce the Commission Members here.

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

We have heard from Marc Leblanc, the Secretary of the Commission, and we also have with us Ms Lisa Thiele, Senior General Counsel to the

Commission.

**CMD 15-H11.A**

**Adoption of Agenda**

**THE PRESIDENT:** I would like to start by calling for the adoption of the agenda as outlined in Commission Member Document 15-H11.A.

Do we have concurrence?

**MEMBER VELSHI:** Yes.

**THE PRESIDENT:** So for the record, the agenda is adopted.

Marc...?

**MR. LEBLANC:** Thank you.

Please bear with me for some opening remarks and to explain the logistics for today and the next three days.

So this is Part 2 of the public hearing, as I stated earlier. The first part of the public hearing on this application was held on August 19th in Ottawa. The Notice of Public Hearing 2015-H-04 was published on May 26, 2015.

Presentations were made during Part 1 of the hearing by the applicant, OPG, under CMDs, or Commission Member Documents, 15-H8.1 and 15-H8.1A, and

by Commission Staff under CMDs 15-H8 and 15-H8.A. CNSC Staff filed a supplementary submission on September 16th under CMD 15-H8.B. OPG also filed a supplementary submission on September 16th, which is 15-H8.1B.

On August 19, the Canadian Environmental Law Association submitted a Request for Ruling on its own behalf and on behalf of other allied organizations requiring that CNSC staff release the results of what they called the uncensored Darlington Severe Accident Study, that we refer to here as the SARP Study, by September 15, 2015. The CNSC made available, on August 21st, the final version of the "Study of Consequences of a Hypothetical Severe Nuclear Accident and Effectiveness of Mitigation Measures."

The public was invited to participate in Part 2 of the hearing either by oral presentation or written submission. September 28 was the deadline set for filing by intervenors. The Commission received 283 submissions. Thirteen additional requests were received after the deadline and were denied. Two requests were denied in accordance with Rule 19 of the CNSC Rules of Procedure.

October 19, 2015 was the deadline for

filing of supplementary information. We note that supplementary submissions and presentations have been filed by CNSC Staff, OPG and several intervenors.

Participant funding was made available to intervenors to prepare for and participate in Hearing Part 2. Seven groups or individuals are receiving funding. The funding decision is available on the CNSC website.

All documents are available at the reception, either on CDs or in paper format, as well as the Commission Members' biographies.

Right after these opening remarks, we will hear the presentations by OPG, CNSC staff and at least one intervenor. The presentations by the intervenors will then resume after a short break.

Time permitting, the Commission will also review written submissions at the end of each day, including this evening, or when oral presenters are not available or if there is time between oral presentations. These written submissions have already been read by the Members and we will address each of them before the close of this hearing.

Seventy-nine intervenors are scheduled to present orally this week. While the oral presentations are limited to 10 minutes, Commission

Members will have the opportunity to ask questions after each presentation. The Commission Members have read all the submissions and intervenors are encouraged to use their oral presentation time to highlight key points rather than simply reading previously submitted written materials.

Your key contact persons in this room will be Ms Louise Levert and Ms Johanne Villeneuve, who are at the back, at the reception area, from the staff of the Commission Secretariat, and you will see them going around or at the back of the room if you need information regarding the timing of presentations and for any other of your needs.

I would also like to start this hearing with a few additional remarks.

We are in Courtice for the next four days to consider these submissions and oral presentations from a large number of citizens and organizations who wish to express their views in the context of Part 2 of the Darlington renewal and refurbishment hearing. I would like to clarify a few things prior to getting this hearing under way.

I wish to emphasize that the Commission is a quasi-judicial administrative tribunal and that consequently it is independent from any

political, governmental or private sector influence. In fact, each Commission Member is independent of one another and also independent of the CNSC staff.

Interventions filed for this hearing include recommendations to the Commission. CNSC staff also make recommendations to the Commission, but at the end of the day it is the Commission Members who will render a decision based on all the evidence presented in the context of the hearing process.

The Commission Members are appointed by the Governor in Council on the basis of their achievements in their respective fields of endeavour as well as their excellent reputation among their peers. Their mandate is simple: ensure that the use of nuclear is done in a manner that protects the environment as well as the health, safety and security of the workers and the public.

Several intervenors have raised concerns regarding the risks and cost of this project to public health, the environment and the finances of the Province of Ontario. I trust that you will understand that the Commission, as an administrative tribunal, does not have the statutory authority and will not consider questions that are of a political nature and that it is the Ontario provincial

government that must address these 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.

I would also like to emphasize that the CNSC has no economic mandate and will not base its decision on the economic impact of a facility. I will repeat: It is the health, safety and security of the people and the protection of the environment that guides its decisions.

Finally, as I 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 is a tribunal and wishes to hear the now 79 oral presentations and ask as many questions as it deems necessary on these, we ask that everyone respect the decorum of a tribunal setting and assist with the orderly, civil and respectful conduct of these proceedings. 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 the other

proceedings it conducts in Ottawa and in the communities.

Mr. President...?

**THE PRESIDENT:** Thank you, Marc.

Now, before starting with the proceeding, the presentations, I would like to acknowledge we have some people from Environment Canada, Ms Nardia Ali and Mr. Duck Kim, who are with us here today.

We also have, from Fisheries and Oceans, Tom Hoggarth, Jennifer Wright and Sara Eddy.

There will be some other representatives from other departments throughout these four days and we will let you know who they are.

**CMD 15-H8.1B/15-H8.1C**

**Oral presentation by**

**Ontario Power Generation Inc.**

**THE PRESIDENT:** I would like to start the hearing by calling on the presentation from Ontario Power Generation, as outlined in Commission Member Documents 15-H8.1B and 15-H8.1C.

I understand that Mr. Jager will make the presentation. The floor is yours.

**MR. JAGER:** Good afternoon, President Binder and Members of the Commission. For the record, my name is Glenn Jager, Ontario Power Generation's Nuclear President and Chief Nuclear Officer. As head of OPG Nuclear, I am responsible for ensuring our nuclear power plants are operated to the highest standards and that safety remains our number one priority.

I am joined today by Brian Duncan, Senior Vice President of Darlington Nuclear Generating Station; Deitmar Reiner, Senior Vice President of Nuclear Projects; Laurie Swami, Senior Vice President of Decommissioning and Nuclear Waste Management; and Steve Woods, our Chief Nuclear Engineer.

I won't be at the hearing the entire time but I will be available later if needed.

My team and I are here before the Commission today in support of OPG's request to renew the licence for the Darlington Station which expires on December 31st, 2015. We have requested a renewed licence term for approximately 13 years until December 1st, 2028.

Our presentation in Part 1 of this hearing in August outlined why we concluded that a 13-year licence term is necessary, acceptable and

appropriate.

In summary, we submit that a 13-year operating licence is the safest way to manage refurbishment because it would allow execution of a complex and challenging four-unit refurbishment under the same set of regulatory requirements. This will enable us to ensure nuclear safety through a consistent plan and plant configuration through all the units.

Our team has already completed comprehensive assessments to cover about 30 years of operation, well beyond December 2028 as described in CNSC Regulatory Document RD-360: Life Extension of Nuclear Power Plants.

Our team is already installing safety improvements which will result in Darlington being an even safer and more reliable plant.

And finally, Darlington is one of the top performing nuclear power plants in the world. All of us at OPG remain committed to ensuring this will not change.

Today, we would like to provide the Commission with an overview of safety at OPG and public engagement with our host community.

Since the Part 1 hearing we have

completed the Darlington Vacuum Building Outage, or VBO is what we call it, and we would like to update you on that project, our biggest of the year. We will also update you on the company's biggest project, the Darlington Refurbishment. Then we will follow up on some items from the Part 1 hearing and respond to some of the concerns raised by intervenors in their written and oral submissions. To close, I will summarize our request for a 13-year licence term to the end of the refurbishment project.

I would first like to recognize the importance the public has placed on safe operation of our nuclear power plants. The importance of safety as our overriding priority comes through loud and clear in interventions, open houses and at our Community Advisory Council Meetings.

I want to assure the Commission and the public that we share that priority. We know that nuclear energy, while a tremendous resource for Ontario, does have its risks and that we are entrusted to protect the public from those risks. Because of that, we insist that safe operation underpins everything we do at our stations. We constantly stress the importance of safety to our performance. Our record shows that operations at Darlington

continue to result in amongst the best safety performance in Canada and in fact worldwide. But we don't rest on past experience, we constantly strive to do better.

Excellence in safety performance goes hand-in-hand with excellence in plant operational performance. Darlington produces some of Ontario's most reliable, lowest-cost electricity, with virtually no greenhouse gas emissions. We produce about 20 percent of Ontario's electricity for just about the lowest cost in the province. Only OPG's regulated hydro costs less.

Our reactors are consistently named among the world's top performing CANDU units. For the seventh straight year Darlington received an overall integrated station rating of fully satisfactory in the CNSC report, the highest rating achievable.

Our performance has also been recognized by our industry peers from the World Association of Nuclear Operators in a top rating for two successive reviews. We were the first outside the U.S. to receive a top rating and the first to receive two.

These ratings are based on critical reviews of our programs and performance against best

industry standards. For example, protection of our workers from radiation hazards at our plant is achieved by programs that we have benchmarked against the best in the world, and representatives from other nuclear operators visit us and benchmark our program to see what good looks like. We have implemented state-of-the-art technology in radiation detection and shielding to understand the hazards and protect all of our workers.

In addition, we were the first plant in Canada to complete all of the post-Fukushima action items established by the CNSC, which included assessing the plant for possible hazards beyond what had ever been considered possible before and taking actions to prevent them. For years we have kept our radiation emissions to the public at only a fraction of 1 percent of the legal limit.

Despite this record of excellent performance, all of us at OPG remain focused on continuous improvement. We are on a journey of excellence through refurbishment and beyond. Keeping the plant and public safe is our task each and every day. That has been true up until now and will remain true throughout the licence period.

To expand on this, I will now turn it

over to Brian Duncan.

**MR. DUNCAN:** Good afternoon.

For the record, Brian Duncan, Senior Vice President for Darlington.

Glenn has already spoken to our commitment to safety. It's one thing to work safely, it's an entirely different thing to explain to the public how that ensures their safety. We recognize that another key aspect of our commitment to the community is through sharing information about our operations.

If you want to know more about how we operate our plant, we are pleased to provide that information not only by appearing before you every five or 13 years but daily. It means being a part of our community, responding to questions, sharing values and supporting what matters to them. Whether there are questions about refurbishment, safety, waste or the environment we do our best to answer these questions. We do that throughout the year and we'll do it throughout this week.

We use a wide variety of forums to share information about our operations through our Community Advisory Council and stakeholder information sessions, our information centre, open houses and site

tours among others.

As we said during the Part 1 hearing, to further facilitate openness and transparency, Darlington Licence renewal material has been posted on our public website and we are pleased to see that many intervenors have made use of that material in preparing their submissions.

One of the updates on our operations that I would like to review today relates to the major planned outage of our vacuum building that we have undertaken this fall. This has been the third vacuum building outage, or VBO, performed since Darlington was commissioned.

The vacuum building is part of Darlington's containment structure, unique to CANDU reactors. The vacuum building is maintained at negative atmospheric pressure. In the unlikely event of a nuclear emergency it is designed to condense, cool and contain steam for several days, allowing time for much of the radiation to decay prior to a controlled filtered release. This would dramatically reduce the amount of radiation that would escape to the environment around the plant in the very unlikely event of an accident.

So you can see that this is an

important safety system which we need to test and make sure it's working well.

I would like to show you a video about the vacuum building with a rarely seen look inside, and then I will talk more about it.

--- Video Presentation

"The vacuum building is a unique safety feature of multi-unit CANDU nuclear generating stations and is designed to contain radiation inside the station's containment system in the event of a severe accident. It's a 71-metre high cylindrical concrete structure that is connected to all four reactor containment systems by a pressure relief duct. The vacuum building is maintained at negative atmospheric pressure and in the unlikely event of a nuclear emergency it is designed to condense, cool and contain steam for several days, allowing time for much of the radiation to

decay prior to controlled filtered releases.

Every 12 years OPG is required to perform inspections, maintenance and testing to confirm the integrity of the vacuum building and containment structures.

This outage began in September with all four units being safely shutdown allowing work to begin. Over the course of this outage, pipefitters, electricians, carpenters, millwrights, boilermakers, construction workers and maintenance staff performed over 40,000 tasks. This is in addition to close to 8,000 tasks that were completed as prerequisite work prior to the outage and, unlike previous outages OPG used drones to help inspect the 24-story high structure. The tests proved that

the containment structures and vacuum building exceed regulatory standards.

In addition, we took the opportunity to make the necessary connections for the Containment Filtered Venting system, an important safety improvement project and to confirm the integrity of other components in concrete structures such as our lake water intake.

Work was also performed on the Emergency Coolant Ejection System and the Emergency Service Water System which can provide large volumes of cooling water.

This outage was OPG's largest nuclear project for the year and confirms the continued availability and integrity of Darlington's safety systems for continued operation."

**MR. DUNCAN:** Brian Duncan, for the record.

So I hope you found the video interesting. Normally no one can go inside the vacuum building, of course, so getting to see it up close and the use of the drones so that we could get some really neat video and some neat pictures there is pretty unique.

As I was saying, we need to make sure the vacuum building would work if it was ever needed. The primary purpose of the Vacuum Building Outage is to perform inspections, maintenance and testing to confirm integrity of the vacuum building and containment structures. This includes a pressure test of the containment structure in the vacuum building property.

These tests and inspections are part of our program to verify that it will stay in excellent condition until the planned end-of-life of the station. We test the entire containment system, including the vacuum building, by pressurizing it to full design pressure using temporary compressors shown in this slide.

These tests and inspections are part of our program to verify that- - I'm going to skip here- - we monitor internal pressure over several hours to determine containment integrity. We also

send operators and engineers across the entire station to inspect the containment boundary for leakage once pressurized. The inspection results have confirmed concrete integrity and that the vacuum building exceeds regulatory standards.

Performance is virtually unchanged since the first two vacuum building pressure tests and performance is in fact an order of magnitude better than your operational targets.

The final results will be provided to CNSC staff in a detailed report, and we will re-test the vacuum building again about every 12 years as required by our licence.

I should also point out that leading up to this outage and during it, we completed a lot of the work to install the new Containment Filtered Venting System, one of the safety improvement opportunities we committed to as part of our Environmental Assessment for the Darlington Refurbishment and continued operation. This new system provides additional protective capacity better and beyond the original filter system to protect the public in the very unlikely event of a multi-unit accident at Darlington.

I'll be providing more information

about our operations later but while we are talking about outages, let me turn it over to Deitmar Reiner to talk about the biggest outage we'll ever do.

**MR. REINER:** Deitmar Reiner, for the record, Senior Vice President of Nuclear Projects.

We showed the following slide of the refurbishment's timeline at our Part I hearing and we thought it would be beneficial to show it again because of the interest in our refurbishment work.

Refurbishment is a massive and complex project. We recognize that some people doubt whether we can pull it off successfully because they have seen that other refurbishment projects came in late and over budget. Of course we recognized that risk from the beginning and it has informed everything we have done to prepare. As a result, our preparations are the best, the most detailed and thorough ever undertaken by a reactor refurbishment.

We sent staff to observe and learn from other refurbishments, for example, at Point Lepreau and Bruce A. We have done extensive benchmarking. We have brought in third parties to audit our preparations and provide critical reviews. We have adapted our contractor processes to take account of these learnings. We have structured our

organization to maximize accountability and focus.

We have done a lot of preparation already to lay the groundwork for the upcoming refurbishment projects. For example, we have about 700 construction workers already on site and the site is a hive of activity.

We have also constructed a very precise replica of a Darlington reactor on which workers are training for refurbishment operations just a few kilometres away from here. We are also using this mock-up facility to test and prove our specialized tooling. This helps us ensure that the refurbishment work is efficient and that radiation exposures to workers are minimized.

Unit 2 will be the first unit shut down for reactor component replacement starting in October 2016. The majority of the refurbishment work will take place under each unit's three year refurbishment outage.

The Integrated Implementation Plan, or IIP, activities will be executed over approximately 13 years as shown. A similar timeline to the one shown here can be found in Ontario's Long Term Energy Plan. The province has factored Darlington into its long range energy plans for providing low cost, clean

electricity to the province for another 30 years beyond refurbishment. OPG is accountable to the province and the ratepayers for keeping electricity costs low. As such we are required to provide regular updates on our progress to the province. In addition, updates will be provided to the Commission of public meetings following each unit's refurbishment outage.

As I mentioned at our Part I hearing, the Integrated Implementation Plan work is not limited to the refurbishment outages. We are progressing well on our scheduled work and expect to complete all items planned for 2015 by the end of the year. All Integrated Implementation Plan work activities will be completed by 2028, hence the requested 13-year licence term.

But before we start refurbishment work on Unit 2, we will be completing work on three of the five safety improvements we have committed to as part of our Darlington Refurbishment Program. These projects are being implemented in recognition that even though the original design of Darlington was state of the art and is very safe, sometimes new technologies offer opportunities to make the reactor safer still. These projects either further reduce the likelihood of serious events or reduce the

consequences should one occur.

The Containment Filtered Venting System is a new system that protects the containment structure by venting pressure within the containment system that could occur following a severe accident. It uses a filter bank to minimize releases to the environment should venting be required. The system augments our existing emergency filtered air discharge system.

A third emergency power generator provides an additional seismically-qualified backup power supply in the case of a seismic event that knocks out our entire regular and other backup power supplies. The powerhouse steam venting system upgrade provides additional reliability to the existing powerhouse steam venting system for protection of equipment in the turbine hall in the event of a large steam release in this building. Installation of this modification is almost complete with one unit remaining that will be completed by the end of this year.

The remaining two safety improvements will be completed prior to the end of each unit's refurbishment outage. These are the Shield Tank Overpressure Protection Project which provides

additional pressure relief to ensure the large volume of water in the end-shield tank surrounding the reactor remains available and effective for fuel cooling the case of a severe accident.

And the emergency heat sink, which provides yet another independent and redundant means of supplying water to keep the fuel cool in the event that all of the other redundant systems fail.

I should point out that whether or not refurbishment is completed on each unit, the first four safety improvements will be done.

Our supplementary written submission for the Part 2 hearing includes responses to items from the Part 1 hearing requiring follow-up discussion and clarification.

The following sides provide further detail and illustration of two items in particular: organizational structure and potassium iodide pill pre-distribution.

I'll cover the first item and then pass the presentation back to Brian.

As I mentioned earlier, the OPG management team understands that people want to know how to ensure the refurbishment execution will be successful. There are many tools that we're using for

this. I'd like to touch on two of these, the organizational structure we've put in place and our nuclear management system.

The organization chart of the Darlington station and refurbishment is shown here, and represents a simplified visual of our integrated organizational model.

As you can see, there are separate and distinct organizations for the station refurbishment and engineering that all report to OPG's Chief Nuclear Officer, Glen Jager.

To enhance accountability, under refurbishment execution there are dedicated resources for the project bundles and associated project support groups. The project bundles are groupings of work by major components, for example, the retube and feed replacement bundle or the turbine and generator overhaul.

Having separate operations and project organizations allows personnel in both organizations to better focus their attention on the tasks at hand, specifically, safe plant operation and planning and executing refurbishment.

Now, to ensure consistent engineering practices and standards are followed, the Chief

Nuclear Engineer is responsible for all engineering activities across OPG's nuclear fleet, including refurbishment, so the same nuclear management system, the same standards, the same engineering change control process that is used in operating the fleet is also applied in refurbishment.

Also under this organizational structure are centre-led organizations that are accountable for delivering fleet-wide support. Centre-led groups provide one consistent point of accountability for an entire function, to deliver support across the whole of the nuclear organization.

For instance, to address a question from the Part 1 hearing, a centre-led radiation safety department provides radiation protection services, dosimetry and health physics support to the Darlington station, to refurbishment, the Pickering station and our nuclear waste facilities.

Our benchmarking work has shown that the real key to success is teamwork. Today, the entire nuclear organization, from operations to projects to engineering, operates under a single nuclear management system and the Chief Nuclear Officer.

What that means is one engineering

change control program, one nuclear safety program, one team and one goal.

**MR. DUNCAN:** Brian Duncan, for the record.

Another topic of considerable interest, both to the Commission and intervenors, is the pre-distribution of potassium iodide pills.

Potassium iodide is one of the protective measures in the provincial Nuclear Emergency Response Plan which would be used to reduce the uptake of radioactive iodine in the thyroids of people who could have been exposed to radiation in the event of a serious accident.

For that reason, potassium iodide has been stocked and available around our nuclear stations for many years.

However, at previous hearings, some intervenors expressed concerns about the ease with which these pills could be made available if needed. The Commission acted on this issue to require all nuclear power plants to pre-distribute the pills to the primary zone, and we have met that requirement.

We worked closely with partners, primarily Durham Region, the City of Toronto, their medical officers of health, and the Office of the Fire

Marshal and Emergency Management. Together, we developed a well thought-out plan for potassium iodide pre-distribution.

A detailed description of the plan was provided to the Commission in October by OPG and our partners in the Region of Durham and City of Toronto as the first boxes of pills were being delivered to residents.

The pre-distribution of potassium iodide in the primary zone is now complete. Approximately 200,000 boxes of pills have been delivered by mail to all addresses within the Darlington and Pickering primary zones.

We have stocked six million pills for use as needed in the secondary zone.

The web site [preparetobesafe.com](http://preparetobesafe.com) is now receiving orders for additional pills and orders for residents in the secondary zone who wish to receive them. A communications campaign will continue, extended to the secondary zone, to inform residents that potassium iodide is available through the web site.

If people do not wish to use the web site to order, they have the option to call the Durham Region Environmental Health Line to place an order.

In addition, OPG supplies potassium iodide for the pharmacies in Durham Region, which have provided potassium iodide to residents for many years.

The secondary zone stockpile of pills is available at the Government of Ontario Pharmacy in the Greater Toronto Area. In an emergency, these pills would be taken to reception centres or other locations designated by the provincial Emergency Operations Centre for distribution to residents if required.

Community information sessions were held for interested members of the public and confirm for us that the program was successful in informing and educating the public on potassium iodide and emergency preparedness.

OPG will continue to monitor and measure the success of the program and to improve it where necessary.

The web site will be updated based on public feedback and public information regarding potassium iodide pills and other elements of emergency planning which will continue to be provided to residents in partnership with the Region of Durham and City of Toronto.

OPG staff has reviewed all written and

oral comments that have been contributed to the hearing by intervenors. We appreciate the interest in our operations and encourage feedback from the public. It's an important part of the licensing process that also lets us respond to public concerns.

We would like to address some common areas of interest as well as a few misconceptions and factual errors that we noted in some of the interventions. Some of these may be raised through the course of the hearing, but we decided to highlight a few during this presentation.

One example of these is the question of the authorization we received from the Department of Fisheries and Oceans. Darlington will comply with the conditions of this authorization, just as we comply with all other licensing requirements.

What we'll do over the next few slides is to provide clarification on a number of these topics raised in the interventions. I'll hand it over to Deitmar to start with a discussion of refurbishment waste management.

**MR. REINER:** Deitmar Reiner, for the record.

After our experience with the Deep Geological Repository hearing process, we understand

the public interest in how we will manage the radioactive waste arising from another 30 years of operation and from the refurbishment itself.

We understand that people need to know that both today, and for future generations, this waste will be managed in a safe and secure fashion that keeps it out of the environment.

It has been suggested that we do not have plans for safe management of the waste and that the measures we have in place are inadequate to protect the environment, so let me go over the facts around our plans.

As a brief overview, there are two primary streams of nuclear waste.

First, at the top of this slide, there are low and intermediate level nuclear waste. This is generated both during refurbishment and routine Darlington operations.

Most low and intermediate level waste will be transferred to the Western Waste Management facility located in Kincardine.

The fuel channel components like end fittings, pressure tubes, garter springs and calandria tubes will be removed from the reactors and placed in a shielded flask for transfer to the retube waste

processing building at Darlington. Once there, the shielded flasks will be unloaded into one of two independent waste processing lines for volume reduction, segregation and packaging.

At the end of this process, the intermediate level radioactive waste will be packaged in large, heavily-shielded retube waste containers for interim storage for about 25 years at the newly-constructed retube waste storage building at Darlington.

Low level radioactive waste will later be packaged and transported to a licensed waste management facility. A current plan, subject to the final approval, is to use the Deep Geological Repository for this.

The second primary stream is high level nuclear waste, or irradiated fuel. Upon removal from the reactor, this is stored in irradiated fuel bays on site before being transferred to Dry Storage Containers, or DSCs, after about 10 years.

The DSCs are stored at the Darlington Waste Management Facility until a long-term storage facility is available. Such a long-term storage facility is currently being planned by a federal government agency called Nuclear Waste Management

Organization.

The Nuclear Waste Management Organization is an independent organization established by the federal government- - sorry, by the *Nuclear Fuel Waste Act* to deal with long-term storage of nuclear fuel from all Canadian reactors.

All containers, storage flasks, shipping containers and buildings, including the irradiated fuel bays, used to control and contain radioactive waste are designed and maintained to high standards to ensure their integrity and prevent release to the environment.

We would not operate these plants and we would not be refurbishing if we did not have all the necessary measures in place to protect the public and the environment. Those measures have been confirmed acceptable by the environmental assessment already performed, and no new information has been presented by intervenors that would require the environmental assessment to be reopened.

**MR. DUNCAN:** Brian Duncan, for the record.

Since the tragic earthquake and tsunami in Japan, and the resulting accident at Fukushima Daiichi Nuclear Power Plant, the nuclear

industry worldwide has been focused on improving emergency response to deal with events that extend beyond the original design basis of the stations.

At OPG this has resulted in significant enhancements to accident response and emergency planning for the most severe conditions. Contrary to some claims, though, this does not mean we believe the same accident could occur at a reactor on Lake Ontario. For one, an earthquake of that magnitude is not a realistic possibility in this region. Secondly, the structure of Lake Ontario mean a tsunami is not a realistic possibility.

Nevertheless, we've incorporated learnings from the Fukushima accident into our models, such as the loss of all power, for whatever reason, and put into place mitigations to ensure public safety under those more challenging conditions.

We appreciate the interest shown by several intervenors in the emergency and evacuation plans which may be activated in the unlikely case of a serious event at our Darlington plant. These plans are obviously of great importance to everyone who lives near the plant, including my own staff, most of whom, including myself, live here in Durham Region.

OPG and the emergency response

organizations test these plans regularly, and update and improve them based on these tests, taking into account evaluations by observers, including the CNSC.

An example of this is the Exercise Unified Response which we organized and completed in 2014. This was a massive undertaking, involving over 1,000 participants from more than 50 organizations. We worked closely with those organizations in emergency exercises because, as you know, it is not OPG, but the province, that leads the response to an accident with consequences beyond OPG's boundaries, and many different organizations, including OPG, have responsibilities as part of these plans.

We've reported to the Commission about this before and we thought the broader public would be interested in the exercise itself, so we have a video I'd like to show you now.

--- Video presentation

"Safety is Ontario Power  
Generations number one priority.  
As an operator of nuclear power  
plants, OPG has multiple safety  
systems in place to prevent a  
nuclear emergency from ever  
happening. But creating plans is

only one part of preparing for an event. Equally important is the regular testing of those plans, procedures and capabilities.

In May of 2014, Ontario's emergency response capability was strengthened when OPG, municipal, provincial and federal governments conducted a three-day mock nuclear emergency exercise. Fifty-four agencies participated, including the Canadian Nuclear Safety Commission, Health Canada, the Province of Ontario, Region of Durham and Municipality of Clarington.

The exercise tested OPG and participating agencies on their response to a simulated nuclear emergency and radio-active release at Darlington Nuclear. The exercise provided OPG the opportunity to test the effectiveness of our on-site response plans and the deployment

and operation of the emergency mitigation equipment.

OPG's Emergency Operations Centre was activated, as were operation centres at the local, regional, provincial and federal level. As part of the scenario, the Province of Ontario ordered a simulated evacuation for local residents and Durham Region activated the public alerting sirens around the station.

Health agencies also participated, with the Ministry of Health and Long-Term Care deploying its emergency medical assistance team, which included a mobile hospital and Lakeridge Health, Bowmanville, simulated treatment of a contaminated casualty.

Durham Region established an emergency workers' centre, and liaised with Durham Regional Police Services, who practised

their neighbourhood patrol.

The federal government also enacted their response plans. Joint operations were conducted by field teams from federal and provincial responders, including teams from Natural Resources Canada that flew over the area with radiation detectors and shared survey information with the province to guide their decision making.

The exercise also tested communications with the public through a simulated media website that was used to provide news articles, radio broadcasts and twice daily news video broadcasts, which, along with social media inserts, made the exercise more realistic for participants.

OPG created press releases and emergency bulletins that were posted and shared with other

organizations to ensure coordination of public messaging.

Exercise Unified Response demonstrated that there is an effective, coordinated response between OPG and the local, regional, provincial and federal governments and agencies, with defined roles in nuclear emergency planning. The lessons learned will be used to enhance the current capability of every nuclear response organization to respond to a nuclear emergency, improving public safety today and throughout the licence term."

**MR. DUNCAN:** Brian Duncan, for the record.

Another common concern among the interventions was the ability of emergency response organizations to evacuate people in the unlikely event of a severe accident, and specifically whether the plans to do so were up to date.

I'm pleased to report that the evacuation time estimate for the Darlington station

primary zone has just been updated using 2011 census data, with estimates for 2015, and projections for each decade until the end of the plant life, around 2055. This new information is hot off the press, so to speak.

The purpose of evacuation time estimates, ETE for short, is to help emergency directors make decisions that protect the public. They offer estimates for evacuation of the entire primary zone or portions of the primary zone.

The ETE study considers populations of residents, workers and transients in the evacuation areas, and the time it would take them from the evacuation order to reunite with their families, mobilize and travel out of the evacuation zone.

It considers special facilities, such as hospitals and schools, and the transportation needs and mobilization time of these special populations.

It also considers the impact of people outside the evacuation zone deciding to evacuate, referred to as the "shadow evacuation."

The ETE data is provided by sectors in a number of different scenarios based on time of year- - winter or summer- - midweek or weekend, time of day and good weather or rain or snow.

In addition, the estimate also considers the impact of a significant public event, with more people in the primary zone and the impact of lane closures on the major roads.

The methodology used for the study is state of the art. It is based on the latest U.S. Nuclear Regulatory Commission guidance and was validated by the U.S. Federal Emergency Management Agency for evacuation modelling.

The engineering firm who performed the work has done similar studies for over 60 nuclear stations in the U.S., all of which have been reviewed and accepted by the NRC.

The results show that it does not take very long to evacuate the primary zone around Darlington. The entire primary zone evacuation is estimated to take less than five hours even in the most challenging of the scenarios: winters, midweek, during the day, with snow on the ground. That means that the very last person to cross out of the zone would do so in less than five hours after the evacuation order is given.

Most other people would be out of the evacuation zone in much less time than that. Even if a severe accident occurred and even if the prevention

and mitigation equipment and tools that are in place did not function, the passive containment capability of the plant alone would delay the release of radiation for long enough to permit an evacuation.

Using these studies, emergency directors can look at the scenarios which best represent the conditions they are facing during an event, and make decisions accordingly. OPG plans to release the results of the report publicly on our website.

In conclusion, OPG has a robust and effective nuclear emergency program that complies with regulatory requirements and is well integrated with external emergency response agencies.

**MR. REINER:** Deitmar Reiner, for the record.

One of the intervenors raised the issue of radiation protections for refurbishment workers, the potential for alpha radiation hazards and the potential for a previously unknown hazard being discovered. These are very good questions, and we have asked them ourselves. In fact, for decades the first two steps in our radiation work planning processes have been: anticipate the hazards, and then assess the hazards.

Our Darlington station has a longstanding record of excellent radiation protection and worker safety performance. We have never had a worker exceed a regulatory dose limit and our internal limits are lower than the legal limit.

Of course, it's not enough to just keep doses less than the limit. We have to keep them as low as reasonably achievable, or ALARA. So ALARA considerations are a key component of our refurbishment plans.

We've implemented a wide range of measures to reduce the dose to our workers. We have highly specialized automated tooling to minimize the length of time workers must work at the reactor face and maximize their distance from it as they work. We apply innovative radiation shielding wherever possible, and we always look for more ways to minimize the dose overall.

I'd like to assure the Commission that OPG is very aware of the Bruce Power alpha contamination event raised by the intervenor. Prior to this 2009 event, OPG already was in the process of upgrading our alpha radiation protection program based on industry best practices and other operating experience.

By early 2010, we had implemented a benchmarked industry-standard program for alpha monitoring, protective equipment and dosimetry that not only satisfied the CNSC, but satisfied the external peer evaluation teams which measure us against industry best practices. An example of our alpha detection capability, a continuous air monitor, is shown on this slide.

As we prepare for our Darlington refurbishment, we take account of the thousands of alpha surveys we have done, and our radiation protection planning addresses those hazards.

Of course, we don't just prepare for alpha. Our radiation protection program deals with gamma, beta, tritium and alpha hazards, both internal and external.

Our radiation instrument detection capability includes spectroscopy and spans the energy range so that no hazards will go undetected.

Finally, in terms of training, we're keenly aware of our accountability to keep our workers safe and one way to do that is by ensuring workers know and understand the hazards they face so that accidents and unexpected radiation exposures do not happen.

Our contract refurbishment workers receive not just radiation protection training, but specialized job training in our state-of-the-art mock-up facility where they practise doing the job with the actual tools in an exact replica of the work environment wearing the actual protective equipment so we know how long the work will take and can accurately predict the dose and take steps to minimize it.

We're accountable to keep all of our workers safe and we will.

**MR. DUNCAN:** Brian Duncan, for the record.

Moving from worker safety to nuclear safety, one of the most complex topics we deal with at each hearing is probabilistic safety analysis, or PSA. It's clear to us from the ongoing interventions at each of OPG's last few licence hearings, as well as at Bruce Power's earlier this year, that the topic of PSA continues to attract considerable attention.

It is clear, however, that there remains confusion about the use of PSAs, the methodology behind it and the conclusions that can be drawn from it. In the interest of public understanding, OPG has attempted to clearly answer these questions through two documents posted on our

public website in the last few months, our detailed PSA Summary Report and also a brief overview document on what PSA is and what it's used for.

As with radiation safety, here too we need to identify and assess the hazards, the risks and potential consequences of operating a nuclear power plant. We then need to take actions to minimize those risks and we need to communicate those risks and our actions to minimize them to our own staff so they thoroughly integrate the safety imperative into their actions and behaviours, and to the public so they know what we're doing to operate this plant safely.

To anticipate and assess risks, we have many tools at our disposal. There is the more traditional deterministic safety analysis, there are computer codes and models. We do component and condition assessments of the plant. We have an extensive inspection and maintenance program and we have probabilistic safety analysis among others.

These techniques and tools are used by our highly trained engineering staff and our CNSC certified operation staff to ensure we know the condition of our plant, understand its operation and predict and prevent events from occurring.

The main purpose and benefit of PSA is

to support the operation of the plant and to help identify risk insights that can be used to improve the plant design and operation and evaluate effectiveness of our actions.

The numbers PSA generates are not exact, nor do they need to be. For example, the independent, portable, flexible emergency mitigation equipment we installed after Fukushima as a physical improvement to plant safety does significantly reduce risk for the Darlington station.

However, some interveners appear to have misunderstood some of the technicalities in the PSA risk results and, consequently, have made inaccurate statements and various comparisons. One such statement was that, overall, risk has increased. On the contrary, the measures we have taken have reduced the risk at Darlington.

Another was a claim that our analysis shows an international nuclear event scale, or INES, Level 7 event to be "realistic". That is not correct.

As part of our analysis, we imagine all kinds of possible accidents and events. We think of all sorts of ways such events could happen and then we systematically go through them and evaluate what we can do to either prevent them entirely or mitigate

them if one happened.

And, thus, we have put measures in place through our Fukushima Action Plan that make the probability of such an event extremely low; extremely low indeed, but not realistic.

The safety improvement projects like containment filter venting that we mentioned earlier today enhance our defence in depth to protect the public even further.

To reiterate, the primary use of PSA isn't to compare a number to some target or limit but, rather, to find ways to improve plant safety and we have done that. The safety improvement projects are examples.

Nonetheless, we know that people want to see these PSA results. To re-cap the results we presented at Part 1, OPG has used PSA to assess the risk of Darlington reactors and the results indicate that there is very low risk to the public.

The Darlington risk assessment was performed in accordance with the applicable regulatory requirements, CNSC Standard S-294. This was first completed in 2011 and has now been updated consistent with CNSC accepted methodologies and best industry practice.

A very wide range of hazards were assessed for both at power and outage operating conditions, including internal events, fires, floods, seismic events, high winds and others.

A summary of the 2015 PSA update was made publicly available in August on the OPG website. As summarized in the public report, the baseline 2015 PSA update incorporates enhancements under the OPG Fukushima Action Plan, in particular, the Phase 1 emergency mitigation equipment.

The severe core damage frequency and large release frequency values are well within the safety goal limits for all of the hazards and these risk values have generally improved from the previous 2011 PSA risk estimates.

OPG has provided a Darlington whole site risk estimate based on a simplified method to account for all units and hazards, even though there is no quantitative PSA safety goal that is applicable for purposes of comparison.

That said, it is noted that the aggregate Darlington whole site risk is still better than OPG's per unit per hazard safety goal limit and with the safety improvement projects factored in, it's significantly better.

From a holistic and site perspective, there are a wide variety of measures in place that serve to ensure nuclear safety is met with high confidence.

These are founded on defence in depth principles and include programmatic elements as well as physical aspects of the nuclear power plant site. Our level of defence in depth of safety systems is amongst the highest in the world and Darlington's operational performance is amongst the best among our peers.

That said, we recognize that some will say these results are still not good enough. OPG has developed an action plan to further reduce the risk for Darlington. We are implementing Phase 2 of our EME project, as well as the committed safety improvement opportunities.

Phase 2 EME as a defence in depth measure includes provision of larger mobile generators to provide power supplies to re-establish heat syncs and manage water for long-term response. This is an enhancement that will continue to lower the risk. The Darlington plant risk will be reduced even more with these changes.

In summary, the risk assessment report

submitted to CNSC staff demonstrate that the Darlington station satisfies all safety goal limits and represents very low public risk. Darlington is a safe plant.

**MR. JAGER:** Glenn Jager, for the record.

Members of the Commission, we have requested a licence term of approximately 13 years to December 1st, 2028 for a very simple but important reason. The refurbishment project and life extension is a very large and complex project that will take place over the next 13 years. It needs to be successful. To be successful and to maximize safety, we need to have a consistent set of rules. We have taken several years to plan the work for the next 13 years and now we need to execute that 13-year plan.

If the requirements are changed along the way through a licensing process, that changes the plan and it could impact the safe and successful execution. That's why we've requested a 13-year licence.

We recognize that this is longer than previous licences and we recognize that some interveners are concerned that this decreases their opportunity to raise issues in front of the

Commission. There's no question that there's value in these opportunities to publicly review licensee performance and future plans, and I'd like to outline some ways that these opportunities continue to be available throughout the refurbishment period.

We've committed to update the Commission in a public meeting following each unit's refurbishment and as far as OPG is concerned, we're prepared to address public interventions at those meetings.

There's also existing CNSC practice of approximately monthly public Commission meetings with a status report on our performance. Here the public can see the Commission challenges and even lower level events get public scrutiny.

There's also the annual CNSC Report on Performance of all Canadian Nuclear Power Plants with public interventions permitted. Your participant funding program lets the public hire experts to perform critical reviews of licensee performance and better inform their interventions and then you challenge us with questions raised by interveners.

This is a rigorous process and from what we've seen this goes beyond the licensing process in other countries, and that's a good thing. We don't

want to discourage that practice and, at the same time, we want to position this vital refurbishment project for every chance for success.

The safest and most efficient way to refurbish four reactors is to have the same plant design changes apply to each unit using the same integrated implementation plan, or IIP. If the licence requirements change along the way, either due to new licence conditions, new codes, or the outcome of a periodic safety review performed partway through, this injects new requirements for different designs, different components and can significantly impact the project.

Changes put safe execution at increased risk by having to manage and inject changes to the configuration of each unit. That said, if some significant safety concern arose like in the case of Fukushima, OPG would take action to address that safety issue. We did that in response to Fukushima and the CNSC staff and the Commission have tools to ensure that it's done no matter what the licence term.

I would like to briefly describe how the periodic safety review timeline might best be implemented within our licence request to enable this. Note that a periodic safety review takes about three

years to complete, allowing for CNSC reviews and approval.

Looking at this timeline, you can see that starting the next periodic safety review in 2026 and obtaining approval of the next integrated implementation plan in 2028, a 13-year term, results in only one IIP in effect at a time. It makes sense to be executing one improvement plan at a time.

On the other hand, completing the PSR 10 years from now results in us managing two overlapping plans between 2026 and 2028. Developing and having two IIPs at once will be a distraction and will occur when the refurbishment work is intensifying.

If the second is implemented while the first is being applied to the last couple of units, the result would be that the last units would have a third level of engineering changes or modifications, a different plant design than the first couple of units. Different plant design means training engineering, operations and maintenance staff to deal with those differences. This presents the potential for a negative safety impact. Changing the plan also introduces risk to successful completion of the refurbishment project which was designed to take

advantage of executing the same plan consistently on each unit.

Allowing the periodic safety review to leverage the learnings of the full refurbishment period of 13 years also makes good sense in safety terms as well as practicality and efficiency. Whether the licence term has to be linked to the completion of the PSR is of course up to the Commission to decide.

In summary, we have spent several years planning every detail of this project and it is critically important to safe and successful execution that we manage our engineering changes and our plant modifications consistently across the units. We reinforce to our staff that the safest place to be is on the plan and that is just as true here on our 13-year plan.

We performed comprehensive assessments of our station through the regulatory process and have submitted them to the CNSC staff. These assessments confirm the safety case for Darlington well beyond the requested 13-year term all the way to the end of the planned Darlington operation in 2055.

We have already invested billions of dollars in major safety improvements such as the ones described today as well as the upcoming large

investment for the refurbishment upgrades and infrastructure to ensure that we can continue to provide the people of Ontario the safe, clean and low-cost electricity that Darlington has provided for the last 25 years.

We described in the Part 1 hearing how OPG is qualified and capable of safely operating our Darlington plant through a 13-year licence term. We have previously described in detail how Darlington's first rate performance and safety record should give you the confidence to grant us a licence.

We are implementing the safety improvement opportunities in advance of refurbishment. No one else has done this. We are accountable to operate to the highest safety standards and the Commission and the CNSC staff have all the necessary powers of oversight and enforcement to hold us to the highest safety standards.

In conclusion, I affirm that OPG is fully qualified to continue safe operation of our Darlington Station for 13 years, to December 1, 2028, and has made provisions for the protection of the environment, the health and safety of workers and the public, and Canada's international obligations. A 13-year licence will allow OPG to efficiently operate

to the highest levels of safety throughout the refurbishment and safety improvements of each Darlington unit.

Thank you for your attention.

**CMD 15-H8.B/15-H8.C**

**Oral presentation by CNSC staff**

**THE PRESIDENT:** Thank you.

I would like to move now to the presentation from CNSC staff as outlined in CMD 15-H8.B and 15-H8.C.

I understand that Mr. Howden will make the presentation. Please proceed.

**MR. HOWDEN:** Good afternoon, Mr. President and Members of the Commission. My name is Barclay Howden and I am the Director General of the Directorate of Power Reactor Regulation at the CNSC.

With me today are Mr. François Rinfret, Director of the Darlington Regulatory Program Division; Ross Richardson, Senior Regulatory Program Officer of the same Division; as well as CNSC inspectors and staff who are available to answer any questions the Commission may have.

This CNSC staff presentation provides

background information on the licence renewal and information on key topics raised in the public interventions regarding the renewal of the power reactor operating licence for the Darlington Nuclear Generating Station to authorize refurbishment and continued operations.

We will begin today's presentation by providing background information on the licence renewal, followed by information on key topics raised in the public interventions. We will then finish the presentation with our overall conclusions and recommendations.

I will now pass the presentation over to Mr. François Rinfret, who will provide further background on the licence renewal.

**MR. RINFRET:** Thank you, Mr. Howden.

Mr. President and Members of the Commission, my name is François Rinfret and I am the Director of the Darlington Regulatory Program Division.

The CNSC Part 1 hearing for this licence renewal was held on August 19th, 2015. CNSC staff's overall conclusions and recommendations have not changed, including our recommendation for a 10-year licence and the commencement of the

implementation of a sitewide Periodic Safety Review, or PSR, during the proposed licence period.

In September 2015, CNSC staff issued supplemental CMD 15-H8.B to describe the CNSC staff process for the removal of regulatory hold points.

OPG began feasibility studies for Darlington refurbishment and life extension, including commencement of the implementation of the Integrated Safety Review back in 2008. Since that time, the CNSC issued an Environmental Assessment Scoping Information Document as well as an Environmental Assessment Screening Report.

In 2012, a public hearing was held to consider the Environmental Assessment Screening Report and the renewal of the operating licence for a period of 22 months. In 2013, the Commission concluded that the proposed refurbishment project is not likely to cause significant adverse environmental effects, taking into account mitigation measures. The CNSC also renewed the licence for a period of 22 months to allow sufficient time for OPG to complete the necessary studies for the proposed refurbishment outages.

In 2014, at the request of OPG, to allow additional time to provide more comprehensive

documentation, to reflect new CNSC expectations relative to probabilistic safety assessments and to facilitate public engagement for this relicensing process, the CNSC renewed the operating licence to December 31st, 2015. The Part 1 public hearing for this licence renewal took place in Ottawa on August 19th, 2015, which brings us to this week's Part 2 public hearing which is being held here in Courtyce to allow better access for the local community.

The CNSC's regulatory requirements for refurbishment and life extension are provided in CNSC Regulatory Document RD-360: Life Extension of Nuclear Power Plants.

CNSC staff have reviewed and accepted OPG's assessments for refurbishment and life extension, including the Environmental Impact Statement which resulted in the EA screening report approved by the Commission. CNSC staff have also reviewed and accepted the Integrated Safety Review, Global Assessment Report and Integrated Implementation Plan.

The Integrated Safety Review, or ISR, is a comprehensive assessment of plant design, condition and operation, and includes a comparison against modern codes, standards and practices to

determine reasonable and practical improvements to be made to enhance safety to a level approaching that of a new nuclear power plant.

The Global Assessment Report, or GAR, presents the results of the EA and ISR in an integrated manner and provides an overall risk judgment on acceptability of continued operation for the extended plant life.

The Integrated Implementation Plan provides the proposed environmental and safety improvements resulting from the EA and ISR and includes timeframes for implementation. If approved by the Commission, OPG will be required to complete the IIP safety improvements as a condition of the proposed licence.

Overall, CNSC staff conclude that OPG's assessments for Darlington refurbishment and life extension meet CNSC RD-360 requirements.

CNSC staff have identified four proposed regulatory hold points for the return to service of each unit undergoing refurbishment as noted on this slide. Regulatory hold points strengthen the CNSC's compliance oversight by requiring focused inspections and verifications to be done to ensure that the work has been conducted in accordance with

applicable requirements before the hold points are removed.

The removal of regulatory hold points are compliance verification activities performed by CNSC staff to verify that the conditions of the licence are being met. Compliance verification criteria for the removal of all regulatory hold points are presented in the Draft Licence Conditions Handbook. This public hearing on the Darlington licence renewal provides an opportunity for public interventions on the proposed licence and Draft Licence Conditions Handbook.

CNSC staff recommend that consent to remove regulatory hold points for Darlington be delegated to the Executive Vice President and Chief Regulatory Operations Officer. The same delegation of consent to remove regulatory hold points was previously granted by the Commission for the Bruce Power Units 1 and 2 and New Brunswick Power Point Lepreau refurbishment projects. The process that CNSC staff will use to remove the regulatory hold points is further described in staff's supplemental CMD 15-H8.B. CNSC staff will report to the Commission after any hold point is removed.

With regards to the fitness for

service of pressure tubes, to demonstrate margin on the projected equivalent full power hours, or EFPH, values at scheduled refurbishment outages, the pressure tube service life for Darlington is planned for 235,000 EFPH.

CNSC staff have evaluated and are satisfied that OPG has established programs in place to monitor the fitness for service of pressure tubes to support the continued safe operation for the pre-refurbishment service life to 235,000 EFPH. The approach is the same as the ones the Commission previously approved for the Pickering and Bruce Nuclear Stations.

Operating beyond 235,000 EFPH is not a cliff-edge effect and OPG plans to refurbish the Darlington reactors prior to reaching this point.

Pressure tubes are continually monitored and continued fitness for service must be demonstrated and will be overseen by CNSC staff.

CNSC staff recommend that the Commission authorize OPG to operate the Darlington units up to 235,000 EFPH.

The CNSC has a clear and robust regulatory framework in place to ensure the continued safe operation of nuclear facilities.

Regulatory oversight is provided to ensure licensees operate the nuclear facility in a safe manner, in compliance with the requirements of the *Nuclear Safety Control Act* and its regulations as well as the Commission-approved licence conditions.

Regular inspections and evaluations verify that licensees are complying with the laws and regulations as well as the conditions of their licence. In this way, the CNSC can assure licensees are operating safely and adhering to regulatory requirements.

Licensees are required to notify the CNSC of situations or events of high safety significance and submit routine scheduled reports on a quarterly or annual basis to the CNSC on various topics.

CNSC onsite inspectors verify compliance on a continuous basis and CNSC staff report annually to the Commission on licensees' performance in the "Regulatory Oversight Report for Canadian Nuclear Power Plants" Annual Report.

This slide shows the historical trending of CNSC's plant safety performance ratings for the Darlington Nuclear Generating Station from 2008 to 2014.

As shown, Darlington has received a "fully satisfactory" integrated plant rating each year for the past seven years.

CNSC staff are confident that OPG will continue to operate the Darlington Station safely and that OPG will continue to maintain and implement adequate programs, fulfill regulatory commitments and complete the planned safety improvements during the proposed licence period.

With regards to public and aboriginal involvement, early in the review process First Nations and Métis groups who may have an interest in the Darlington licence renewal were identified, provided information about the process and encouraged to participate in the Commission's public hearing and to apply for funding through the CNSC's Participant Funding Program.

Since the EA refurbishment hearings in 2012, CNSC staff have met with identified groups upon request to discuss OPG's licence application and the life extension process. CNSC staff will continue to actively communicate and build relationships with First Nations and Métis groups who express an interest in the Darlington Station.

The CNSC has an open and transparent

regulatory process which encourages public participation. Participant funding was made available to assist members of the public, Aboriginal groups and other stakeholders to participate in the CNSC's regulatory process for the Darlington licence renewal.

The public was invited to intervene in Part 2 of this hearing. As said, 283 interventions have been filed, including 79 requests for oral interventions to be heard during this hearing. CNSC staff have carefully reviewed all of the public interventions.

I will now pass the presentation over to Mr. Ross Richardson, who will discuss the key topics raised in the public interventions.

**MR. RICHARDSON:** Thank you.

Mr. President and Members of the Commission, my name is Ross Richardson, I'm a Senior Regulatory Program Officer at the CNSC in the Darlington Regulatory Program Division.

As mentioned previously, CNSC staff are recommending a 10-year licence period to align with international practice and the recommended PSR frequency in the Commission-approved CNSC REGDOC-2.3.3 entitled Periodic Safety Reviews.

During the proposed licence period,

ongoing reporting to the Commission will continue in a public forum through the Status Report on Power Reactors presented at every Commission meeting, the Annual Regulatory Oversight Report, and Event Initial Reports and follow-up as required. Following current practice, the public will have an opportunity to participate in the proceedings for the Annual Regulatory Oversight Report when it is presented to the Commission each year. Ongoing Commission scrutiny and public interventions will continue during the proposed 10-year licence period.

It should be noted that the length of the licence does not impact the effectiveness of CNSC staff's compliance program nor the authority of the Commission to suspend, revoke or replace the licence or establish new licence conditions at any time.

As mentioned, the CNSC has recently introduced Periodic Safety Reviews to the regulatory framework. REGDOC-2.3.3 supersedes RD-360 and requires periodic assessments against modern codes, standards and practices to determine reasonable and practical improvements to be made to enhance safety. A PSR is complementary to and does not replace routine and non-routine regulatory reviews, inspections, event reports or other CNSC compliance verification

activities.

CNSC staff are proposing to introduce a new requirement in the Darlington licence to require a PSR. RD-360 has been successfully used to identify safety improvements for refurbishment and life extension, and CNSC staff's position is that these types of reviews should continue to be done on a periodic basis over the life of the facility.

Past experience with refurbishment and life extension projects gives the CNSC and the Canadian nuclear industry a large degree of familiarity with the PSR process. As such, the application of a PSR in Canada represents an evolution of a current practice as opposed to the adoption of a new one. Overall, PSRs are an effective tool in achieving improvements in safety.

If approved by the Commission, OPG plans to complete the refurbishment Integrated Implementation Plan, or IIP, on all units over a 13-year period. During the proposed licence period, OPG will also be required by licence condition to commence implementation of a sitewide PSR process in accordance with REGDOC-2.3.3.

The PSR process requires OPG submittal and CNSC staff acceptance of a PSR basis document,

safety factor reports, a global assessment report and an IIP. The PSR-IIP will require Commission approval in a public proceeding.

The intent is to provide a seamless transition from the refurbishment-IIP to the PSR-IIP with no compromise in safety.

With regards to severe accident mitigation, following the Fukushima event, the CNSC required safety improvements in this area. As noted in the OPG presentation, OPG is the first licensee to have closed all CNSC Fukushima Action Items. OPG has already walked us through many of these safety improvements, so I will not repeat them here, but I would like to highlight a few that were not mentioned in OPG's presentation.

One is that hydrogen mitigating Passive Autocatalytic Recombiners, or PARs, have been installed on all units and also that emergency mitigating equipment and severe accident management guidelines are in place at Darlington.

These safety improvements, along with the safety improvement opportunities you heard in OPG's presentation, further reduce the very low likelihood of severe accident progression for the protection of the public and the environment.

The CNSC Study of Consequences of a Hypothetical Severe Nuclear Accident and Effectiveness of Mitigation Measures was completed to assess the potential consequences and possible preventative mitigation of a hypothetical severe nuclear accident in Canada. It addresses the direction received from the Commission following the December 2012 public hearing on the environmental assessment for the Darlington Refurbishment project.

In June 2014, the draft study was released for public consultation and presented to the Commission. Following the consultation period, CNSC staff addressed and incorporated Commission feedback and comments from over 500 submissions from the public, government and other organizations. A subsequent update was presented to the Commission in March 2015 and the study was published on CNSC's website in September 2015, in advance of this Part 2 relicensing hearing.

Some of the severe accident scenarios predicted doses that are comparable to the actual doses measured at Fukushima, hence to the IAEA INES Level 7. The study concludes that in the unlikely event of a radioactive release there would be no detectable increased risk of cancer for most of the

population, with the exception of an increase in childhood thyroid cancer risk. The result is not unexpected given the sensitivity of a child's thyroid gland to radiation. The findings emphasize the importance of potassium iodide pill distribution and administration in emergency planning.

With regards to emergency preparedness, OPG provided a video on Exercise Unified Response, so I will not repeat it here. However, I would like to point out that in October 2014 the CNSC issued REGDOC-2.10.1 entitled Nuclear Emergency Preparedness and Response, which modernizes current requirements.

OPG has acceptable emergency plans in place and is making additional enhancements to implement this new regulatory document by September 2017. It should be noted that this date is a year earlier than previously reported in our Part 1 CMD.

The most significant change in REGDOC-2.10.1 is the requirement for the pre-distribution of potassium iodide, or KI, pills. OPG provided an update on this matter in their presentation, so I will not repeat it.

In summary, OPG and offsite authorities continue to make enhancements to their

emergency preparedness and response capabilities.

With regards to nuclear waste management, again, OPG's presentation provided information on this topic. However, I would like to highlight that the Darlington Waste Management Facility is licensed under a CNSC Waste Facility Operating Licence which was renewed by the Commission in 2013 for a period of 10 years. CNSC staff presented a report on the regulatory performance of the Darlington Waste Management Facility in June 2015 which concluded that the facility meets regulatory requirements.

Also, CNSC staff have verified that OPG has acceptable financial guarantees in place for future decommissioning and lifecycle management of all low and intermediate level waste and used fuel. In summary, nuclear waste continues to be managed safely to protect workers, the public and the environment.

With regards to environmental protection, the Environmental Assessment follow-up program included in the IIP includes, among other activities, monitoring of impingement and entrainment of fish and larvae, monitoring of cooling water discharge temperatures and the completion of a stormwater control and effluent characterization

study.

In June of 2015, Fisheries and Oceans Canada issued a section 35(2) *Fisheries Act* authorization to OPG for the operation of the Darlington Station arising from the continual intake of cooling water and the impingement and entrainment of fish from Lake Ontario. The authorization includes conditions to be complied with in relation to mitigation, offsetting, monitoring and reporting.

Overall, CNSC staff conclude that OPG is making adequate provision for the protection of the environment, including aquatic biota.

As part of an ongoing effort around all major nuclear facilities, CNSC staff carried out an Independent Environmental Monitoring Program around the Darlington Nuclear Generating Station in 2014.

The results confirm that the public and the environment around the Darlington Station are protected. These results are consistent with the results submitted by OPG, confirming that OPG's environmental protection program protects the health and safety of people and the environment.

I will now pass the presentation over to Mr. Barclay Howden for concluding remarks.

**MR. HOWDEN:** Thank you, Mr.

Richardson.

Mr. President and Members of the Commission, based on the assessment of OPG's safety performance at Darlington, CNSC staff conclude, as per section 24(4) of the *Nuclear Safety and Control Act*, that OPG is qualified to carry out the activities authorized by the proposed licence, and in carrying out those activities, OPG will continue to make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.

OPG has clearly identified the refurbishment work and has the programs in place to safely conduct this work. Through the ISR process, OPG has identified numerous safety improvements and will be required to implement these improvements. OPG will also be required to commence implementation of a PSR during the proposed licence period to identify additional safety improvements. This approach makes continuous improvement part of the licensing basis.

CNSC staff recommend that the Commission accept CNSC staff conclusions and recommendations presented in CMD 15-H8 and 15-H8.B and

renew the licence to authorize OPG to refurbish and continue to operate the Darlington Nuclear Generating Station from January 1st, 2016 to December 31st, 2025.

CNSC staff also recommend that the Commission authorize the delegation of authority as indicated in two proposed licence conditions, including the removal of the regulatory hold points.

Finally, CNSC staff recommend that the Commission authorize OPG to operate the Darlington Nuclear Generating Station beyond 210,000 Equivalent Full Power Hours, up to the proposed refurbishment outages to a maximum of 235,000 Equivalent Full Power Hours.

Thank you, Mr. President and Members of the Commission. We are prepared to respond to any questions you may have.

**CMD 15-H8.52**

**Oral presentation by**

**Canadian Association of Nuclear Host Communities and  
the Municipality of Clarington**

**THE PRESIDENT:** Thank you.

Before questioning CNSC staff and OPG, as per normal procedure, we like to hear from the

intervenors and I would like to move to the next submission, which is an oral presentation by the Canadian Association of Nuclear Host Communities and the Municipality of Clarington, as outlined in CMD 15-H8.52.

I understand that Mayor Foster, you will make the presentation. Over to you.

**MAYOR FOSTER:** Dr. Binder, Members of the Commission, thank you for the opportunity to speak and welcome to Clarington.

For the record, I am Adrian Foster, Chair of the Canadian Association of Nuclear Host Communities and I am also the Mayor of the Municipality of Clarington, the host community of the Darlington Nuclear Generating Station. I am joined today by our CAO, Mr. Franklin Wu, and Gord Weir, our Fire Chief.

Our Association is comprised of the head of Councils of host communities of various major nuclear facilities in Canada and the Municipality of Clarington is a founding member of that Association. The Association provides a forum for our members to share knowledge and best practices in our respective experiences in working with the nuclear industries. Most importantly, our Association provides support to

our members through public hearing participation and liaises with various government agencies to further our objectives.

Both CANHC and the Municipality of Clarington have established excellent working relationships with OPG and are familiar with the many facets of its operation at the Darlington 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 Clarington, and of course the safety to our residents, particularly those living nearby the Station. We believe public safety should never be compromised with any application for nuclear operation, be it new build, refurbishment, or operating licence renewal.

OPG, through its many years of operating the Darlington Nuclear Station since the early 1990s, has demonstrated to our satisfaction year after year that it has continued 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. I need not further elaborate on this point.

Another aspect of public safety is emergency preparedness, where Clarington Emergency and Fire Services regularly participate with OPG and Durham Region in various manners, including exercise drills, evacuation planning, offsite training at the Wesleyville facility and so forth. Through the assistance of OPG, the Municipality of Clarington recently opened a modern Emergency Operation Centre in Newcastle, further demonstrating the commitment by both OPG and Clarington to emergency preparedness and public safety.

Since the start of construction of the Darlington Nuclear Station in the late 1970s to its fully operational phase, the Darlington Nuclear Station has provided tremendous positive economic impact to Clarington and its surrounding communities. As OPG employees settled in the area, they injected significant stimulus to the local economy. The resultant growth is evident throughout Clarington and continues to establish Clarington as the vibrant eastern anchor to the Greater Toronto Area. Much of this economic activity would not have happened without

the building of the Darlington Nuclear Power Plant. The continued operation of the power plant can only reinforce the confidence in both the commercial and industrial sectors to continue their commitments and investments in our local communities.

There are, of course, other important and compelling reasons to support the licence renewal, key of which is maintaining safe, stable, low carbon baseload electricity to Ontarians. I will leave it to others to make that case.

The 13-year renewal request may seem lengthy to some, but given the excellent operational track record of the Darlington Station and the continuous vigorous safety oversight by the CNSC, we are of the opinion that the licence renewal is necessary and is in the best interest of the local communities and beyond.

Last but not least, OPG has been an excellent corporate citizen in the local communities. It provides annual presentations and reports to Clarington Council and we enjoy a very good working relationship with OPG, both at the political as well as at the staff level. We are confident that this partnership will continue and flourish through its ability to continue its operation.

In summary, OPG and the Darlington Nuclear Station have been a significant and positive presence in Clarington for many years and have earned the trust and confidence of our community. I thank you for the opportunity to address the Commission. Both CANHC and the Municipality of Clarington are fully in support of its application for licence renewal.

**THE PRESIDENT:** Thank you.

Questions? Ms Velshi...?

**MEMBER VELSHI:** Thank you, Mr. President, and thank you.

OPG in their presentation talked about updating their evacuation time estimate study. Were you involved in that at all or have you seen it?

**MAYOR FOSTER:** Adrian Foster for the record.

I am going to pass that to the Chief. I was not directly involved but our Emergency Services and DEMO would have been.

**MR. WEIR:** Gord Weir for the record.

Yes, we were somewhat involved with DEMO, Durham Emergency Management Office, and with our local Durham Regional Police Services. So we have been part of that whole process as it has been

ongoing.

**MEMBER VELSHI:** So that evacuation time study itself, you have been involved in?

**MR. WEIR:** I have not been involved directly in it but I haven't seen portions of it, yes.

**MEMBER VELSHI:** Thank you.

My second question: As Canadian Nuclear Host Community Association, have you got feedback from other host communities who have hosted refurbishment of other nuclear facilities or learnings or advice to you as a host community?

**MAYOR FOSTER:** Adrian Foster for the record.

The most recent would be Point Lepreau. So we will meet at the CNA, the Canadian Nuclear Association. We had an extensive presentation from them the year before last, speaking to learnings that they had during that entire process.

**MEMBER VELSHI:** Thank you.

**THE PRESIDENT:** Question?

Just following up on the emergency management, you are probably aware that that has been one of the issues of concern to many of the intervenors. I just want to hear you tell me: Are you satisfied right now with the existing plan,

emergency management is good enough, and why did it take so long post-Fukushima to get it updated?

**MAYOR FOSTER:** Adrian Foster for the record.

Dr. Binder, I can't speak to why it takes so long to get it updated. I know that a lot of work has happened at the direction of the CNSC, with OPG doing these. The most recent emergency plan, which is all-encompassing for natural emergencies as well as nuclear emergencies for Clarington, was done in 2014. We will update it shortly for 2015. I note that Durham Region has updated theirs for October of 2015. Hence, we will wait to make sure that those plans are aligned.

**THE PRESIDENT:** I think we're going to get into deep discussion, I think tomorrow.

**MR. LEBLANC:** Yes. On emergency management, mostly on Wednesday.

**THE PRESIDENT:** Wednesday. So maybe you should tune in then.

Thank you. Thank you for your presentation.

Anybody else?

So again, any last words?

**MAYOR FOSTER:** Adrian Foster for the

record.

Dr. Binder, to you and your staff, anytime that I have called I have received a response incredibly quickly, which gives us confidence in the regulator, you, in terms of overseeing Darlington OPG. So a lot of that confidence goes into the statements that were made today.

**THE PRESIDENT:** Thank you. Thank you very much.

Marc...?

**MR. LEBLANC:** Yes, thank you.

We have a bit of a change to the agenda. The next submission was to be from the Mississaugas of the New Credit First Nation. Because of the change of scheduling they were no longer available and we have rescheduled them to Wednesday morning.

We also had a special request by Mr. Tim Seitz, who is our next presenter, that he be allowed to present earlier for personal reasons.

So we will now proceed with the submission from Mr. Seitz, as outlined in CMDs 15-H8.91 and 15-H8.91A.

That would be about the fourth one from where you were supposed to be, Mr. President and

Members of the Commission. So you had Lake Ontario Waterkeeper, the Mohawks of the Bay of Quinte and then the OCNI, and then would have been Mr. Seitz' presentation.

**THE PRESIDENT:** I found it. Has everybody found it? I think it's a bit of a challenge to navigate through these binders. We are okay? Good to go? Okay.

I think you have already been introduced. We are going to hear the next submission from Mr. Seitz, as outlined in CMD 15-H8.91 and H8.91A. Mr. Seitz, the floor is yours.

**CMD 15-H8.91/15-H8.91A**

**Oral presentation by Tim Seitz**

**MR. SEITZ:** Thank you.

Thank you for inviting me. I feel very privileged as a citizen to stand here and speak as a citizen who is also a ratepayer and a taxpayer to address these issues. They have been a lifelong issue with me, so the statements I am about to make are what you might call perspectival, going back to the '50s and the promises made by the nuclear industry then that they would have solved all the nuclear waste

issues by 1960. So you can see a lot of time has transpired since then.

That not being the only thing but the constant promises of new things and never, ever having been on budget, that they are always running over budget. So this brings up the question of 13 years before a citizen can speak out.

Having been involved in industry as well as education, I would like to bring up the idea of a work-in-progress approach to this so that maybe every two years people could speak to it and say, well, are we on target, are we getting there or have any new developments since transpired.

Thirdly, I do not really like the CANDU reactors- - that might have been the only choice- - because they are tritium dumpers. If you compared a CANDU reactor to a light water reactor, the CANDU reactor will create about 2,400 times more tritium than a light water reactor. It's because of our mode of fissioning requiring heavy water. So that brings up the issue of what do we do with tritium.

I understand there is a tritium removal facility at Darlington. So that raises about three other questions in my mind. What do we do with the tritium from Bruce? What do we do with the

tritium from Pickering? Are they going to be transported here and then run through this procedure to take the tritium out?

The next question I want to ask is: Will it take all of the tritium out or just some of it?

Then the other issue with tritium is what we went through with Shield Source in Peterborough: Is this a commodity that we want to put on the market? What are we going to do with this tritium?

It can have many dangerous applications. It can certainly enhance the blast effects of nuclear weapons if you want to be dramatic. I couldn't think of a more dramatic way to pollute the planet.

Having been in astronomy for 50 years and looking out at the stars, I can see that this is it, this is the only planet we have. And then when I think of refurbishing and rebuilding here, I think that there's also 450 other nuclear stations around the planet, probably which the real estate will never be recoverable because of the nuclear waste that's there. Nobody would want to live there.

So handling nuclear waste, I don't

think it's a marketplace option because where they have tried to do that it has failed. It has been dumped in the Mediterranean by people in marketing looking for a solution to it. It has been dumped off the coast of Somalia and it has created a lot of very angry fishermen there- - by Europeans.

In the Soviet Union they had over 200 nuclear subs and some people tell me that they are just sitting in the Arctic, you know, rotting there.

Then of course we have Hanford in the United States, which is perpetually saying they are going to solve the nuclear waste problems there.

So I really wonder why we can't think of other options than nuclear.

I have to state where I'm at. I am totally against more nuclear plants because they have never been under budget, they have always been over budget and I have no reason to believe that this will be any different other than what you tell me.

The other thing about saying 13 years before it can come up for review, I find that is very bad. Because I am having a chance to reciprocate with you now, you have spoken, I am speaking back to you. So it is this whole issue of reciprocity where citizens can be involved. So again, I bring up the

idea of maybe we should have a work-in-progress.

Since I am footing the bill and no insurance company will, and I am also paying for my hydro, so I am as implicit in this as anyone else. I buy this hydro, so we are all together. And I wish you imminent success but I think it will be better if citizens can stand here and say what they should say to you and hopefully we will come to a resolution.

I don't have any more to say. Thank you.

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

**MEMBER MCDILL:** Thank you.

I wonder if I could ask staff and perhaps then OPG to talk a little bit about the tritium which the intervenor brought up. How is it being managed in Ontario at this time and what are the future implications?

**THE PRESIDENT:** Who wants to start? OPG?

**MR. DUNCAN:** Brian Duncan, for the record.

So one feature of a heavy water moderator reactor is, of course, the CANDU reactor is that we do produce tritium in both the heat transfer

and the moderator systems. And we have a tritium removal facility at Darlington which cryogenically distills tritium out of solution and it is then stored in a safe metal matrix, if you will, and stored on site. And at this point in time it's allowed to decay.

We detritrate. We provide detritration services not just for the Darlington reactors. We also provide detritration for the Pickering reactors as well as under contract to Bruce Power. So we detritrate for all of the Ontario reactor fleet.

Now, does that process remove all of the tritium? The fact is a detritrate factor is, as you know, it's a ratio of about 24 or 25 to one when we look at detritration. So the goal is to- - and there are licensed limits on how much tritium can be in solution as part of how we operate the plants and the goal is to take water that has higher levels of tritium in it, detritrate that water to very, very low levels and then essentially replaced higher and keep the cycle going.

So we do that for- - we provide that service for Ontario reactors today.

**MR. HOWDEN:** Barclay Howden speaking.

So as Mr. Duncan said, the tritium is a product of the heavy water moderator being irradiated but because OPG does have the tritium removal facility it does lower the concentrations in the moderator which makes less available to be emitted. From a regulatory standpoint OPG is held to limits called derived emission limits and they are consistently at about .01 percent of those limits. They are also required by ALARA to- - which is As Low As Reasonably Achievable to put in measures to minimize the releases to the environment.

In terms of impacts we have people here who can speak to them if you would like further information, Dr. McDill.

**MEMBER MCDILL:** Maybe to go back to the intervenor.

**THE PRESIDENT:** Yes.

**MR. SEITZ:** Do you have a question for me?

**THE PRESIDENT:** No, you just heard some explanation to your intervention.

Any final thoughts?

**MR. SEITZ:** Well, just a final thought would be because my background is Math and Physics I would like to know how much tritium is in fact

released to the environment. I know from reading that about 1/500th of a gram of tritium would kill virtually anyone if it were in your system and if you breathe tritium in, a millionth of a gram could give you lung cancer.

So I heard stories about tritium being boiled off from the reactor. I have heard stories from the Bruce- - Friends of the Bruce where they put a well down and they found two-millionth parts or Becquerels per litre of tritium in the past. So I hope that these practices are not part of it and that we can simply find a way to contain it and maybe bring it down to what California thinks is a good limit, like 15 Becquerel per litre. I understand our lake down by Kingston where I live is 5 Becquerels per litre.

But if you go back to 1943 it'd be all this- - before all this fissioning began again being perspectival, the amount of tritium in natural coming from ionization high in the air would be less than 0.25 Becquerel per litre. So if you took that higher limit you can say, "Well, my goodness, we have 2,000 percent more tritium in our water in Kingston" and I think it does show up, no matter than perhaps you can filter it out. Our municipality can't filter it out

either so it's in my drinking water.

If I were advising a young pregnant woman I would tell her, "But here, I am going to go get you some bottled water from- - that I know is tritium-free because I don't want your embryo floating in titrated water".

**THE PRESIDENT:** M. Harvey...?

**MEMBER HARVEY:** Just as Mr. Seitz mentioned that with the 10-year licence or 13 years that the public will be left out of no occasion to participate. So I would like the staff to explain a little bit that point that the length of the licence does not automatically imply that the public will not have any occasion to participate or debate.

**MR. HOWDEN:** Barclay Howden speaking.

In terms of reporting to the Commission, I think the most significant report that we make on a yearly basis is the Regulatory Oversight Report which is the report on the performance of all the nuclear power plants in Canada. That's done on an annual basis and up till now the Commission has invited written interventions to that meeting. That's usually held in August of every year. So that's an opportunity for the public to be involved. And we just finished one this year and we had about five or

six interventions.

Also in terms of the public to be aware of things that are going on, we do a status report on a monthly basis to the Commission on the power reactors.

We also do an update if there is an event. We do an Event Initial Report which is reported as required to the Commission Members.

So the public doesn't necessarily intervene but they are aware because we post that information.

Also, if there are events under proactive disclosure we have a REGDOC called 99.3. The licensee is required to post on their website any reporting requirements or events per the regulatory requirements. When that is done we do link to it from our website. If someone is just visiting our website they can then go to OPG's website to find the information.

So that's the regulatory reporting that is available to the public with the public being able to intervene on the Regulatory Oversight Report.

**THE PRESIDENT:** Can you just react to the health impact of tritium?

**MR. HOWDEN:** Yes, I'd like Dr. Patsy

Thompson to provide commentary because there is a difference between limits that could impact health versus the regulatory limits that are put in place.

**DR. THOMPSON:** Patsy Thompson, for the record. I am the Director General responsible for the Health and Environmental Programs at the CNSC.

The impression left by Mr. Seitz' comments is that the levels of tritium in drinking water that are around 5 to 8 Becquerels per litre - - so are much, much below the drinking water standard but also much below the California objective. The impression is that this is a health concern and that, you know, women who are pregnant should not be drinking water. That is totally wrong. There is no factual scientific basis for that statement. It would take tritium concentrations, orders of magnitude higher than this to have any effect on human health. And so this is just not factual information.

The doses to members of the public including from drinking water around the Darlington site are 0.6 microSieverts per year and so that's even - - you know, it is quite a bit lower than just the background - - natural background radiation.

So there is actually no health consequences to the levels of exposure of tritium to

tritium around the Darlington site and in Kingston. A lot of the drinking- - the tritium in Lake Ontario measured at Kingston is from weapons fallout essentially, so it's residual tritium from that period with a little bit of impact from the Pickering and Darlington facilities. But the concentrations are irrelevant in terms of potential health impacts.

**MR. SEITZ:** Tritium coming out of those plants at the point where they are exhausting the water into the lake is it measured there, or do we have a fishery that measures the amount of tritium in the fish?

**THE PRESIDENT:** The answer to that is "yes" on all and you are going to hear about this in some other- - throughout the three days.

**MR. SEITZ:** Okay.

**THE PRESIDENT:** I think we already heard from the independent environmental monitoring people. So this will continue.

So thank you. Thank you for your intervention. It's a good time for us now to take a 10-minute break. Okay.

**MR. SEITZ:** Can I make one last comment?

**THE PRESIDENT:** A very quick one.

**MR. SEITZ:** Yes. About low-level radiation over a very prolonged period and there is a lot of medical evidence now that this can be just as deadly as a higher level of radiation, and it certainly is higher than before we began fissioning on this planet.

Thank you.

**THE PRESIDENT:** Thank you.

So we will come back at- -

**MR. LEBLANC:** 4:45.

**THE PRESIDENT:** - - 4:45.

--- Upon recessing at 4:35 p.m. /

Suspension à 16 h 35

--- Upon resuming at 4:49 p.m. /

Reprise à 16 h 49

**CMD 15-H8.3/15-H8.3A**

**Oral presentation by Lake Ontario Waterkeeper**

**THE PRESIDENT:** Okay. We are back and ready to move to the next submission which is an oral presentation by Lake Ontario Waterkeeper, as outlined in CMDs 15-H8.3 and 15-H8.3A.

I understand that Ms Feinstein will

make the presentation. The floor is yours.

**MS FEINSTEIN:** Thank you. Good afternoon, President Binder and Commission Members. Thank you for the opportunity to address you all today.

For the record, my name is Pippa Feinstein. I am counsel for Lake Ontario Waterkeeper and I am joined by Tristan Willis, Waterkeeper's public interest articling fellow.

Waterkeeper was provided with participant funding to prepare these submissions and we hired experts, Dr. Seaby and Mr. Draganchuk to assist with our efforts.

Lake Ontario Waterkeeper was founded in 2001 and has since tirelessly advocated for local swimmable, drinkable and fishable water.

The organization seeks to empower people in order to stop pollution, protect human health and restore habitat. They have significant expertise concerning the Darlington station and applicable environmental law.

Waterkeeper is glad to be able to share its specialized knowledge with the Commission at this hearing and urges the Commission to take a prudent, precautionary and responsible approach to

considering whether to renew OPG's current operating licence.

Ultimately, as we will show during this presentation, OPG has failed to provide sufficient information to demonstrate that the Darlington station makes adequate provisions to protect the environment. As such, the Commission should refuse to grant the company's requested 13-year licence.

In order to assist the Commission in arriving at a decision consistent with the public interest, this presentation will focus on three important things.

First, it will describe the larger context of this relicensing decision and its potential to impact the swimmability, drinkability and fishability of Lake Ontario.

Second, it will review the major ways the Darlington station threatens the fragile yet dynamic and rebounding ecology of Lake Ontario.

And third, it will explain how adverse environmental impacts of the station could be corrected by implementing Waterkeeper's recommendations.

So with that, topic one, Ecological

and Legislative Context:

Lake Ontario is a precious resource and home to a vibrant, dynamic and recovering ecosystem. Both federal and provincial governments have passed legislation recognizing this fact. The lake provides drinking water to 9 million people and is an important site for several recreational activities such as swimming, canoeing or connecting with nature. It's also a site for recreational, commercial and subsistence fishing.

However, the lake is threatened by various stresses leading experts to explain that it is in the midst of a huge ecological upheaval. Historic and ongoing abuse and pollution of Lake Ontario including by Ontario's energy sector has already altered nutrient dynamics, hydrological rhythms, coastal habitats, water quality and biological diversity. And the lake is responding to these changes in unpredictable ways.

Further, the local population in Durham Region continues to expand and urbanize. The province's growth plan for the Golden Horseshoe predicts an influx of an additional 350,000 people to the area by the year 2031. This population growth will mean both increased use of the lake as well as

increased human-made stresses on the lake. Durham Region storm water runoff and its release of growing quantities of secondary treated sewage into the lake affect the health of the local shoreline. The effects of this pollution are already exemplified by the growing severity of the region's nuisance algae problem.

All levels of government in Canada have recognized the value of our Great Lakes and enacted legislation and signed international treaties to ensure that protection. Last month the Ontario Legislature passed the *Great Lakes Protection Act* which recognizes that all Ontarians have an interest in ecological health of our Great Lakes.

The federal government also co-manages the Great Lakes with the U.S. through the *Great Lakes Water Quality Agreement* which focuses on the remediation as well as protection of these precious waterbodies.

It's crucial that the Commission consider OPG's relicensing application in light of this larger ecological and legislative context. Waterkeeper was deeply disappointed when the Day 1 hearings for this proceeding on August 19th failed to do this. We look forward to the opportunity to engage

with CNSC staff and OPG about these issues during the question period after our presentation.

Topic 2, Darlington's adverse environmental impacts:

Available data indicates that the Darlington station continues to impede the lake's resilience and is a source of several environmental stresses on the cold water quality. The first major stressor from the Darlington station sends its impact on aquatic biota.

We should note that the Commission is required to consider processes in the *Fisheries Act* and the *Species at Risk Act*, pursuant to a memorandum of understanding it signed with Fisheries and Oceans Canada and that this memorandum specifically applies to relicensing processes.

The Darlington station has a several decades' long history of non-compliance with the *Fisheries Act* and *Species at Risk Act*. This past summer OPG obtained a permit from Fisheries and Oceans Canada allowing its cooling water intake system to seriously harm up to 2,200 kilograms of Age+1 equivalent fish per year. This permit specified that none of these harmed fish could belong to federally-recognized species at risk.

Waterkeeper has collected expert evidence that demonstrates that the Darlington station fails to comply with both terms of this permit. According to OPG's own calculations, the once-through cooling water intake seriously harms more than 2,200 kilograms of Age+1 equivalent fish. However and further, it is possible and increasingly likely that this intake system will also seriously harm species at risk.

Due to Atlantic salmon and American eel conservation and restocking strategies it is likely that these protected species could become more abundant in the waters surrounding the Darlington station. As such, it is also increasingly likely that these species will be impinged and entrained by the once-through cooling system.

Further, we have expert reports noting that available impingement and entrainment data indicates the rates of fish killed has steadily increased over the past decade or so. Between 2004 and 2006 entrainment values increased by 875 percent, between 2006 and 2011 impingement values increased by 200 percent.

We have also shared expert reports with OPG and the Commission that explain how it is

likely that the Darlington station already impinges far greater numbers of fish than the current fisheries authorization permits.

OPG's current authorization does not permit OPG to discount round goby or carp from its reported impingement or entrainment biomass. However, this is the only way OPG could meet the terms of its approval. If OPG were to include the impingement and entrainment of these species in its annual total we would see the Darlington station actually harms 10 times the amount they were permitted to harm in their permit. This number is likely to continue to increase in years to come.

Waterkeeper's concerns of the threats to local aquatic biota are compounded by the absence of proper impingement and entrainment monitoring programs at the Darlington station. The result is a series of significant information gaps that make it difficult to predict with any certainty future trends in impingement and entrainment. These gaps also frustrate one's ability to understand the project's current impact on protected species.

In light of these already problematic gaps and important environmental data for the site, OPG's plan to monitor impingement and entrainment only

once every 10 years is completely inadequate. Such limited monitoring will make it impossible for OPG to ensure compliance with the *Fisheries Act* or *Species at Risk Act*. This scant monitoring scheme will also fail to be able to address any ecosystem changes that are bound to occur in the area over the next several years.

In addition to the station's adverse impacts on aquatic biota, the Darlington station has not made adequate provisions to minimize surface water pollution. It has 12 stormwater sub-catchments on its property that lead to 16 different outflows that release untreated water directly into Lake Ontario.

The station has a long history of stormwater pollution, contaminant concentrations on onsite and near site waterbodies have regularly exceeded provincial water quality objectives.

An example of this at Coot's Pond, while this picture may look inviting and the pond certainly attracts diverse wildlife it has regularly exceeded provincial water quality objectives making it a local ecological hazard. The lack of containment and treatment of pools like this is a significant environmental concern.

Again, the inadequacies of OPG's

monitoring scheme confound these existing environmental issues. Only three studies have been undertaken concerning stormwater at the Darlington station in the last 20 years. Now, even this limited data indicates cause for concern. Samples of stormwater in 1996 and 2001 failed acute lethality tests and while samples passed these tests in 2011 they continued to exceed provincial water quality objectives. Here are some contaminants found in onsite or near site waterbodies and a list of contaminants and samples from 2010.

Recent monitoring has also shown that tritium levels in stormwater runoff are hundreds of times higher than Becquerel levels. In at least one instance sub-catchment tritium levels were measured at 5,430 Becquerels per litre. While this value is still below the 7,000 Becquerels per litre provincial water quality objective limit, the Ontario Drinking Water Advisory Council has long recommended that 7,000 Becquerels limit be decreased to 20 Becquerels per litre.

The monitoring inadequacy as we explained with regard to impingement, entrainment and stormwater data is particularly significant when considered in the light of inadequacies in the

Environmental Screening report for the Darlington refurbishment. Flaws in this report deprive the Commission of the information it needs to assess whether the Darlington station adequately protects the environment.

Firstly, the report fails to consider economically and technologically-feasible close cycle cooling systems. This technology if installed at the Darlington station would drastically reduce the quantity of water it draws in from Lake Ontario and would reduce impingement, mortality and entrainment by 97.5 and 94.9 percent respectively.

Secondly, the report fails to consider the broader ecological context of the ecosystem of which Darlington's once-through cooling water system is a part. It ignores the cumulative effects of lake-wide stresses or how local ecology could be affected by climate change.

The report also notes deficiencies in available information as a reason for inaction rather than further precaution and further study, which is inconsistent with the precautionary principle in Canadian environmental law.

Topic 3, Waterkeeper's recommendations.

In order to assist the Commission in taking prudent precautionary and responsible approach to considering OPG's application to renew the Darlington licence, Waterkeeper presents the following recommendations.

First, the Commission should require OPG to develop and implement a robust impingement and entrainment monitoring program for the Darlington nuclear generating station.

Two, the Commission should require OPG to immediately review available impingement and entrainment mitigation options and determine how it will comply with its current DFO authorization- - Fisheries authorization.

Third, the Commission should require OPG to develop and implement a regular stormwater monitoring regime.

And fourth, the Commission should require OPG to take corrective actions to ensure that on-site and near-site water bodies meet provincial water quality objectives.

Further, the Commission should not renew the Darlington station's licence until the flaws in the environmental screening report have been addressed.

Should the Commission decide to issue OPG a general operating licence, it should be for no more than one year, and it should incorporate the recommendations we've just outlined.

OPG's requested 13-year licence term is more than twice the length of its past licences for the station, and too long to rely on such meagre environmental monitoring. A one-year licence would also be consistent with the Commission's decision last year to extend OPG's licence to provide enough time for it to prepare the necessary paperwork to support its current relicensing application, thus, another one-year licence would not be out of keeping with the Commission's past decisions.

During the future one-year licence term, OPG should be able to determine how it will comply with its Fisheries authorization, it could develop and implement adequate impingement and entrainment monitoring programs and develop a plan to ensure on-site and near-site water bodies consistently provincial water quality objectives.

So thank you. That concludes my presentation, and I look forward to your questions.

**THE PRESIDENT:** Thank you.

Who wants to start questions? Dr.

Barriault?

**MEMBER BARRIAULT:** Thank you, Mr. Chairman.

I guess I'm looking at the stormwater monitoring program, and the impression I have is that it's not being done. Is that correct?

Can OPG comment on this, please?

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

Stormwater monitoring is regulated under the MISA regulation, and OPG complied with the requirements to do that.

As part of the environmental assessment for the refurbishment and continued operation, we also did additional stormwater monitoring to demonstrate what the conditions were and expected results at the facility.

There's no requirement for ongoing stormwater monitoring, and so OPG complies with what requirements are there.

**MEMBER BARRIAULT:** So if I understand correctly, it's not required, it's not done. Is that correct?

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

That's correct, in recognition that storm events are interim- - are not consistent, so it's very- - it's not an ongoing monitoring program that one would implement. It's more of a periodic monitoring program.

**MEMBER BARRIAULT:** So you don't have a treatment program, then, for your stormwater outlet.

**MS SWAMI:** The stormwater monitoring- - or stormwater program, generally, we have releases to the lake. However, for parking areas and the like on site, we would have stormwater management ponds that would be used for settling purposes, et cetera.

**MEMBER BARRIAULT:** Thank you.

CNSC, do you care to comment, really, in terms of monitoring and protecting the environment?

**MR. HOWDEN:** Barclay Howden speaking.

I'll ask Andrew McAllister and Caroline Ducros to comment because it is in the follow-up, but Mr. McAllister could comment on the requirements.

**MEMBER BARRIAULT:** Thank you.

**THE PRESIDENT:** Sorry. While you're doing this, I'd like to hear from Environment Canada about what is the regulation associated with

stormwater across the whole lake. I just- - are there no regulations about farming?

There's factories, all kinds of things. What are the rules on stormwater release to the lake?

So over to you, staff.

**DR. DUCROS:** Dr. Caroline Ducros, the Director of the Environmental Assessment Division at the CNSC.

There is a requirement, and it's in the integrated implementation plan of the licence. It comes out of the environmental assessment follow-up monitoring program that OPG submit to us a stormwater sampling plan by 2018.

We have been in discussions with OPG. CNSC, DFO and EC have been part of those discussions.

So we are expecting a stormwater- - a detailed sampling plan for stormwater to arrive to us by 2018.

**THE PRESIDENT:** Sorry. Maybe I called Environment Canada, but is DFO the one that controls stormwater?

**DR. DUCROS:** Sorry. Environment Canada for stormwater.

**THE PRESIDENT:** Then maybe we should

get DFO- - I think they're going to be called in also to help us on this one.

Environment Canada, do you want to comment?

**MS ALI:** So there's no specific regulation for- - sorry. Nardia Ali, Environment Canada, for the record.

There's no specific regulation for stormwater. It would- - what stormwater would fall under is deposit of deleterious substance under the federal *Fisheries Act*. There's no specific regulation.

As the CNSC just stated, Environment Canada has been involved in the review of the follow-up monitoring program, and we have recommended that there be more frequent stormwater monitoring. And we've seen recently in the draft- - the draft follow-up monitoring plan and the adaptive management that OPG has indicated that there- - based on the results of the stormwater monitoring originally proposed, more extensive stormwater monitoring would be done if necessary.

**MEMBER BARRIAULT:** But if you're not monitoring, how would you know if it's necessary, I guess, is the biggest question.

**MS ALI:** No, there is- - like Duck, do you want to elaborate?

**MR. KIM:** Duck Kim, for the record, for Environment Canada.

So currently, the- - our understanding is that OPG has committed to one full extensive- - so in addition to what is required under the MISA provincial program that OPG has committed to conducting an extensive stormwater study, so that will inform us and the CNSC and OPG to consider further action if necessary.

**MEMBER BARRIAULT:** Is there any limits on other industries with their stormwater effluents?

I'm thinking of, you know, refineries, for example.

**THE PRESIDENT:** What about farming?

**MEMBER BARRIAULT:** Farming.

**THE PRESIDENT:** Most of the contamination, I would think, would come from farm run-offs.

You guys- - are you worried about farm run-offs, Waterkeepers?

I mean, we are off topic, but you can answer anyhow.

**MS FEINSTEIN:** Yeah. It's a little

off the scope.

I think run-off is definitely a concern of our organization, but we think it is key to focus on the facility and the specific stormwater runoff issues at Darlington.

**THE PRESIDENT:** Thank you.

**MEMBER BARRIAULT:** I just want to go back one step again.

We at CNSC are supposed to protect the environment, obviously, along with the people. What are doing to protect from contaminated stormwater?

**THE PRESIDENT:** I hear somebody waving. Go ahead.

**DR. THOMPSON:** So Patsy Thompson, for the record.

So just to provide some background information, a little bit of an overview, stormwater is essentially water that runs off when there's a rain event, so it can be from parking lots, essentially industrial land that is close to facilities, and so the best way to control stormwater quality is to have best management practices in terms of looking after parking lots, minimizing the use of road salt, having spill response programs where, if there's diesel being handled, there's actually measures there put in place

to prevent spills and, if there are spills, to clean it up quickly.

And so that's the way the stormwater quality is being managed, through those best practices.

Historically, on the Darlington side, there had been issues and, following those issues, the requirements were to implement best management practices as well as to do some- - not landscaping, but regrading and other measures to control, essentially, the quality of that stormwater.

Since the environmental assessment, as Dr. Ducros explained, there will be additional characterization done to ensure that the effectiveness of the measures that were taken in the late nineties, but currently, the- - you know, the management on site appears to be adequate and the risks to Lake Ontario, the receiving environment to the risk assessments that have been conducted, the risks are not being seen, essentially.

**MEMBER BARRIAULT:** So it's my understanding the same principle applies to all nuclear plants, at least in Ontario. We're not monitoring the stormwater emissions or discharges?

**DR. THOMPSON:** Excuse me. So Patsy

Thompson, for the record.

So it's the same requirement not just for nuclear facilities; for all industrial sites.

**MEMBER BARRIAULT:** Thank you.

**THE PRESIDENT:** So just as- - you're doing independent environmental monitoring, so you already take the sample. Do you actually measure some of the contamination that was listed here and, if not, could you or should you just to give an extra information?

**DR. THOMPSON:** So Patsy Thompson, for the record.

So we have done, on a couple of occasions, not just radiological components, but the chemical components, the metals, went through the- - so yes. But in this case, we only did the radiological contaminants, but it's possible to take Lake Ontario samples and do the full spectrum to get all the metals and all the- - essentially, the contaminants that have been identified.

**THE PRESIDENT:** It seems to me since you're collecting them anyhow, you've got the sample. I don't know how difficult it is to actually measure some of those things, but between Environment Canada and CNSC, probably you would want to know what the

level of contamination is.

Mr. Jammal, you want to say something on this?

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

I'd just like to go back to the regulatory requirement. There is a debate about are they going to take sampling.

The answer is yes, regardless of OPG's policy or not. Once the IIP has been approved and accepted by the CNSC staff and is being presented to you, the Commission, once it's approved, it becomes part of the licensing basis that they must take sampling.

And they will be providing us with a sampling program and the frequency of the sampling, and our staff will be evaluating and determining the sampling with respect to the stormwater.

So from regulatory perspective, I'll pass it on to my colleagues from our technical support, it is part of the licensing basis and OPG has no choice but to comply with that requirement, so it is a regulatory requirement.

**THE PRESIDENT:** OPG?

**MS SWAMI:** Laurie Swami, for the

record.

I did not want to imply we would not comply with regulatory requirements. We will comply with regulatory requirements.

The element is- - part of our follow-up monitoring program is a requirement, and we are required, as mentioned, to provide a sampling plan, conduct a study in 2019, and we would compare that to our previous findings.

So that is part of our program. I did not want to imply otherwise.

I would say that there's a lot of changes on our facility over the period of time when we're in refurbishment, and so that is the discussion that Dr. Thompson provided with respect to grading and other elements we've put in place. And so that is the way that we mitigate this.

In addition, we do ecological risk assessments looking at the various components and their potential impact on the environment.

This was all covered during our environmental assessment process where we provided this information and we had discussion about what the appropriate actions to take as a result would be. And that's included in our best management practices

around the site as well as the follow-up monitoring program that's been described.

**THE PRESIDENT:** Thank you.

Monsieur Harvey?

**MEMBER HARVEY:** Just to continue on that, we're talking of that, but you mentioned that there has been some issues with some water. But what is the importance of the problem?

What do we know about that, about the importance of the problem, of this issue compared to other issues?

Is it something- - what do you know about it?

**DR. THOMPSON:** So Patsy Thompson, for the record.

I'll provide some information and perhaps my colleagues have more.

So in the mid to late 1990s, there were a number of events where the samples from the stormwater were toxic to fish. And in response to those findings, OPG essentially took actions to improve the situation on site.

Following those improvements, the stormwater has not been toxic to fish, and so essentially, the stormwater is of quality that, you

know, fish can live in.

And the ecological risk assessments that have been done of stormwater discharge into Lake Ontario have also shown that there's negligible risk.

**MEMBER HARVEY:** Well, it's potential risk. It's difficult to qualify.

**DR. DUCROS:** Caroline Ducros, for the record.

I just want to clarify that stormwater was one of the components that was assessed in the environmental assessment that was conducted and which the Commission had made a decision on in 2012. It was the- - some of the interventions that we heard this morning regarding stormwater were also given to us during a 45-day public comment period on that environmental assessment screening report and discussed at the last hearing.

We still conclude the same conclusion we had on that EA, that there's no significant adverse environmental effects after the implementation of the mitigation measures.

We did put in that EA that a follow-up program would be put in place to assess the predictions and confirm the predictions.

If any predictions are ever found to

be incorrect, we would put in place other mitigation measures, and we have that capacity to do so under the NSCA.

**THE PRESIDENT:** Ms Velshi?

**MEMBER VELSHI:** Thank you.

It would be helpful if DFO folks were to come up front. My next- - my set of questions is around impingement, entrainment and the DFO authorization.

So one of the comments made in the submission is that the DFO authorization, this is the first time OPG has got it, and even though it's been a requirement for a long time. I wondered if OPG could start- - comment on that, and then staff. And then I'll move on to my second set of questions.

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

OPG does not believe that it was not in compliance previously with *Fisheries Act*. When we did the environmental assessment for the continued operation of Darlington, we felt that it was prudent at that time to consider whether an application was required.

Going through that process, it was determined that an application to Department of

Fisheries and Oceans was appropriate, and we proceeded through that program based on the environmental assessment results and then working through the various application process that DFO has.

**MEMBER VELSHI:** So DFO, did you think this was a long-standing requirement of Darlington, to have authorization?

**MS WRIGHT:** Jennifer Wright, with Fisheries and Oceans Canada, for the record.

During the EA phase for Darlington, it was DFO's opinion at that time that the facility was non-compliant with the *Fisheries Act*.

**MEMBER VELSHI:** So prior to that, you just weren't aware that it wasn't in compliance.

**MS WRIGHT:** It was an existing facility, and through a position statement, we are working with OPG to become compliant with the Act, along with CNSC.

**MEMBER VELSHI:** I understand that. My question was, were you aware that it was not in compliance until the EA process- - I'm just trying to understand why, after 25 years of operation, one suddenly realizes, oops, we're not in compliance and the- - what the regulator's position on this was.

**MS WRIGHT:** Jennifer Wright, for the

record.

We were aware, at the time, that the facility was not in compliance with the Act.

**THE PRESIDENT:** Okay. Let me understand what I understand on this.

I thought there was legislative change that absolutely made it mandatory to require authorization to kill fish, if I understand correctly, and before it was a decision to grandfather all existing facilities.

Did I understand this right, or not?

**MS WRIGHT:** Jennifer Wright, for the record.

Prior to the change in the *Fisheries Act* in 2013, there was another section of the Act, Section 32, that prevented the killing of fish. So - -

**THE PRESIDENT:** Unless you got permission from the Minister.

**MS WRIGHT:** Unless authorized by DFO.

And I know Tom Hoggarth with Fisheries and Oceans is on the line, if he'd like to add anything to that. He was present during the EA phase.

**MR. HOGGARTH:** It's Tom Hoggarth here. Do you guys hear me?

**THE PRESIDENT:** Yes, we can. Go

ahead.

**MR. HOGGARTH:** Yeah. So Tom Hoggarth here, from Fisheries and Oceans Canada, for the record.

So the plant has been in operation for, like you said, 25 years, and it came online prior to the implementation of some of the fisheries protection provisions that are now currently- - well, were in the old Act and are now currently within the existing Act.

And it wasn't until 2007, I think it was, that Fisheries and Oceans Canada came out with a position statement on existing facilities.

And at the same time, we came out with a position statement as well on mortality of fish.

And both position statements, at that point in time, recognized that there was facilities within Canada, and it's throughout Canada, that are in non-compliance with the *Fisheries Act* and that, when opportunity rises, we would then work with industries to get them in compliance in the Act.

And so for this facility, the best time to work with them to get them in compliance with the Act was when the EA started for the refurbishment. And it was from that point forward that we started the

discussions around compliance issues.

**MEMBER VELSHI:** Thank you.

So OPG, now having received the authorization and the chart in here that shows that your current impingement entrainment is an order of magnitude higher than what you're authorized for, do your current mitigation strategies- - would they address that, or do you need to develop new ones?

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

We intend to be in full compliance with the Fisheries authorization.

What I would say is the Darlington intake structure is specifically designed to prevent or limit the amount of impingement and entrainment to the facility, and we believe that it's still a very effective design that we have in place at Darlington.

The authorization was granted under the understanding that round goby, an invasive species that we all very familiar with as destructive to the health of the lake, are not included in that total count. And we understand that. I believe Fisheries and Oceans also understand that, and so we will be in compliance with that number.

On top of that, we have a habitat bank

that we have in the Bay of Quinte that we are monitoring and enhancing the habitat as an offset for any residual effects from our operations, so again, I believe we're in compliance with the authorization.

**MEMBER VELSHI:** So to make sure I've heard you right, whatever's in your follow-up monitoring program and whatever you're doing right now, you believe you are or will be in compliance with your authorization.

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

It's partially in the follow-up monitoring program, but the habitat bank is actually in- - specified in the fisheries authorization, so there's a combination of requirements. But yes, it's covered in the various tools.

**MEMBER VELSHI:** So as I look at the recommendations from the intervenor where they talk about a compliance strategy, am I correct, then, in concluding that there is nothing additional required than what's already in place?

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

I would agree with that. One of the conditions is to consider available technologies down

the road that would be also available to us. As I've already said, the technology at Darlington is very good for this purpose, but we do have a requirement to look at that as well.

So there's a number of elements in our authorization and in the IIP that would address these issues, and I believe they're sufficient to address the concerns raised.

**THE PRESIDENT:** Well let me ask the regulator here, are you happy with the plan that they have in place and the offset being proposed moving forward? And maybe you can tell us what you're going to do if they're off compliance.

**MS EDDY:** Sara Eddy, Fisheries and Oceans Canada, for the record.

So DFO is satisfied that OPG is in compliance with the *Fisheries Act*. Residual impacts will be offset by the creation of their habitat bank in the Bay of Quinte. We are satisfied that will offset the loss of fish at the Darlington water intake.

And my colleague, Jennifer, has more detail on the monitoring plan.

**MS WRIGHT:** Jennifer Wright, for the record.

I think it's important to note that we're in agreement with OPG, and the rationale they provided, for excluding round goby for the numbers. So that is why there's such a disparity in the slide presented by the Ontario Waterkeepers.

And another important point to note is that the valid authorization period ending December 31<sup>st</sup>, 2027, was intended to coincide with the refurbishment period only, with an addition of two years of monitoring for entrainment and impingement. So we don't expect OPG to go above and beyond what DFO authorized, being the 1,742 kilograms of fish per year to the upper threshold limit of 2,200 kilograms of age 1 fish per year.

They're conducting entrainment monitoring in 2015-2016, and then again in 2024-2025, back-to-back two years, along with impingement and monitoring at that time, and we are satisfied with the monitoring.

**THE PRESIDENT:** Would you like to comment on that?

**MS FEINSTEIN:** Thank you. Pippa Feinstein, for the record.

There are three main points that's I'd like to make.

The first is that the DFO authorization doesn't make any note of OPG's permission to subtract round goby populations from its annual fish kills. If this was understood to be part of the authorization, it should have been included in the permit.

And the round goby deaths do increase the annual kills at the plant by, you know, a factor of 10 times, and so this is very significant. The *Fisheries Act* is very clear that no facility can kill fish without a permit, and the language of the permit is the sort of legal exception to the application of that act.

This makes it imperative that the permit contain as explicitly as possible the extent to which the exception of the act can stand, and so it's very significant that there's no mention of round goby in the authorization at all. So that's the first point that we'd like to make.

Second, our organization does have significant concerns over the fact that the lack of compliance by OPG with the *Fisheries Act* over so many decades was permitted to continue regardless of whether there was a system to grandfather certain industries. It's been several decades of millions of

fish kills, and the fact that it would only be - - you know that this issue would only adequately be addressed in 2015-16 or 2024 seems unreasonable.

The third issue, which is also an issue that applies to stormwater, is this lack of monitoring. It's extremely important that regular monitoring occur at the site to fully understand how many species are being killed, which species are being killed. And it's important also, in terms of stormwater, to understand the stormwater runoff contaminants, and how they can defer year by year, season by season, which is why we're asking for monthly stormwater testing, but, at a bare minimum, quarterly stormwater monitoring each year. And similarly, these are the reasons why there needs to be a better understanding of the actual fish kills that are occurring at the site.

**THE PRESIDENT:** Okay.

A question here? Mr. Tolgyesi.

**MEMBER TOLGYESI:** Merci, Monsieur le Président.

I have two. One is for OPG.

Ms Swami, you said that you expect or you will be in compliance with DFO regulatory limits. When?

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

We're in compliance today.

**MEMBER TOLGYESI:** You are in compliance today.

So it answers to some of your...?

**MR. WILLIS:** Tristan Willis, for the record.

Well, I think that when we read the language of the authorization right now, and use the numbers that you've provided, it seems as though you aren't in compliance, and that's where our concern arises.

**MR. DUNCAN:** Brian Duncan, for the record.

I think the DFO authorization has to be considered in context to the application that we made for that authorization. It outlined the conditions and the allowances, which included in that application the exclusion of the round goby.

I guess we could debate whether the licence- - the authorization in this case, should include every single element, but the two documents go together. We applied for, and received, that document. We believe we're in compliance today.

There are elements in the authorization which we will have to execute in the future: the 12-month entrainment study in 2015-16, the two-year back-to-back impingement in 2024-2025. We'll have to execute those. Those are part of the authorization. We intend to do that.

**THE PRESIDENT:** And Fisheries and Oceans is also empowered, I understand, to do all kind of- - I'm not trying to- - for dealing with non-compliance, let me put it this way. Dealing with non-compliance, you have inspectors, you have all kinds of abilities to make sure- - to enforce compliance.

**MS WRIGHT:** Jennifer Wright, for the record.

Yes, ultimately, the responsibility lies with OPG to be compliant with the authorization and the *Fisheries Act*. There is a separate section of the act, 38.(4), which we call "Duty to notify." So the OPG has a "duty to notify" DFO if they exceed the threshold value that we authorized, being the 2,200 kilograms of fish per year.

**THE PRESIDENT:** Thank you.

Other questions? Dr. McDill.

**MR. JAMMAL:** Mr. President- -

**THE PRESIDENT:** Sorry.

**MR. JAMMAL:** - - we've got a CNSC perspective, if you allow Staff.

Go ahead.

**DR. DUCROS:** Carolyn Ducros, for the record.

There are just a few points that I wanted to make for clarification.

The assessment and the environmental assessment did take into consideration all fish, including the round goby, and under section 24 of the NSCA we concluded that there's no significant environmental effects to the aquatic IOTA.

I also wanted to add that, under the environmental risk assessment that we're expecting from OPG at the end of next year, we will be able to look a little bit more into whether the predictions are correct, and that will be halfway through. That will again be revised at five years, so halfway through the length of the *Fisheries Act* authorization.

And, finally, under the memorandum of understanding between DFO and the CNSC, CNSC takes on the roll of compliance monitoring and verification, so OPG has to report to DFO and CNSC on the *Fisheries Act* conditions. And we do, as part of our compliance

verifications, have inspectors go into the site, so our inspectors will be looking at procedures at the screens on a much more frequent basis.

**THE PRESIDENT:** Thank you.

--- Off microphone

**THE PRESIDENT:** Go ahead.

**MEMBER TOLGYESI:** Thank you.

I understand that stormwater, it's water that's coming from up and it's going into the lake by different ways. On your statement, on page 15, you are saying that, "As the population of Durham grows, the quantity of stormwater into Lake Ontario will increase."

Have you correlated the size of the population and the increase in the population to the volume of or quantity of stormwater released, if it doesn't depend on the number of citizens who are living there, it depends on other the considerations?

**MR. WILLIS:** Tristan Willis, for the record.

So I think where stormwater typically comes from is it comes from-- there are channels and ditches that collect the water and move it into the lake. So, typically, when water falls, say, for example, on surfaces that aren't paved, a lot of that

would be absorbed by the landscape. But as you have increased development, so you can imagine more parking lots, more roads, more subdivisions, what have you, that water will all then be channeled into ditches that are created and collected. Of course, as it passes over these areas it will pick up chemicals or metals or whatever happens to be on the ground or the buildings it lands on, and that will then be channelled into the stormwater ditches, catchments, and eventually the lake.

So even though there's a fixed amount of rain that falls, how much of that rain reaches the lake as stormwater is correlated to development and the amount stormwater ditches, subcatchments, et cetera, that are constructed. **MEMBER TOLGYESI:** So you expect that- - you are saying that it will be directed through channels, et cetera, to the lake. You expect that those contaminants will be on these places because it's more contaminants which are going, compared to one is absorbed in the ground and it's maybe, to some extent, filtered or not.

**MR. WILLIS:** That's correct.

If you think, for example, even of the Darlington nuclear site, you can imagine that before there was a facility there stormwater would have

fallen, most of it would have been absorbed into the ground, some of it would have run into the lake, it might have picked up some, you know, metal concentrations from the earth there, But since there's a large industrial facility now, the water that falls there and picks up- - you can see the whole list of chemicals and metals that we've highlighted. All of that is now being picked up and moved into the lake. None of that would have been happening before that facility existed.

So that just sort of gives you a sense of how, I guess, stormwater can change over time, depending on land use practices.

**THE PRESIDENT:** Okay.

Dr. McDill.

**MEMBER MCDILL:** I have two questions. The first is perhaps a little more meaty.

Is there a way for intervenors such as Waterkeeper and others to access the documents so that this confusion over how much and when can be read and interpreted.

I'm not sure if that goes to Staff or OPG. Is it posted, for example?

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

All of our documents for the hearing process have been posted. The environmental assessment work that we did

previous is posted on our website and available to intervenors. We can provide additional information. We have many opportunities for the public to participate at our facility. We do site tours. We have a community advisory committee where public members could attend. We also present at other forums. As Mr. Foster was describing earlier, we make presentations to councils, we make presentations to the Durham Nuclear Health Committee.

So the information is essentially quite easily available to people. Should there be some specific information that's required, we would certainly be amenable to providing that information.

**MEMBER MCDILL:** But the application to DFO in two parts, is it available at DFO, on your website? Is it available to interested parties, whomever they might be?

**MS EDDY:** Sara Eddy, Fisheries and Oceans Canada, for the record.

Those documents are available through the access to information requests.

**MEMBER MCDILL:** To Waterkeeper, did you try to seek out information of this nature when you wrote your submission, given that there's an EA?

**MR. WILLIS:** Just for clarification, you're asking about the DFO authorization specifically?

Well, we did get that information. I

think the problem, from our perspective here, is more a problem of both communication and care. You can imagine that for a small group like us, if we were to contact DFO or OPG and say, "Hey, we don't think you're in compliance," we typically are going to be dismissed. So it's often until a venue like this- - it takes something like this for us to get our opinion heard and to be listened to.

And so I think the really fundamental problem here, from our perspective, is that the language of this authorization- - and that's the legally binding document. It may be that DFO and OPG feel that there are some implied terms from DFO's- - or, sorry, OPG's application to DFO, but that's not a legally binding here, it's the DFO authorization.

And so when members of the public read this authorization, and it very clearly states terms, in this case that the maximum threshold is 2,200 kilograms of age 1 fish, I think the onus is on both DFO and OPG to make sure that those terms are clear, they're easily interpretable and that they're correct, and in this case we don't feel that that's the case.

**THE PRESIDENT:** But I was under the impression that those documents were available.

OPG or Staff?

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

I understand our application to the DFO specifically that we had was not made publicly available; however, we would be happy to do so. It's not something that we would hold through an access to information or freedom of information request. We've been working hard, as you have obviously directed us, to make sure that our documents are available.

What I would like to point out is that we had a stakeholder information session period as part of our application for this relicensing program, and in that we invited many of the stakeholders, including organizations like Lake Ontario Waterkeepers. So we do work with Lake Ontario Waterkeepers routinely, so that we can provide information that they would like to see. They've toured our facilities, they've participated in many of the environmental assessments, and we like to think that we would have an open relationship to share information with them.

**MEMBER MCDILL:** Another question, if I can ask Waterkeeper, and then you'll have a chance to respond at the same time.

This is not the first time that I've heard that goby is excluded, so it presumably is in our transcripts and would have given you another source of information even if you felt there was an access to

information.

Did you call OPG or DFO before you...?

**MS FEINSTEIN:** Pippa Feinstein, for the record.

It might be worth clarifying that our concerns are with the text of the DFO authorization, that if this is a term that is understood by both parties to apply to the facility that it be included in the legal language. You know we did have access to OPG's application to the DFO, and that was requested separately, and, you know, we have attended stakeholder meetings, and we are grateful for those opportunities to express concerns and get information that might not otherwise be publicly available, but that is aside from the issue of this authorization.

Ultimately, under the *Fisheries Act*, if there's to be an exemption, it needs to be in writing. And if it's in writing, it needs to clearly communicate what the scope of that exemption to the act is. In this instance that hasn't been done, because the round goby was not explicitly included in the authorization.

Now if this is a aspect of the authorization, then I think Waterkeeper would be very happy just to see it in the language so that other members of the public, when they consult this authorization, understand

the total number of fish kills that can happen at the site.

**THE PRESIDENT:** So will all of this get squared with the mention- - Staff just mentioned it was in the EA explicitly, so how come it didn't get translated into the authorization arrangement?

**DR. DUCROS:** Caroline Ducros, for the record.

When we make a determination under the environmental assessment or under section 24 of the *NSCA*, the measure that we use is the population level effect. The residual impacts after that are what needs to be authorized under a *Fisheries Act* authorization. So we don't think that there is a significant adverse environmental effect to the populations under the *NSCA*, and that was the conclusion of the *CEAA*.

The residual effect, I would turn it to DFO to talk a little bit about the difference between why round goby wasn't considered, but that's why we made our determination under the *NSCA* and under *CEAA*.

**THE PRESIDENT:** I'm trying to understand. So if there is no adverse environmental impact, then there's no need to put it in the authorization- -

**DR. DUCROS:** No, pardon me- -

**THE PRESIDENT:** - - is that what you're saying?

**DR. DUCROS:** - - there are different tests. So under the *NSCA*, it's population level effect. Under the *Fisheries Act*, you have to be authorized for the killing of fish, and that number is undefined, but it's in DFO policy. It could be one fish or it could be more, but it's not a population level effect, it's an effect to the local population.

I think Jennifer or Sara could speak more thoroughly to that.

**THE PRESIDENT:** Go ahead, please.

**MS WRIGHT:** Just to clarify, the exclusion of round goby is because they're an aquatic invasive species, both federally and provincially, so we would not ask any proponent to offset for that species. That's why it was excluded, and we concurred with the rationale provided in the application by OPG.

Sara can provide more information as to why we didn't specifically list that species in the authorization wording.

**MS EDDY:** Sara Eddy, for the record.

So Jennifer's correct, when a proponent applies for a *Fisheries Act* authorization, they submit an entire package under the regulations of the *Fisheries Act*, which includes the details of offsetting, mitigation measures, timing, et cetera. In this case that application

package is considered supporting documentation to the authorization, so we would not repeat all the information from the application in our authorization.

**THE PRESIDENT:** Okay, I'm going to move on.

Any...? Dr. McDill.

**MEMBER MCDILL:** This was the second one, sorry.

What is the status of Cootes Pond right now? Does anybody know, since it was raised as an issue?

**MR. DUNCAN:** Brian Duncan, for the record. Quite simply, I don't know. We can find out and get back to you on that.

**MEMBER MCDILL:** Thank you. By the end of the week maybe. Is it possible?

**MR. DUNCAN:** Absolutely

**MEMBER MCDILL:** Thank you.

**THE PRESIDENT:** Any other questions?

Okay, you have the final word.

**MS FEINSTEIN:** Thank you very much to the Commission and OPG and CNSC staff, Environment Canada and the DFO for answering our questions, for hearing our submissions. There are a couple of points that I'd like to make before we close.

The first is concerning monitoring. It's

impossible to manage what you can't measure, and so we sincerely hope that the Commission will encourage OPG to have a more stringent monitoring program, both for fish kills and for stormwater management. The more specific specifications of that monitoring- - or the recommendations that we're making with regards to that monitoring is in our written submissions.

And on the issue of the DFO authorization, as a member of the public I don't think it's unreasonable to read a permit and see that it allows a certain number of fish kills, and to assume that those are the four corners of the permit. I think it's a bit dangerous to require members of the public to have to call industry after they read a permit to see if that really does indicate what the permit is permitting, and that that's problematic from a public interest perspective.

Those are the two major arguments that I'd like to make to close.

**MR. WILLIS:** And I would only follow up with that, that I think- - we hope, at least, that you've seen that there is a real need for more monitoring here. There's evidence that there hasn't- - even after the position statement in 2007, there wasn't a *Fisheries Act* authorization. One of the terms of the *Fisheries Act* is that they have to report. They cannot kill listed species,

and if they do they should report this within, I think, a three- to five-day period.

Right now entrainment and impingement monitoring is scheduled for once a decade. So, I mean, there's just a bit of a disconnect between what the authorization is allowing and what will be happening with this sort of total lack of short-term monitoring.

And we also really want the Commission to consider imposing or attaching stormwater monitoring as a licensing condition.

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

We will now move to the next submission which is an oral presentation by the Mohawks of the Bay of Quinte as outlined in CMD 15-H8.6 and 15-H8.6A.

I understand that Mr. Shipley will make the presentation.

**MR. SHIPLEY:** Yes.

**THE PRESIDENT:** The floor is yours.

**CMD 15-H.6/15-H.6A**

**Oral presentation by**

**Mohawks of the Bay of Quinte**

**MR. SHIPLEY:** My name is Kevin Shipley. I'm with a firm called XCG Consultants. We're an environmental consulting firm and we were hired to represent the Mohawks of the Bay of Quinte to review the licence application documents and provide comment.

I have with me today Greg Mallette, also from XCG, who did the bulk of the work on the review, and Nicole Storms from the Mohawks of the Bay of Quinte. She's an environmental services coordinator.

So I hope that you have our submission which was originally dated September 28th, 2015 and then revised October 19th, 2015.

I'm going to be following that in my presentation and just hitting some of the highlights.

So, first of all, I'd just like to mention that we appreciate the funding that was provided in order to do this work, the participant funding program, and thank you for making it possible for us to review the documents and provide these

comments.

The Mohawks of the Bay of Quinte occupy territory called the Tyendinaga Mohawk Territory which is on the north shore of the Bay of Quinte. It's approximately 140 kilometres east of the Darlington facility. The Mohawks of the Bay of Quinte environmental unit have a mission statement that addresses the environment and it's in our letter at the bottom of the first page. I just want to read it for the record.

"The Environment is a gift and it is our responsibility as caretakers to protect it. A healthy environment means healthy people. Honouring diversity, respecting creation's life-cycle, embracing our interconnectedness to creation and...practising Kanyen'kenaka traditional beliefs and using the Ohenton Karihwate'hkwen as our guide are the foundation of a healthy and sustainable community for future generations."

The Tyendinaga Mohawk Territory is

about a 73-square kilometre area. It has a population of over 2,000 people and then it also has approximately 7,000 additional Band members who live off-Reserve.

So it is of critical importance to the Mohawks of the Bay of Quinte that environmental management of the construction activities and operations at the Darlington facility are carried out in a manner that will minimize the risk to the environment and that everything possible be done to prevent damage to the environment and damage to the health of people, especially considering the proximity of the Mohawks of the Bay of Quinte First Nation.

Now, in my presentation I'm going to be referring to a few of the documents that we reviewed. I have a list of them on page 2- - or at page 3 of the submission. And the main ones that I'm going to refer to are in the fifth bullet point, the Darlington Nuclear Generating Station Application for Licence Renewal, which I'm calling the Application for Licence Renewal, and then the last bullet point on page 3 is the Addendum to the Licence Renewal, so we'll call that the Renewal Addendum, and then the very last bullet point on the next page in that section is called the- - In Support of the Renewal of

Darlington's Power Reactor Operation Licence, and that I'm calling the Licence Renewal Support Document.

So we attended an Aboriginal information session on April 29th of 2015 and that is covered in section 2.2 of the submission. There were a few recommendations that came out of that session. They don't really specifically target the Darlington Licence Renewal process, but they're more general comments about the ongoing relationship between Aboriginal groups, OPG and CNSC. And so those recommendations are mentioned at the bottom of page 4.

OPG is to review opportunities for enhanced notification processes if an event were to occur, and I'll touch on this a little bit more later on.

The second one is, OPG is to investigate options and report back to interested participants around the potential for enhancing the site monitoring program to reflect Aboriginal interests.

And then another one is with regard to the 30-day review period which is typical for documents that are published by OPG and that we would like to see - - the Mohawks of the Bay of Quinte would like to see a longer period. Thirty days is often not

sufficient for this organization because of the time required to assign limited staff to review these documents, report to Chief and Council and receive feedback from Chief and Council. So we'd like to see a longer time line.

So these are general comments for consideration for future situations, and we'd like to see a time line for addressing these comments.

Now, moving into sort of the main points. Yes, okay. So this is page 6 I guess, or is it- - is that 4?

**MR. MALLETT:** Yes, that will be page 4.

**MR. SHIPLEY:** Page 4, okay. Sorry. I think I'm getting my pagination wrong.

On page 4, section 3.1, we're concerned about nuclear waste management. We do understand that the majority of shipments of nuclear waste from this facility go towards the west to the Bruce Nuclear facility, the Western Waste Management facility, but nevertheless, if there were a change in plans or a change in the shipment of the waste we would require- - or we would ask that the Mohawks of the Bay of Quinte be notified about such a change.

There are some shipments that go to

the Chalk River facility, small amounts of waste and that is a potential concern. We do understand it's a small amount, but we would like to have - - any shipments of waste, that notification be provided to the Mohawks of the Bay of Quinte in advance of those shipments because Highway 401 passes in close proximity to the Tyendinaga Mohawk Territory.

We're also concerned about the establishment of an underground storage facility which is contemplated for the future. I know it's not part of this licence application, but just for the record, the Mohawks of the Bay of Quinte are not in favour of such a facility.

In terms of radiological releases, on the next page, section 3.2, we have the concern about the release of tritium and any other radioactive substances from this facility, we'd like to see much - - very close monitoring and control of these types of releases. The Mohawks of the Bay of Quinte depend very much on the health of fish and the fishery in the lake and so any effects, negative effects on fresh water aquatic life are a potential problem for the Mohawks of the Bay of Quinte and their livelihood.

Section 3.3, environmental spills.  
This section goes into talking about several spills

that have occurred in 2009 and 2013. Although those spills were judged not to have had a significant environmental impact, nevertheless, they indicate a potential problem for future spills to have potentially larger impacts.

And, again, because of the dependency of the Mohawks of the Bay of Quinte on the fishery in the lake, this is of concern and it's important to ensure that any such spills are prevented, if possible, that mitigation programs be in place for these and that in the event that any kind of spill that could have a more wide-ranging effect were to occur, that we would want to see action taken to notify the Mohawks of the Bay of Quinte regarding this.

How much time do I have left?

**MR. LEBLANC:** You've already exceeded.

**MR. SHIPLEY:** Already exceeded?

**MR. LEBLANC:** Yes, so if you could just summarize it really clear points, the Members have read all the submissions, they'd like to ask questions, if possible.

**MR. SHIPLEY:** Okay.

**MR. LEBLANC:** Thank you.

**MR. SHIPLEY:** Just give me a minute

and I'll wind up.

The section 3.4 in terms of the- - the first portion of that was based on a document that doesn't actually apply to this licence renewal. It was to do with the new build EA and it was just a bit of confusion regarding which documents were applicable and which weren't. But we are, nevertheless, concerned about thermal impacts on the lake and about chemical releases and that's outlined there.

And then skipping just to seismic events, section 3.6, we are concerned that the refurbishment be done in a manner that maximizes the facility's resistance to seismic events.

And also just as a final note, we mention tornadoes in the last paragraph of section 3.6. It isn't really covered in the risk assessment summary report, it's excluded, high winds are excluded from that. And, in addition, things like terrorist events, missile strikes, things like that that are a potential concern for a facility like this, we don't see it covered in that report and I'd like to know where that type of thing has been covered and addressed.

Thank you very much. I think that covers what I had to say.

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

We did read all of this, so we now can get into some specific questions.

Who wants to start? Mr. Tolgyesi...?

**MEMBER TOLGYESI:** This is to OPG. The interveners were saying that they are about 140 kilometres east of your facilities. What is the communication strategy in case of unplanned release and what distance is covered for communication purposes? Do you consider, for instance, winds or some other conditions to communicate with the communities and municipalities and wind direction?

**MR. DUNCAN:** Brian Duncan, for the record.

As you know, the management of communications off-site is the responsibility, of course, of the Provincial Nuclear Emergency Response Plan, as well as, you know, working with Durham Emergency Management Organization as well.

What I can tell you is those plans are robust, those plans consider things like the type of release, they consider the atmospheric conditions at the time of the release, they consider things like wind direction.

I think for further details on that I

think I'd like to ask my colleague Laurie Swami to offer any insight.

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

It's important and important to OPG that we have very good relationships with First Nations communities and one of the areas that we're looking to enhance is our communications with First Nations in the surrounding communities. A hundred and 40 kilometres may sound like a long distance, but we think it's important that we continue to communicate and build that relationship and that's what we intend to do and we're working with the First Nation to achieve that.

**MEMBER TOLGYESI:** And my second is, intervener is saying on page 7 of 9 that- - is mentioning:

"According to SENES Report, extensive lake infilling and shoreline protection associated with refurbishment...will remove about 40 hectares of near shore habitat."

Is there- - for lake infilling, are you doing that and is it necessitating a specific

permit because when you do that in the lakes it's necessary, so- - and how you will- - it is temporary or it is permanent situation, when lake will be infilled, that means that's it?

**MR. DUNCAN:** Brian Duncan, for the record.

I suspect this may be referring to the new build proposal. As part of the refurbishment we're not doing any lake infill. You know, as part of the refurbishment we are creating some new settlement ponds and the like for parking lot run-off, we've installed some new parking lots, but there's no significant lake fill or excavation going on of that nature.

**MEMBER VELSHI:** Question for OPG. On page 3 of 10 the intervener is requesting OPG to enhance the environmental monitoring program. Any comments on that, on what you're planning on doing? And I'll ask the CNSC as well with the independent environmental monitoring program, are you looking at that as well?

**MR. DUNCAN:** Brian Duncan, for the record.

You know, fundamentally it was good feedback. We have a pretty extensive environmental

monitoring program in place, we sample water, we sample milk, we sample vegetables and fruits grown in the area and the feedback we got from the First Nations were that they would appreciate if we could include some plants and foods that we may not have traditionally considered.

So we're absolutely going to look at that and see how we would manage it. Haven't quite got that answer, you know, how it will be going forward, but we're absolutely going to take that feedback and act on it.

**MEMBER VELSHI:** I think the intervener wanted to get some sense of a time line on that. So do you have something in mind?

**MR. DUNCAN:** Brian Duncan, for the record.

Laurie is telling me she's got that.

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

So OPG does intend to expand the program to include traditional plants and harvest goods. We plan to begin that in a pilot program next year in 2016. We will be working with First Nation communities to help us to understand the important products to include in that study.

With that, we plan to issue a report on a regular basis as a result of the work that we do.

**THE PRESIDENT:** CNSC staff, you also have a lot of experience in doing some traditional food, et cetera, monitoring. Are you going to apply it here to Darlington, Bruce, et cetera?

**MS FRANCIS:** Kiza Francis. I'm the Director of the Environmental Compliance and Laboratory Services Division. For the independent environmental monitoring program at the CNSC we do send letters out to Aboriginal groups before we went on our sampling trips this year and in those letters we offer the opportunity to talk about the sampling plans for future years and how we can enhance them based on Aboriginal groups' interests.

And we also could, in discussion with Aboriginal groups, provide a special program to look at specific interests that they might have.

This year's Darlington independent environmental monitoring program results aren't in yet. We have last year's results and something we can do too with Aboriginal groups is meet with them to talk about, when the results come in and explain what those results mean.

**THE PRESIDENT:** Thank you. Dr.

Barriault...?

**MEMBER BARRIAULT:** Thank you, Mr. Chairman.

You know, in the submission there's a comment made that there was a 6,000-litre oil released from a heat exchanger. Do we know what kind of oil that was? It wasn't PCBs or anything, was it?

**MR. DUNCAN:** Glenn Duncan, for the record.

No. I recall, Commissioner, we gave an update on that at the yearly, but that was turbine lube oil specifically, it was from a seal oil heat exchanger on the generator. It has low, not proud of the volume, but it has low impact on the environment, it's not a PCB-carrying material.

**MEMBER BARRIAULT:** Yeah, light oil.

**THE PRESIDENT:** Question? Dr. McDill...?

**MEMBER McDILL:** First question. Do the Mohawks of the Bay of Quinte have the capacity to respond to CNSC requests, for example, of what natural foods are Native specialties you might wish to have harvested?

**MR. SHIPLEY:** We don't have the answer to that question right now, but we could certainly

respond back on that once we consult with some people back at the Band office.

**MEMBER McDILL:** Thank you. The second question or comment, with respect to item 7 on page 9 of 10 which is the issue of tornadoes and other natural disasters, et cetera, could I ask staff to address where the intervener could access information like that relatively easily?

**THE PRESIDENT:** Are we talking about seismic particularly?

**MEMBER McDILL:** There's a list of them on 7, item 7.

**THE PRESIDENT:** No, the reason I'm asking is because I think we have an expert from NRCAN that can talk about seismic issues.

**MEMBER McDILL:** Well, that would be a very good time to do it, yeah.

**THE PRESIDENT:** Sorry.

**MEMBER McDILL:** Yes.

**THE PRESIDENT:** Okay. NRCAN, can you hear us?

**DR. ADAMS:** Yes. This is Dr. John Adams here for Natural Resources Canada. The question was about where the data can be found. The location for earthquakes can be downloaded from our website

earthquakescanada.ca. If the specific request is needed, we can do it manually, but it is available on the website.

The specified earthquakes that were talked about, the 5.0 and the 5.2, are actually in western Québec, they're quite a ways from the Darlington plant and so they're not actually particularly relevant in terms of a seismic hazard.

Thank you.

**THE PRESIDENT:** So let me understand. So it's not likely to have a severe seismic event at that particular place?

**DR. ADAMS:** (off microphone)  
earthquake where those two earthquakes occurred which is western Québec on the north side of the Ottawa River would not be a damaging effect at the Darlington nuclear plant, however, the seismic hazard assessment does include the effective shaking of an earthquake of that size and larger close to the plant.

**THE PRESIDENT:** Do you want to query the expert?

**MR. SHIPLEY:** Well, I think, you know, it could be that some earthquakes that have been mentioned in my letter might be some distance away, but I think the point is that there is potential for

larger earthquakes to occur in this area. I'm not an expert on faults and earthquake occurrence, but I think the fact that there are earthquakes that have occurred within a few hundred kilometres of this location indicate that there's a possibility of a larger earthquake occurring in this area.

But I was also curious to know about, in addition to earthquakes, other natural disasters such as tornadoes. They don't seem to be addressed in that particular risk assessment report I was referring to, and fairly large tornadoes have occurred in Ontario. For example, in Barrie a tornado of a magnitude EF4 occurred in 1985 and a tornado that large can destroy a brick building and reduce it to rubble.

So I guess my question is: I am assuming that this has been looked at for the Darlington facility and for the upgrades that are going to be made, but where, in what documents have tornadoes been looked at and in what documents have terrorist actions been addressed in terms of the resistance of the facility to these types of things?

**THE PRESIDENT:** Well, we will start with OPG and then with staff.

**MR. DUNCAN:** Brian Duncan for the

record.

Whether it's a seismic event, a sustained high wind, flooding, other natural disasters, that analysis is done as part of a probabilistic safety analysis for the site. We consider all of those implications.

You know, if you look at the site and you look at the capability that I have today, the emergency power generators for example are in structures so robust that they are tornado structures, if you will. As we add a third emergency power generator, that structure will be even enhanced further.

And then we have done things on our site, not only in the design in the construction site, how robust the structure is, how thick the concrete is, how well reinforced it is, we have done other things with our emergency mitigation equipment. So, for example, we locate some of these critical pieces of equipment away from the power plant, up on a hill. We locate it in a structure that if high winds were to hit it, the structure would actually blow away but the equipment itself is anchored firmly to a very sturdy, robust foundation. All of that is to give us flexibility for whatever, whether it is a high wind

event, whether it is a seismic type event, to be able to respond to that.

What I would offer is some of the security features, the design basis threat for terrorist or other activity is not something you would see us talk much about in public. Yes, of course analysis has been done. That analysis is of course a requirement with the regulator and it is kept very private, though, for obvious reasons.

**THE PRESIDENT:** Staff?

**MR. HOWDEN:** Yes. Barclay Howden speaking.

I think one of the questions that the intervenor had asked was where do they find this information and I think in some cases it's hard to find, in some cases it's not. I know with OPG, they posted a summary document of their probabilistic safety assessment on their website that probably talks to these issues but perhaps maybe not in the level of detail that someone might want.

Mr. Duncan spoke about the seismic. I think one of the questions the intervenor has was, okay, so for refurbishment, is this being taken into account, and the answer is yes, for any new equipment that's going in, anything existing, OPG has done a

reassessment to make sure that it meets the modern codes and standards.

Tornadoes, I don't know if it is in the report but that work has been done. So it is a case of where could the intervenor find that information. And tornadoes actually generate missiles, because one of the points raised by the intervenor was what about missiles. I think you might think of someone firing a missile but a tornado generates a lot of missiles and I think OPG has demonstrated that the site has the robustness to withstand things being thrown around at a very high speed.

In terms of robustness, this has been assessed. Some of it has to do with security, so it's not public information. But we can say from a terrorist perspective- - Mr. Duncan talked about the design basis threat- - Canada just underwent, finished last week a two-week international mission where international folks came in and assessed the Canadian regulatory program and the licensees in terms of being able to withstand- - it's all to do with physical security, which includes terrorist attacks, and Canada got a very high rating within the review as one of the leaders. So there will be- - because its

security-related, there won't be a lot of information out but there may be a high-level summary document.

So from our perspective, you folks have a good connection with Kim Noble who works with us, and we are more than happy to try to help you find anything that you need that maybe OPG hasn't been able to provide.

**THE PRESIDENT:** Thank you.

Question? Question? Any final comments?

I have a question. You mentioned 30 days, you think it's too short. What do you think is a reasonable length of time that you need for us to consult or for OPG to consult on some documentation?

**MR. SHIPLEY:** I would say maybe 90 days would be helpful because we need time for an expert to be hired to review the document or for staff to take the time to review it, to present it to Chief and Council, which only meets periodically, and to be able to provide feedback. So I would say 90 days.

**THE PRESIDENT:** Thank you.

Any other final comment?

**MR. SHIPLEY:** No. I think just to reiterate that one of the most important aspects is the quality of the lake water, the fish populations

and the health of the freshwater aquatic life, that is a very important aspect to the Mohawks of the Bay of Quinte as well as anything to do with disasters, shipment of waste. We would like an enhanced level of communication where anything that could potentially affect the Mohawks of the Bay of Quinte is communicated in advance as early as possible to allow the MBQ to respond and take appropriate action.

**THE PRESIDENT:** Thank you. Thank you very much.

**MR. SHIPLEY:** Thank you.

**CMD 15-H8.18**

**Oral presentation by**

**Organization of Canadian Nuclear Industries**

**THE PRESIDENT:** We will now move to the next submission, which is an oral presentation by the Organization of Canadian Nuclear Industries, as outlined in CMD 15-H8.18.

Mr. Oberth, you have the floor.

**MR. LEBLANC:** Can I just make an announcement?

**THE PRESIDENT:** You want to make an announcement?

**MR. LEBLANC:** Just so everybody knows where we stand in terms of scheduling, we will have a dinner break right after Mr. Oberth and it will be a 45-minute break. So if some people need to plan, I just wanted to give you advance notice. Thank you.

Mr. Oberth...?

**MR. OBERTH:** Dr. Binder, Members of the Panel, for the record, I am Ron Oberth, President and CEO of the Organization of Canadian Nuclear Industries, which I will hereinafter refer to as OCI.

This is a verbal presentation that supplements my written submission to the Commission or the Panel as of on September 28, 2015.

First of all, the organization that I represent is a trade association representing approximately 190 suppliers of equipment and services to the nuclear industry. So therefore, the Association that I represent is both a stakeholder in the licence approval for the continued operation of Darlington as well as a valued contributor in that companies that I represent supply quality equipment and services to Ontario Power Generation.

For reasons that will become evident in my submission, OCI supports the application for a 13-year operating licence for Darlington Nuclear

Generating Station.

First of all, as you have seen from the submission from Ontario Power Generation, Darlington is one of the best performing stations in the world. Three of its units ranked in the top 10 percent of all operating stations and it is well known across the nuclear industry sector and the generation sector that top-performing plants are also extremely safe plants. So the evidence supports the fact that Darlington is being operated by a world-class utility and has demonstrated that for its 20 years of operation.

In 2014, a WANO peer review rated Darlington as one of the top-performing plants in the world. So the evidence is there that this plant is well maintained, well operated and continues to achieve extremely high performance records and extremely high safety standards.

Reliable and cost-effective electricity has always been a cornerstone of Ontario's economy and we would assert that the 3500 MW of power that Darlington supplies to Ontario at a cost of just over five cents a kilowatt hour is crucial to the economic and environmental well-being of the province. Removing 3500 MW of clean, low-cost power would have

serious environmental consequences which I will outline.

As you know, Ontario has been a leader in the environmental area by being the first jurisdiction in North America to remove all coal-generating plants. In April 2014, the last coal-burning plant in Ontario was removed from service. So currently, we have one of the lowest greenhouse gas intensity systems in North America and that is largely because of the performance of the nuclear power plants. In 2014, nuclear power produced 62 percent of Ontario's electrical energy and of that portion Darlington alone provided 30 percent of that amount.

So we are an environmental leader and I would also assert that one of the most serious issues facing the planet today is climate change. We know now that 2014 was the hottest year on record and so anything that we can do as a province and as a country to produce power in a way that minimizes greenhouse gas generation is important to the well-being of the province and all those of us who live upon it, including species and humans.

So to back up that assertion, OCI, in co-operation with the Power Workers' Union,

commissioned a report in 2013, as part of our submission to Ontario's long-term energy plan, that compared the environmental, economic and price impact of two scenarios, one scenario which used more wind and less nuclear and the other scenario which used more nuclear and less wind.

That submission was part of a report, which is on the record, done by a company called Strategic Policy Economics and it was submitted as part of our submission to the long-term energy plan in 2013. The results looked at those two scenarios over a 20-year period.

Just to summarize those results, which are included in my submission, the nuclear option resulted in electricity rates which are approximately 10 to 20 percent lower than going with an option that depended upon wind, of course backed by gas generation to fulfill the gap where the wind doesn't blow.

We also compared the economic impacts of the two options and because nuclear option creates so many quality long-term jobs in the Province of Ontario, largely in the member companies that I represent, that option would deliver \$60 billion of greater economic benefit than the higher wind/gas option over a 20-year period.

The nuclear option also created 107,000 more person-years of employment than the other option. And the most important factor is the environmental benefit and that is the nuclear option resulted in 107,000 fewer tonnes of greenhouse gas emissions over the 20 years.

So I just want to conclude by saying it is critical that we continue to operate this plant safely, that it continues to produce valuable and clean power for the Province of Ontario so that we can continue to show the leadership that we are all very proud of Ontario as one of the cleanest and lowest greenhouse gas emission jurisdictions in the world.

Thank you for your attention and I am happy to take any questions.

**THE PRESIDENT:** Thank you.

Questions? No questions? I guess it's very clear then.

Thank you. Thank you very much.

We are now going to take a 45-minute break. So we will get back at 7:15.

--- Upon recessing at 6:27 p.m. /

Suspension à 18 h 27

--- Upon resuming at 7:18 p.m. /

Reprise à 19 h 18

**MR. LEBLANC:** We are just missing one Commission Member. We can't start until he joins us.

**CMD 15-H8.25**

**Oral presentation by Louise Lanteigne**

**THE PRESIDENT:** Okay, we are back and we will move to the next submission, which is an oral presentation by Ms Lanteigne, as outlined in CMD 15-H8.25. Over to you.

**MS LANTEIGNE:** Yes. I have a PowerPoint presentation. I'm just not sure how to get it from here- - oh, there it is, okay. Now, we can begin.

So I'm just basically showing how over the past 10 years approximately \$65 million has been spent addressing the issue of algae and mussels because they pose a serious risk to the nuclear power plant and I understand that health, safety and security is the priority of the Board but it is also enmeshed with economic issues as well and the viability of the project and the totality.

So here is the concern. Those little

critters in the pipe are the zebra mussel. They form almost like a cement type thing. Once they get into the infrastructure, they are a real bear to clean up. And also the kind of discharge they emit at the base is a corrosive material.

So Ontario Power Generation estimates that as a direct consequence of zebra mussel its operating costs increase between \$500,000 and \$1 million per year at the Darlington and Pickering Nuclear Station. If you go further down, it says it has spent \$20 million installing, maintaining chlorine applicators- - that's chlorine- - at its Great Lakes facilities and has spent \$13 million on research to reduce or eliminate chlorine. So the only solution they have going is the one they are trying to phase out. So what's the next answer, I have no idea. That is the Auditor General of Canada's report.

The next picture here shows those are muscles clogging in the water intake equipment. That costs millions of dollars each year to clean. This photo was taken by Ontario Power Generation.

Methods being used to curb zebra mussel. OPG was using chlorination with sodium hypochlorite in order to manage the zebra mussel. I have no information on any alternative process. And

that is according to the CNSC record of proceeding, reason of decision from 2012. So the problem of using this particular chemical- - let's give a little background.

The zebra showed up in 1988, so it wasn't that long. So if you add from this point another 13 years, you also have to excavate the population of those muscles. So the problem is not getting better. We are not getting rid of them. They are a problem at Christmas Lake, Lake Winnipeg. Literally, there is no solution for this animal to date that is a long-lasting solution for our Great Lakes.

What they did find was that the chemical that they used was making the PVC piping very brittle. The pumps broke down and the automatic systems became dysfunctional, and because the systems broke down a lot, there was not much continuous treatment of the mussel issue taking place.

So the system was becoming very labour-intensive to operate and ultimately it was a system that resulted in ineffective treatment. And this is according to redesign of the sodium hypochlorite treatment approach for zebra mussels at Niagara Plant Group Generating Stations. Tony Van

Oostromd and also Ontario Power Generation's Kelly Peterson was involved with that. So there is no plausible deniability. They know the issue. Where is this information in the current application?

Questions regarding zebra mussel. How effective is the current management program? Has any progress been made to achieve a chloride-free alternative? Are the costs of zebra mussel management included with the permit application? And do the costs of zebra mussel management include the chemicals and replacement of infrastructure and the projected lost revenue for downtime?

The next issue I have regards that stuff on the ground. That's called Cladophora. If you have ever gone to a beach and ended up with seaweed in your shorts, you probably found a very hair-like substance type of seaweed. Around the Bay of Quinte, as a kid, I used to take it and throw it at my sisters and it would smack them in the face and stick. These things are very fibrous, very light, and they float at all levels of the water. So I used to go scuba diving in the Bay of Quinte and the stuff would be in the water meandering about with me. So it doesn't just stay at the bottom nor does it float on the top exclusively, it is all levels of the water.

So over here we have seen a dramatic increase from 1981 to 2013. Now, that's an important timeframe because it correlates in part with the use of the chlorine to get rid of the muscles at Darlington and Pickering.

Substrate conditions that existed between Pickering and Darlington during the 1980s. These are studies done that have showed a habitat that is not impaired. You could dive around that area and see rocks with spaces and sand and gravel and different sediment types and that kind of habitat is great for fish that lay eggs.

And at the discharge point of Darlington is an endangered fish known as the Round Whitefish and those sediment types are necessary for the eggs to overwinter to the point that they can survive and breed effectively in this zone. That is a federally protected species. It violates the *Endangered Species Act*, the *Fish and Wildlife Conservation Act*, the Department of Fisheries has legislation for that. It's a huge issue.

And what happened was that in the summer of 2013, after the chlorination was going on, it kind of co-relates, it is almost entirely obscured with Cladophora growth. That means you dive in, all

you see is the algae. You can't see the rock, you can't see the soil. All you see is algae. There is nothing else to see.

These animals lost their habitat. They cannot breed in the sediment because you can't see the sediment. There are mats, thick, thick, thick, between the rocks and the fish have had an effect from that. There is no visible sand and gravel, rubble, cobble, boulder or bedrock in the vicinity of the existing outfall and beyond.

And that is proven in this study. That is by EcoMetrix and that was a field investigation of Round Whitefish habitat along the north shore of Lake Ontario. And the City of Ajax has that, there is no plausible deniability.

Near shore off the Pickering Plant, this is what you see. That's what you see. All it is is coated with algae. It's thick, there are little bits floating in the water, and that is what's getting into the intake and it's a very costly issue because we have to close down the plant and clean it. That's how they do it, they have to close the plant to remove that stuff, and there is no issue on- - no long-term solution.

So is it possible that the use of

sodium hypochlorite to control zebra mussel resulted in that? Is OPG still at risk of losing more than \$30 million in lost power generation at Pickering and Darlington over a 10-year period to clean that algae? That is what they have already spent. How are issues of Cladophora being addressed currently and what measures are there in place to avoid these costs? And are these risks along with the projected downtime and maintenance included in the cost analysis of the current permit application?

I see a risk for the Bay of Quinte when I see a breeding ground for algae in the Lake of Ontario. That will have downstream impact. It can't not have downstream impact. That stuff moves and it breeds and it produces and it increases. So we have to figure a way to not allow that damage to spread.

And believe me, algae is not a fun issue. We have blue-green algae all over Lake Erie. The zebra mussel issue is the reason why my municipality of Waterloo might not ever get a pipeline to Erie. I have been working on that issue for 10 years. There is no solution for it. If there were, I would have found out years ago. I live in the number one hub for water research in Canada and I am friends with a lot of the professors. We don't know what to

do with zebra mussel.

So another concern I have has to do with this. That's Line 9 traverses from Sarnia, goes right north of both Darlington and the Pickering Station and I am concerned because we already have a case history of what it's like when there is an oil spill in proximity to a nuclear plant.

That took place in Salem Nuclear Generating Station in New Jersey. There was a boat called the Athos 1, it hit the bottom and it leaked oil. That oil was 40 miles away from the plant but it ended up getting inside the infrastructure because the oil that spilled was almost like a diluted bitumen content. It remained in the middle reaches of the water. It did not float, it did not sink.

It entered the infrastructure and as a result, December 3rd, small sticky bits of oil began showing up in the screen on the plant's cooling water intake. So to keep them from becoming clogged, the plant decided to shut down two nuclear reactors the next day. So it was shut down for 11 days- - that's on the next page here. It was shut down for 11 days to prevent the heavy submerged oil from clogging the water intake, and closing that cost \$33.1 million. That is from NOAA, a good source.

We know here that Line 9 has already had spills, almost one spill a year over the course of its history, and I daresay there is more than that, but the total spill, according to CTV news, was 3,065,359 L, or if you want to translate that to barrels of oil, 19,280.53 barrels of oil in Lake Ontario from Line 9. Okay?

I was a delegate at both Line 9 hearings and I know that pipe is going to blow the minute they put oil through at the rate that they are going to do. It's not safe and it is a national security risk, in my view, but that's not the topic.

What is the topic in this. We know that the Line 9 has approved it, that leave to open has been granted on condition of further study. We also know that TransCanada acknowledged that the heavy oil sands crude could sink. They admitted that during the U.S. State Department reports regarding the Keystone XL. So diluted bitumen will not float. It will stay inside, potentially getting into the system.

So what I want to ask with this pipeline that has over 90 percent chance of rupture are these following questions right here.

What if a major pipeline spill from Line 9 occurs and discharges in a sewer or a tributary

north of where you're at with the plant?

What is the projected time it would take for the spill to reach the intake zone at Darlington, or Pickering for that matter?

What is the projected response time for Enbridge staff to arrive? Because with the current protocol, the first response is the firefighters come to the scene, and they don't have the booms, they don't have the equipment. Their only job is to keep people away from the spill and to hold the fort until Enbridge's clean-up staff comes. Where is the nearest point where Enbridge's staff has to leave to come to the plant to deal with the spill? What is that timeframe? We need those answers. We need a plan.

Has there been any dialogue between Enbridge and OPG regarding emergency measures needed to address a spill from Line 9 in proximity to Darlington?

Are booms big enough? Would they be effective should the heavier crude/diluted bitumen sink below the surface?

What if a pipeline rupture takes place in the winter when there is ice obstructing the clean-up? What can you do if there is ice? You know,

how can you break the ice without equipment if it's not safe to walk on and how do we stop a spill like that that's under the ice?

Who pays for the lost revenue and associated cleanup cost if a spill happens? Because it is going to be a big bill. Who is it going to hurt? We need to figure those liability risks out now.

So here is my view. We can avoid the problem by considering these things. Massive amounts of water for the cooling system in the age of climate change. Hot, dry summers. Okay, if Lake Ontario gets too warm to cool, what do we do? I want to know what OPG's plan is. Are we going to build a giant fridge beside the plant?

Right now, those are where all the water crises are occurring right now regarding energy systems. Right here we have options available to us and I will add to this concept of solar and wind the fact that Elon Musk released the Powerwall, which can hold 10 kW of energy in a week or 7 kW a day, take your pick. It's a \$6,000 unit that he released for residential homes and what happens is you have solar panels. With that power, it can offset whatever time you need the energy. You can turn it on in the middle

of the night. You don't need the sun on to store that energy in the lithium battery. It's only \$6,000. He made it public last May. The sales of it have jumped up nine times. It is selling like hot cakes.

So basically your market is dying. As a nuclear industry, your market is dying because people are going to go off grid as soon as they can. I'm looking forward to it the next time I do my roof because I am putting up solar and I'm getting that storage.

Okay, the thing that might hurt us most in the end might be the economic risk and the economic risk is in losing clients and not having enough money to close the plant down safe. We have money now to start phasing it out. What happens in 13 years when there is no market for your energy and then the bill comes in to shut it down?

So that is what I have to present today.

**THE PRESIDENT:** Thank you. Thank you very much.

**MS LANTEIGNE:** You're welcome.

**THE PRESIDENT:** Comments? Who wants to start? Monsieur Harvey?

**MEMBER HARVEY:** Monsieur le Président,

there were many questions in that presentation but I would like to turn to OPG to comment about the zebra mussels. Is this really an issue for you? What are you doing and what is the trend?

**MR. DUNCAN:** Brian Duncan for the record.

Absolutely. You know, when Darlington was designed and constructed, zebra mussels did not exist in the Great Lakes and they do today. So certainly, the aquatic environment has changed significantly.

Chlorine is still our preferred method of killing the villagers, the small, the young, if you will, of the mussels to prevent them from attaching inside cooling water lines and other systems inside the power plant. And what we now do, what we have learned over the years is how to manage that chlorine addition system, manage it more effectively, keep it in service much more reliably. And as well we have added a dechlorination system. So I continuously chlorinate the intake water for my cooling systems but I dechlorinate it before it's returned to the lake. That's very important to know that.

The other thing we have seen in the ecology of the lake that has changed is because the

zebra mussels are such effective filter feeders they have actually clarified the lake. The light penetrates much deeper into Lake Ontario than it did years ago. One of the consequences of that is you see growth like Cladophora, which depends on other nutrients in the water, but what you now see is more of that growing due to deeper light penetration. The effect of that for my power plant is reduced significantly from a utility that might draw surface water, you know, a township or whatever, with a deep water intake. Where I run into trouble is there are seasonal die-offs of Cladophora and then I can pull that into my intake.

One of the things I have had to do and one of the things I'm doing now is I am upgrading the screens that I use to basically coarse filter that material out of the cooling water stream before it reaches those critical pumps. I am in the process of replacing all of those screens with ones that are heavier and able to withstand a heavier loading, if you will, of algae and other growths. That is important to me because, you know, at the end of the day the objective is to run the plant reliably and run it predictably.

If I run into trouble for some reason

with excessive clogging of those screens, I will derate units. I will do the safe thing right off the bat. The key is I don't want to have to be in that position, though. I can manage this. I can manage this with the right kind of equipment. I am putting that equipment in.

We have had a lot of success with where we are today with our chlorination and dechlorination system. We monitor when we take systems apart. We monitor and we look for live zebra mussels. We don't see those. We still see shells. Because I am a bottom intake I tend to vacuum shells into the intake canal. I have to manage those shells so I have divers that routinely are keeping my intake canal clean. I have strainers in some of my critical systems to ensure shells don't get down those lines.

You know, fundamentally, we think we are managing that pretty well today. It's been a very long time since I have taken- - opened up a system and I have seen any live- - evidence of live mussels.

**MEMBER HARVEY:** Thank you.

Yes, madam.

**MS LANTEIGNE:** I'd like to give a brief comment.

In regards to the zebra mussels, the

reason why the eagles aren't returning around Lake Erie is because the zebra mussels are stirring up all the DDT and all the trace minerals that have been at the bottom of the ocean- - or not the ocean, of the bottom of the Great Lakes.

We are seeing a resurgence of the old toxins being flushed up from the bottom because of these animals. It's not like that- - you might see a clear glass of water. What you don't see is the aquatic toxicology inside it.

So we already have statistical data on that. I follow the Canadian Water Quality Network and I am a member of the Grand River Environmental Network as well as the Council of Canadians and a host of water supporting agencies.

I actually secured a request for a review for an environmental bill of rights on the protection of the water and the rain. And the Lake Erie Pipeline issue we can't figure out how we could possibly hedge our bets on Lake Erie Pipeline with the blue-green algae issue and the zebra mussels. We can't figure it out. You might have cloudy flora today. You might have blue-green in Lake Ontario in the future. We don't know how fast this stuff is going to spread. But what I am concerned of is what

happens when the critical mass is surpassed.

**THE PRESIDENT:** What does it have to do with OPG wanting a nuclear power plant? Are they causing it?

**MS LANTEIGNE:** Well, the constant- - no, no. We have to prepare for these risks. My position- -

**THE PRESIDENT:** Sorry. I am missing something. We are talking about health and safety and impact on the environment- -

**MS LANTEIGNE:** Correct.

**THE PRESIDENT:** - - from operating a nuclear power plant.

**MS LANTEIGNE:** Correct.

**THE PRESIDENT:** I want to understand. Are they operating- -

**MS LANTEIGNE:** Because the chlorine treatment could flag an issue of aggravating the current situation. Their remedy of dechlorination, to what extent are you dechlorinating it? We're still going to have stormwater runoff with growth. We're still going to have salt emitted from municipalities going into the bay doing the same thing.

We have high salt and the- - was it- - the runoff in terms of the phosphate, the nitrate and

the chloride is aggravating algae growths all over. There have been mass extinctions several times on this planet due to algae alone and we have to make a plan on how these risks are going to be reasonably addressed because our- - right now- -

**THE PRESIDENT:** Risks by whom?

**MS LANTEIGNE:** Well, that's it. We need to- -

**THE PRESIDENT:** Listen.

**MS LANTEIGNE:** - - create a plan in conjunction with all parties who can have a say on this. We need Department of Fisheries on board. We need the fisheries working in partnership with the nuclear industry working in partnership with anyone who has localized knowledge of the loadings that are generating these issues so we can circumvent risk because if the system gets clogged up and if design constraints get surpassed we could see a nuclear accident as a result of these issues.

**THE PRESIDENT:** Okay. Thank you. Anybody else?.

M. Harvey...?

**MEMBER HARVEY:** I would put it to the staff just to ask if that chlorination and dechlorination process has been taken into

consideration in the EA and have you evaluated any impact on the lake from that process?

**MR. McALLISTER:** It's Andrew McAllister, Director of the Environmental Risk Assessment Division.

So yes, to confirm your question, it was looked at in the Environmental Assessment and that was done under the *Canadian Environmental Assessment Act* and, as Mr. Duncan has laid out, chlorine is used. It's optimized. They are regulated provincially on that by the Ontario Ministry of Environment and Climate Change and, further, the examination of that particular element is looked at - - was looked at in your environmental risk assessment.

So the intervenor has raised concerns of other contaminants possibly being stirred up. They do regular water quality monitoring. So all that will feed into the environmental risk assessment and there hasn't been any issues identified with chlorine on that matter.

And just to correct one thing on the record that the intervenor raised, she referred to the round whitefish as a species that has federal and provincial status as a species at risk. That is not correct. They do not have - - they are not considered

a species at risk under both of those jurisdictions.

However, it is an important species. It is a valued ecosystem component that we look at very carefully with respect to thermal impacts related to the operation of Darlington Nuclear Generating Station.

**THE PRESIDENT:** Okay. Anything else? Thank you. Any final words?

**MS LANTEIGNE:** You're welcome. Thank you.

**CMD 15.H8.28**

**Oral presentation by  
Citizens for a Safe Environment  
and The Committee for Safe Sewage**

**THE PRESIDENT:** Thank you. I would like to move now to the next submission, which is an oral presentation by Citizens for a Safe Environment and The Committee for Safe Sewage, as outlined in CMD 15-H8.28.

I understand that we have Ms Buck and Mr. Done will make the presentation. Over to you.

**MS BUCK:** So good evening. I am just going to go through seven different, sort of, headings

of issues that we feel strongly about.

- First of all, our position on the OPG application licensing. We think that the licensing application by Ontario Power Generation should be for a planned phase-out of the four reactors at the Darlington Nuclear Generating Station, not for a refurbishment and that the renewal period should be licensed for a timeframe that accommodates the phase out and end-of-life safe storage.

It is strategically important to phase out the four nuclear reactors at the Darlington Nuclear Generating Station since they represent a current major preventable source of radioactive releases to Lake Ontario, the drinking water source for 6.3 million Ontarians.

- Radioactive releases under normal conditions. In normal operations the four heavy water CANDU reactors at Darlington have reported external losses of radioactive tritium. The losses occur as normal daily releases to the atmosphere from the reactor stack and as releases to water through effluent and groundwater.

In 2007 the measured and reported annual releases by the Darlington reactors were 225 trillion Becquerels to the air and 190 trillion

Becquerels to water.

The Darlington onsite tritium removal facility is a large source of tritium releases to the atmosphere. Unplanned for and accidental releases constitute leaks and spills also through the air and water.

Tritium is a contaminant released to the environment. Darlington is located on the shore of Lake Ontario. Darlington's daily releases to water enter Lake Ontario, the source of Toronto's drinking water and others and Toronto water supply plants in close proximity to Darlington means that Toronto's drinking water is contaminated with Darlington's tritium releases.

Toronto's treatment plants cannot treat or remove tritium from the drinking water to protect the health of Toronto's residents. So there is no safe level of exposure and there is no threshold.

Tritium, a radioactive isotope of hydrogen releases ionizing radiation. There is no safe level of exposure to ionizing radiation. Ionizing radiation is carcinogenic. Every exposure to tritium in drinking water is cumulative and increases the risk of cancer when exposure occurs over time.

Every effort should be made to eliminate or reduce preventive exposures to carcinogens including tritium.

Recent reviews of the low dose hazards of tritium further support a precautionary approach or a more stringent regulatory approach. And of course the unacceptability of the Ontario drinking water standard at 7,000 Becquerels per litre is totally unacceptable. This standard, a departure from the typical method of establishing a drinking water standard for a chemical carcinogen, represents actually a lifetime cancer risk of 340 in a million which is totally unacceptable when one in a million is the acceptable standard.

The Ontario Drinking Water Advisory Council held public consultations on the 7,000 Becquerels per litre Ontario standard for tritium. There was a consensus: Let's make that standard 100 Becquerels per litre, followed by a further reduction over five years to 20 Becquerels per litre. Along with lowering the standard, the report recommendations were also for sampling, measuring, monitoring and reporting requirements. What happened? Nothing. The report noted that the current level of risk for exposure and potential health implications would actually not change with a more stringent standard but

the new standard, if it were put in place, would help you predict risk by finding problems more quickly through surveillance and increased frequency of monitoring.

Now we know that the only way if it's not through regulation, if we can't control all of the releases from being out there and affecting the public, we know that the only way to protect millions of Ontarians from adverse health effects is to ensure that they were not exposed to tritium in their drinking water, to tritium in the air and to tritium in groundwater. We now know that to achieve this is to eliminate tritium's releases to the environment through the phase out of nuclear electricity production in Ontario.

Once again, we reiterate that this licensing application should be for a timeframe to phase out the operation of the four reactors immediately.

The need for sustainability and the restoration of the global environment: Science is providing ever more compelling evidence that we must change our global and local practices if human civilization is to be sustainable.

Nuclear energy is energy production

based on uranium, a non-renewable resource. The mining of uranium, the processing of uranium ore is uranium's use in Darlington's heavy water reactors and its end of life containment all pose environmental radiation contamination risks that we should be avoiding. The Medical Officer of Health has asked for a reduced reliance on nuclear energy twice, once in 2004, once in 2006 in recognition that energy conservation and efficiency, ecologically sustainable, renewable electricity are the answers to the future.

Now, in October 2015 the Ontario Clean Air Alliance in its recently-released research paper is questioning why the Government of Ontario despite its commitment to putting conservation first is continuing to underpay for conservation and overpay for nuclear projects.

And how is the global community generally reacting to nuclear incidents and community values? Well, there were anti-nuclear protests in the 1970s. There was the Three Mile Island accident in 1979, the Chernobyl nuclear disaster in 1986 and the Fukushima-Daiichi nuclear disaster in 2011. And those incidents have set up the stage for the vanguard proposed phase out of nuclear electricity generation by 2022 in Germany under Chancellors Schroeter and

Merkel. Italy, Belgium, Spain and Switzerland who principally decided to become nuclear energy free while others such as Denmark, Ireland, Portugal and Austria will remain totally nuclear-free.

Concluding statement: Nuclear power- - that's for me- - nuclear power plants are the current major preventive sources of tritium releases to the environment. OPG's environmental performance as reported in the 2014 annual report stated that tritium emissions to air and water did not meet their targets. There is no safe level for exposure to tritium. Tritium is ionizing radiation as I said and carcinogenic. Even the very lowest levels of radiation are harmful to life. There is no threshold below which there are no effects of radiation.

Therefore, this licensing application by OPG for the refurbishment should be turned down and revised. The rest of this public hearing should be the issuance or the result of this public hearing should be issuance of a licence for the phase out of Darlington and the licence should be given- - licensees should be given the licence for a reasonable timeframe for the phase out of Darlington and not for a 13-year licence for its refurbishment.

Thank you. David..?

**MR. DONE:** Yeah, I would just like to make a few remarks.

As Karen was saying there either should be a phase out for a number of reasons; nuclear disasters as she mentioned, Chernobyl, Three Mile Island, Fukushima and the fact that the Ottawa Valley is an earthquake zone and there are Teutonic features in the lake that have shown up fairly recently over the last few decades. So that alone should be a good reason for phasing out these nuclear reactors at Darlington and Pickering and in Ontario in general.

Then another reason is the remediation of radioactive waste. This is a problem that was never solved in the beginning of the nuclear technology. It's still an extant problem and is a good enough reason to- - because of the half-life, the enormous half-life of the components of the fission.

And then Karen said quite a bit about tritium. Like, in our neighbourhood we have the R.C. Harris Drinking Water Supply Plant. It's 5.1 Becquerels per litre of tritium coming in. The background level in North Bay and Superior is less than 1.9. That's more than 2.5 times background.

It's not just a question of cost by containing the tritium. It's a problem that it cannot

be overcome by throwing money at it. It's a problem that can only be overcome by phasing out the nuclear industry in Ontario and we see California moving to a 14.6 Becquerels per litre limit for drinking water and the European Union is at a level of 100 in a number of jurisdictions. So it is starting to appear that there is no threshold that basically you don't want to add anything to the background.

So tritium is a big problem along the shore of Lake Ontario from Pickering coming in at the water supply plants from Pickering and Darlington and the only way is to close down the industry and we see- -

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

Thank you very much.

**MR. DONE:** Okay. Can I continue?

**THE PRESIDENT:** No. You had 10 minutes. You are way, way above 10 minutes and you are making the same argument we just heard. Allow us some time to get in some discussion.

So colleagues, anybody has...? Mr. Tolgyesi?

**MEMBER TOLGYESI:** I have one question, Mr. President.

The second bullet in the submission

there is a note:

"...that the industry is not regulated to cover liability costs incurred through mismanagement or unplanned 'worst case' scenario accidents."

OPG, could you comment on that?

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

There is a *Nuclear Liability Act* which covers OPG's operations as it would for any of the nuclear facilities. It has recently been changed and the value of the insurance has gone up and will go up over a number of years now. We know that that's not in force yet but we are expecting that to come into force next year.

**MEMBER TOLGYESI:** Staff...?

**MR. HOWDEN:** So Barclay Howden speaking.

In terms of nuclear liability what Madam Swami has said is correct. The new *Nuclear Liability and Compensation Act*, it has been passed through Parliament but they are waiting to pass through the regulations that would go in place.

The expectation is now that the

federal election is over that there would be movement on that. That would move to a more modern regime where the plants would require insurance starting at \$650 million moving up to \$1 billion over a three year period.

So that has been looked at, but the current act that's in place is out of date and that's why the government moved with a new act.

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

**MEMBER VELSHI:** A question for the intervenor.

It wasn't in your written submission so I may not have understood you correctly. Did you say that with the current tritium emissions the risk of mortality is 340 in a million?

**MS BUCK:** Yes. Sorry.

So the current 7,000 Becquerels per litre that taken- - that was actually set up to only look at a year time, a year's exposure, and that resulted in an analysis and I have got it in this written one, the- - an analysis that showed that there would be 340 million- - or 340 cancers out of a million rather than what we usually do in society and that's one in a million.

**MEMBER VELSHI:** Thank you.

Staff, do you want to comment on that?

**MR. HOWDEN:** Yes. Barclay Howden speaking.

I'd like to- - we have with us Dr. Sandro Demeter who is our medical specialist on the health effects of radiation. He also is very familiar with tritium and I'd like to ask him to comment on that.

**DR. THOMPSON:** Patsy Thompson. Not to be disrespectful to my colleague, but I'll address Ms Velshi's question in terms of the one in a million risk and the risk of tritium and then Dr. Demeter will address some of the health risks.

Essentially what the intervenor is saying is correct. For 0.1 milliSieverts per year, which is the basis for the drinking water standard, if you do a lifetime exposure over 70 years it does equate to a risk of 340 in one million. That's using essentially the standard, the no threshold relationship to estimate cancer risk.

Where the intervenor is wrong is in saying that the level of acceptable risk is one in a million. That's not the case. If you look at the drinking water standards for a variety of chemicals and metals in Canada, the actual level of risk for

each of the standards is quite different and in some cases the risk is close to one in 10,000 depending on- - and the standards are set based on.

The one in a million is sort of the starting point and then they do a national survey in terms of quantities of whatever the substance is and drinking water supply plants across Canada. Then they look at the cost of treatment to reduce the risk and then set the limits. So if you look at all the chemicals that are- - for which there are drinking water standards in Canada, the level, the actual level of risk for the standard is quite variable and the one for radionuclides is actually sort of within the range of the others.

I think Dr. Demeter will address the other issues.

**DR. DEMETER:** Dr. Sandro Demeter, consultant to the Commission.

I think from a public health and a physician point of view, I think it's important to understand the difference between risk and safety. We are exposed to 2,000 to 3,000 microSieverts a year of natural radiation. This 5.1 Becquerels per litre is 1,400 less than the threshold and the incremental dose to the critical person in this community is 0.6

microSieverts compared to 2,000 to 3,000 microSieverts. So there is a small incremental risk but given the magnitude of the difference between natural exposure and this incremental exposure, I think it's still safe.

I think it would be unsafe to tell people that the water is not safe to drink from a public health point of view. To tell a pregnant woman that water is not safe to drink, I think that does more harm than this small, little radiation dose.

As a nuclear medicine physician, when I administer radio pharmaceuticals, I give doses that are much higher than this, and I think it is safe because the doses are so small.

And the linear non-threshold dose is a theoretical model that's used for providing regulatory mechanisms to make the doses as low as reasonably achievable. From an epidemiological point of view, those risks in really low dose chronic exposures are really difficult to prove because they're so small, if they're there at all.

So safety and risk are different things, and I think the level of tritium in the water does not make it unsafe to drink.

**THE PRESIDENT:** Just so I can put it

down in layman language, are the drinking water in Toronto safe?

And are they measured by the Municipality of Toronto, I assume, and if there was any- - any sort of contamination or anything like that, advisory would go, wouldn't it?

**DR. THOMPSON:** So Patsy Thompson, for the record.

So the municipalities have a responsibility for monitoring essentially substances in drinking water, and they do have measures in place to take whatever action is necessary, one, to protect drinking water resources, and also to shut down the supply should the water be unsafe to drink.

And those types of actions have never been taken in relation to normal operating conditions of nuclear power plants around Toronto and around Darlington and Pickering.

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

Anybody else?

Okay. You have the final words.

**MR. DONE:** Dr. Sandor, was it, that suggested that the natural exposure was greater than the incremental effect of the additional tritium placed from the plants along the shore of Lake

Ontario, but that 5.1- - like the natural exposure is less than 1.9. Like the natural background if you go up to Lake Superior or North Bay, Lake Nippissing, is at 1.9, so you've gone 2.5 times as much.

And there is an indication from what Karine was saying that there's no threshold. It's sort of like a zero tolerance with chlorine and dioxin, which I know quite a bit about with regard to wastewater.

We have another no threshold situation here where it's dangerous to have two and a half times, and all of the regulations are coming down, like California.

So I dispute their response.

**THE PRESIDENT:** So if there was no threshold- - you mentioned 1.9? Why are we not- -

**MR. DONE:** Well, that's background. You can't- -

**THE PRESIDENT:** Why are we not all- - if there's no threshold, why are we not all dead- -

**MR. DONE:** Well, because it- -

**THE PRESIDENT:** - - from 1.9?

**MR. DONE:** Because it's a chronic- - it's a chronic thing that builds up, and when you more than double it- - or let it go over a period of time,

a young child, 30 times- - 30 years in the neighbourhood, how do we know? These plants haven't been around that long.

Will this amount- - and it's not only the Horgen and the Harris plants, but it's the other water supply plants along the shore of Lake Ontario.

So it's not- - it's quite a crass remark you make about why aren't we all dead. That's sort of trying to mock and make a joke out of this.

**THE PRESIDENT:** No, I- -

**MR. DONE:** It's no joke.

**THE PRESIDENT:** I'm just trying to understand what- - why 1.9 is okay and five is not.

**MR. DONE:** Well, 1.9 is the background level. You can't do a damn thing about the background level. But you can do something about incrementing the background level.

If you close the plants, you can bring it down to that background level.

We can't do anything about- - about background.

**THE PRESIDENT:** I'm just reacting to you're saying there's absolutely no threshold. That's all I'm saying.

**MR. DONE:** Right.

**THE PRESIDENT:** Okay. Anything else?

**MS BUCK:** I just wanted to repeat, the World Health Organization just put out a meta analysis, and their authors actually have said even the very lowest levels of radiation are harmful to life so that even background levels are harmful, but you keep- - when you keep on adding to that, you have an incremental amount of radiation and you have incremental risk, and you also have incremental harm to life.

And the younger you are, the more dangerous it is. If you ingest it, inhale it, when it's inside your body, it's even more powerful in its harms to you.

Thank you.

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

I'd like now to move to the next submission, which is an oral presentation by the Society of Professional Engineers and Associates as outlined in CMD 15-H8.55 and 15-H8.55A.

I understand that Mr. White and Mr. Ivanco will make the presentation.

Over to you.

**CMD 15-H8.55/15-H8.55A**

**Oral presentation by**

**Society of Professional Engineers and Associates**

**MR. IVANCO:** My name's Michael Ivanco. I'm a past President of the Society of Professional Engineers and Associates. Peter is the current President.

Our backgrounds are, we're technical people. I'm a scientist, recently retired from CANDU Energy, and also I'm a sessional lecturer at University of Toronto in the area of terrestrial energy systems.

Peter is a safety expert in the area of deterministic safety analysis.

We, SPEA, is a labour organization founded in 1974. We're, I think, probably the- - one of the oldest white collar unions in Canada.

We represent engineers, scientists, technicians and technologist. We design and provide support services for CANDU reactors.

Over the last 20 years, hundreds of our members have worked in the design and construction of CANDU reactors in South Korea, China and Romania, which were all on budget. I've heard a lot of people

say over budget.

Our members also recently refurbished CANDU 6 reactors in New Brunswick and South Korea, and we played a key role in refurbishment of Pickering A, Units 1 and 4, and Bruce A, Units 1 and 2.

Formerly, our members worked for the reactor division of Atomic Energy of Canada, which was the design of the Pickering A reactors, co-designer of the Bruce A reactors and designer of CANDU 6 reactors around the world.

Darlington has been and is today one of the best-performing nuclear stations in the world. It's received several awards from organizations such as WANO and the INPOL over the years, and the Darlington units are CANDU units. And we designed those, and we believe they are robust and very safe.

It's worth pointing out the station's construction was originally committed to in the mid-1980s at a time when electricity growth was increasing in lockstep with economic and population growth, and with most of the economical hydro sources already developed, the province needed to build both coal-fired generation and nuclear generation to keep pace, which it did.

So those nuclear generation stations

that were built at the time essentially displaced coal-fired generation that would otherwise have been necessary.

Since they were constructed, the Darlington units have generated over 600 terawatt hours of electricity. And to put this in perspective, that avoided the release of over 600 million tonnes of carbon dioxide from additional coal-fired generation.

To put this into perspective, those 600 million tonnes is approximately equal to six years' worth of tailpipe emissions from every car in Canada.

Darlington generating station produces 28 terawatt hours of electricity annually, roughly, enough to power over 2.5 million Ontario homes without generating carbon dioxide.

If the Darlington station did not exist, the only currently viable way of replacing that electricity would be to burn natural gas instead. Assuming that coal generation is off the table, replacing 28 terawatt hours of greenhouse emission-free electricity with natural gas would increase emissions by about 14 million tonnes.

I should point out that it is possible, in principle, to replace nuclear electricity

with a mixture of wind power or solar and natural gas, but the capacity factors of those intermittent renewables are around 25 percent, so it would be mostly natural gas.

Considerations for licence renewal, in our estimation, are these four. These are the key ones.

Robustness of design, safety performance, environmental performance, and safe management of used fuel and non-proliferation.

So CANDU reactors are unique compared to conventional pressurized light water reactors, be they Westinghouse-type reactors or General Electric-type boiling water reactors.

Our fuel is not enriched, and unused fuel can be handled by hand with no danger. Our reactor core is multiplex. There's 480 channels in these Darlington reactors instead of one large pressure vessel so that if there ever is a loss of coolant accident, it's likely to be confined to a single channel with no danger to the employees or the public.

And the classic example of this is Pickering Unit 2, Tube G16 in 1983. That was Canada's loss of coolant accident. A lot of people never heard

of it because there was no exposure to the public. It was an economic issue for Ontario Power Generation, though.

And CANDU reactors' reactivity excursions in the core in case of any accident are very slow compared to those in light water reactors and, therefore, they're much easier to mitigate.

Our core is kind of- - much bigger, and it's- - responds much more slowly to reactivity insertions.

And there's an order of magnitude more water in a CANDU reactor building compared to a PWR or BWR, and that is there to act as a heat sink in the event of a worst-case scenario accident, for example, a total core collapse.

In addition to having a robust design, safety performance is underpinned by many of the safety control areas evaluated by the CNSC, and these are talked about a lot in the OPG submission and in the CNSC submission, which we reviewed at some length, so they have a strong safety culture.

You can't have it unless you have a sound management structure. All of these various, you know, different things that you mention, human performance management, fitness for service, planned

life management, all of these various areas go into having a strong safety culture and lead to, essentially, a safe operation of a station.

And according to OPG, it has done very well in all these areas. According to the CNSC, they seem to concur, at least, the staff, with OPG's assessment.

So with respect to all these safety control areas, the Darlington station's performance either met or exceeded all the regulatory requirements.

As is the case with all nuclear facilities in Canada, industrial accident rates and lost time injury are well below the set target in comparison to similar industries.

We noted that, early in 2014, OPG was the first Canadian utility to complete and obtain closure from the CNSC on all the assigned Fukushima action items and, in our view, this made an already very safe operating station even safer.

And despite the fact that a Fukushima-scale earthquake, which was somewhere around nine on the Richter scale, and subsequent tsunami could not happen in the Great Lakes, which is an area of relatively low seismic activity, the emergency

preparedness program has been updated to respond to a Fukushima-type accident in an effective manner and should boost public confidence in the safety of the station.

And by that, I mean essentially an accident where you have a complete loss of all power, and back-up power.

With respect to environmental performance, a lot's been talked about this already, but its performance with respect to radiological emissions has been consistently excellent.

The regulatory dose limit at the site boundary is 1,000 microsieverts per year compared to a natural background in the Darlington area of approximately 1,400 microsieverts per year, but this dose has been maintained consistently at less than one one-thousandth of those allowable limits, or less than one microsievert per year.

So this incremental dose of one microsievert on a background of 1,400, we believe, is relatively negligible. We note that there was one rare exception in 2007 when the emissions were one in 770 of allowable limits, but this was still less than one one-thousandth of natural background.

And we do note that there are places

in the world where natural background dose is as high as 260,000 microsieveverts a year, with no apparent negative impact.

In terms of management of used fuel, we read through both submissions. We saw no issues with the way that the fuel was used or handled.

Darlington was found to be compliant with all national and international regulations regarding nuclear safeguards and non-proliferation.

As we mentioned, CANDU reactors don't use enriched fuel. The main proliferation issue is safeguarding fuel and, you know, keeping it out of hands of people who would have the capability to perhaps extract the plutonium from the spent fuel, but that's an extremely, you know, complicated, difficult and costly process. And in Canada, we don't reprocess fuel.

A lot has been said of the duration of licence extension. We noticed that OPG has asked for an extension to span the duration of the refurbishment of the four units, and we support this 13-year request.

They mentioned various safety issues and not having- - having concerns about the requirements changing after they're refurbished a few

reactors. We also note that there's- - simply applying for a licence extension is a huge effort on behalf of a lot of people who would be otherwise involved at the time of refurbishment and also note that, at the 10-year mark, the station will be in a transitional state, so we believe that, for various reasons, the 13-year licence extension makes sense.

Other matters for consideration. A lot has been said of the tritium removal facility.

Detritiation is a good idea. We think it reduces tritium emissions, and that has an overall beneficial effect in lowering airborne and aqueous tritium emissions.

With respect to potential hazard to the public, the operation of the tritium facility has posed no operational hazard that we have read about and appears to be well operated and maintained.

We would also note, although it was probably in our submission, but not in this presentation, that the tritium is the future fusion fuel, and eventually, we will, in this world, we believe, have fusion reactors to generate electricity, and those fusion reactors will need a lot of tritium. So it would be not a bad idea, necessarily, to corner the market in fusion fuel.

So in summary, the station avoids huge amounts of CO<sub>2</sub> emissions that would otherwise be necessary, and based on measurements by OPG and the CNSC, radiation releases are very low.

The CANDU reactors are very robust, have a high resistance to accidental release of radiation, and we believe that OPG has operated this station in an excellent manner, and Darlington has an excellent safety record.

And on this basis, we support renewal of the plant's operating licence.

**THE PRESIDENT:** Thank you.

Questions.

Monsieur Harvey?

**MEMBER HARVEY:** Yes. Thank you for your presentation, but I would like to check some points with the staff.

It seems we have- - the CANDU is the best reactor in the world, so on page 6, there is two points down the page, two last ones, about the reactivity insertion, the reactor core, and the order of magnitude.

Can you comment those two points?

**MR. HOWDEN:** Barclay Howden speaking.

Mr. Harvey, can you just repeat?

You're talking about the- -

**MEMBER HARVEY:** Well, on page 6- -

**MR. HOWDEN:** - - the rate of reactivity insertion?

**MEMBER HARVEY:** Yeah. Compared to those in light water reactor and, therefore, much easier to mitigate.

**MR. HOWDEN:** Okay. And what was the second one?

**MEMBER HARVEY:** The other one after that, the order of magnitude.

**MR. HOWDEN:** So- - Barclay Howden speaking.

So I'm going to ask Michel Couture to respond to the first one in terms of transient insertion.

And on the second one, before he answers, we can confirm that this statement is true in terms of the loca design basis accident is basically set up so that the largest header, if broken, and you have a guillotine failure where the pipe shifts and the water comes out both sides, the design is such that emergency core injection can handle that event, along with the containment.

So that's the second point.

I'll ask Monsieur Couture to respond to the first one.

**MR. COUTURE:** Michel Couture, Director of the Physics and Fuel Divisions.

Regarding- - I was just reading what has been said here. And in terms of reactivity, if you have an accident where you have an injection of reactivity- - and we have examples like, for instance, a loss of coolant accident.

The- - for instance, the neutron lifetime in a CANDU reactor is much longer than the light water reactor.

What does that mean? That means that when you have a reactivity insertion, it's much slower. It is less- - the power may start increasing, but a much slower rate than a light water reactor.

And because of that, we have the safety system that we have, shutdown systems, for instance, could handle this very well and has been studied through all sort of postulated design basis accidents.

So that is one of the features when you call- - and you may even call it an inherent feature of the CANDU reactor is a much slower neutron lifetime; therefore, less reactive to reactivity

insertions.

**MR. HOWDEN:** And the last thing with regard to that, just a reminder that CANDU reactor has two independent, diverse fast-acting shutdown systems, which gives you that extra measure of confidence that the reactor will shut down under any event.

**MEMBER HARVEY:** (Off microphone)

**MR. HOWDEN:** So in terms of the- - there is a positive reactivity, which is a slow-moving, but could increase the power. And that's one of the reasons that there's two independent shutdown systems to ensure that you always have a shutdown and so you don't get into a loss of regulation accident.

**THE PRESIDENT:** So I think we had this discussion in the Bruce hearing about, okay, so it's robust design. So under doomsday scenario- - I don't know if you- - P2G16 is a doomsday scenario.

But if there were a doomsday scenario, how long before there will be a release?

And while I've got you on this, I thought that the lesson from Fukushima, there was one lesson from Fukushima was you got to get your water to the core somehow.

So in your view, now, given all the

mitigation, et cetera, how much time will it take before release occurs?

**MR. IVANCO:** I'll maybe answer the first part.

P2G16 is not a doomsday scenario. WE just submit that that's the likely scenario if there ever was another loss of coolant accident in a CANDU reactor, as you'd likely have it in a pressure tube, not in a header.

Pressure tube, it's like having a chain. If you have a chain, it's the weakest link that breaks. That's generally going to be a pressure tube. It's not going to be something like a header.

And that actually did happen in Pickering in 1983, the loss of coolant accident. There was no harm to the public. There was no release. It was merely an economic- - bit of an economic catastrophe at the time for OPG, but it was recoverable and that design flaw was fixed with no harm to the public.

With respect to the other issue, Peter's the safety expert. I'll let him answer.

**MR. WHITE:** Yeah. So like I commented at Bruce, for the doomsday scenario for the large core breakdown event, that's when the large amount of water

would be a bonus and give you lots of time.

Obviously, if you have a blackout event, the quicker you get to it and the quicker you insert water in means the more stable the plant will be, meaning the more of the geometry will remain intact.

So obviously, if you can get water in quickly, then you keep the fuel channels in their state and they don't collapse. But if they happen to be on that- - if you couldn't get water in, you have that additional water to give you more time to react, right. More time than they had at Fukushima.

But obviously, once you get into that scenario, you are into core damage state, right. You obviously want to act before you get into damage state, so, from economic reasons, you can have a recovery. But you're not going to get additional doses beyond that if you go into that core damage state because you have additional water.

You will be within the dose limits that are required by the licence.

**THE PRESIDENT:** But did you change your number since Bruce in terms of- -

**MR. WHITE:** No, the number- -

**THE PRESIDENT:** - - days no operating

intervention? What is the number?

**MR. WHITE:** Three to four days for- - if you're in that scenario where you have total core collapse, but you wouldn't wait three to four days.

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

Ms Velshi?

**MEMBER VELSHI:** This is on your written submission where you've got comments on OPG's written submission for the licence. And maybe I'll ask OPG the question.

It's on page 3, Section 3.6, steam generators. And the comment is around whether any components of the steam generators require replacement during refurbishment outage, et cetera.

Do you see the section?

**MR. DUNCAN:** Commissioner, do you have a page number?

**MEMBER VELSHI:** It's page 3 of their comments, so I guess it's their appendix to the written submission.

**MR. DUNCAN:** We've got it now. Okay.  
Brian Duncan, for the record.

Fundamentally, when we look at the steam generators, we have no plans to require any components to be replaced in them during refurbishment. We are making one

small modification to them. We're adding some additional hand holes, we call them, but essentially they're inspection ports that would allow us to do- - if required in the future, would allow us to get into the secondary side and do more extensive cleaning if there's any sediment buildup in some of the areas we can't reach today.

So we don't see a need for any other significant changes to those steam generators.

**MEMBER VELSHI:** And the second part is whether there's going to be any cleaning done during the refurbishment of the steam generators.

**MR. DUNCAN:** Brian Duncan, for the record.

Yes is the simple answer to that one. We do extensive secondary side cleaning now on outages. What we will do in the refurbishment, we'll take advantage of that window to do primary side cleaning.

What we've found over the years is a thermal transfer across the steam generator tubes has decreased. We've got some buildup in those tubes and the refurb period, when you can get them completely dry, is the perfect time to go after that.

**MEMBER VELSHI:** Thank you.

And from your perspective, do you have any concerns about these steam generators lasting another 30 years?

**MR. IVANCO:** No. I think it's a combination of materials and chemistry being well taken care of. In some stations, I know at Bruce Power, they had replaced some steam generators, but they're a different design, different material. And certainly at Point Lepreau they didn't replace the steam generators. We did that refurbishment and there were no issues there. So it was just really a question for curiosity and for completeness.

**MEMBER VELSHI:** Thank you.

**THE PRESIDENT:** While we are on this appendix, if you look at 3.12.

I know we will deal with cyber security on Thursday, but since I got you here, what's your concern here about this hacking? It is a different system, though, isn't it? Or you think there's some lessons to be learned on cyber security?

**MR. IVANCO:** Well it's just a question- - I mean there was a hacking incident in South Korea. I don't think it was actually at the reactors. It may have been at the research facility. But the fact is it's a highly secure facility, with a lot of sensitive information, and it was hacked. So I would think- - I think most nuclear operators and labs would be looking into this to try and find out what lessons, you know, there are to learn from this.

The only concern would be- - my understanding is the station's computer control systems are separate, but, you know, are they separate enough to not be hacked? Has OPG looked into this? That was the nature of the question. I've since learned that they have done things. I don't know in detail what they've done, but it was something that seemed to us a natural thing to flag because there was that hacking incident a year or two ago.

**THE PRESIDENT:** You should tune in on Thursday.

**MEMBER HARVEY:** In the same list of questions, on page 2, 3.6, you just asked. Would it be possible at least to summarize what assessments were performed to validate the extension in life from 210,000 to 235,000 hours?

**MR. IVANCO:** Yeah, we weren't challenging it, we just wanted to know what all the assessments were. I mean I understand there were a lot of things done. It would be nice to see just a bullet-point summary of what the assessments were. And I understand that they'll provide that, that's what I've been told.

**MEMBER HARVEY:** Do you want to comment?

**MR. HOWDEN:** So OPG could probably walk you through that, and our Staff can comment on what we've reviewed if you wanted to get a quick overview.

**MEMBER HARVEY:** Any comment?

**MR. DUNCAN:** Brian Duncan, for the record.

I just want to make sure I've got the right bullet here. Page 2- -

**MEMBER HARVEY:** 3.6.

**MR. DUNCAN:** Well, there's a bunch of them that are 3.6.

**MEMBER HARVEY:** Well, the list of questions at the end of the submission. There's a list of questions.

--- Off microphone

**MEMBER HARVEY:** Oh, I'm sorry, that's right. The fourth one. Page 49.

**MR. DUNCAN:** Page 49 of the submission?

**MEMBER HARVEY:** Yeah.

**MR. HARVEY:** Just give me a second.

**THE PRESIDENT:** While you're looking at this, didn't you present to us a meeting? There was a meeting about life extension, some of the research that was done- - at AECL Laboratory was done, and that's all in the public, isn't it?

**MR. HOWDEN:** Yeah, I'll ask Gerry Frappier to give you a quick update on that.

**MR. FRAPPIER:** Thank you. Gerry Frappier, for the record. I'm the Director General of Assessment and

Analysis.

So over the past several years OPG, as well as other industry members, have had what they call a Fuel Channel Life Management Project, which has been an in-depth research project to look at the life of pressure tubes, and the effect of different parameters, including the take-up of hydrogen in particular, which we were quite interested in.

So the CNSC Staff has been following that research closely, and we have been evaluating the results that they have gotten out of it to determine the effect of different degradation mechanisms on the life of pressure tubes.

OPG has presented for Darlington a case that does an overall assessment that demonstrates that their pressure tubes are good for up to 235,000 effective full-power hours, which we have assessed and agree with. You'll remember that in some of the other facilities it was more than 235,000 hours, but in the case of Darlington they chose only to go to two hundred and thirty-five, I think for business reasons.

But also I should comment that there's still a lifecycle management program in place, so there'll be regular testing, there'll be periodic inspections, and this will be something that'll be tracked as we go forward

to ensure that the pressure tubes are always fit for service.

Perhaps OPG wants to put some more details into that.

**THE PRESIDENT:** But the question was where is it documented, and if memory serves- - just please correct me. If I remember correctly, we had a whole meeting session on this, where presentations were made of the research. There were some photos.

Am I dreaming this or that happened?

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

That's correct, sir. We did come to the Commission with a- - at a meeting, a technical meeting. I don't have the date off the top of my head, though, but perhaps we can find it by the end of the week and make sure it gets inserted somewhere.

**THE PRESIDENT:** Is available.

OPG?

**MR. DUNCAN:** Yeah. Brian Duncan, for the record.

That's absolutely correct, we have presented to the Commission a summary of the research we've conducted, the examinations we've done, and the models we've generated, and what confidence we have in those

models going forward, that we can ensure we can operate the reactor and operate these pressure tubes safely.

I'll let Mr. Steve Woods offer some additional detail.

**MR. WOODS:** For the record, Steve Woods.

As you've heard already, fuel channels are expected to remain fit for service for at least 235,000 effective full-power hours, which is sufficient to accommodate the schedule for refurbishment.

OPG's confidence in fuel channel fitness for service is based upon a number of things. Without going into the technical details, that would be our extensive operating experience to date: extensive research and development evidence, in-service inspection, predictive models and fitness-for-service assessments. And, finally, our Fuel Channel Lifecycle Management Plan outlines all the requirements to manage the aging of fuel channel components.

**THE PRESIDENT:** Okay. Any other questions?

Okay, thank you. Thank you very much.

The next submission is an oral presentation by Ms Skelly, as outlined in CMD 15-H8.156.

Ms Skelly, the floor is yours.

**CMD 15-H.156**

**Oral Presentation by Sharen Skelly**

**MS SKELLY:** Good evening. My name is Sharen Skelly. I'm spokesperson for the Huron Grey Bruce Citizens Committee on Nuclear Waste, although this evening I'm speaking on my personal behalf.

I don't have a PowerPoint. I did submit a paper, and I made some additions to it.

I oppose the renewal of the licence for the Darlington Nuclear Generating Station for another 13 years, and my reasons are directly related to the radioactive waste that this plant produces and the problems that disposing of this waste creates.

I have been an advocate for clean drinking water and environmental protection since early 2000, when my family's municipal drinking water in Sauble Beach became contaminated. Then in 2009 I sold my home and moved to Owen Sound hoping that drinking water quality would no longer be a concern. I soon learned that, as consumers of public drinking water, we must be vigilant at all times. It's our responsibility to be aware of what is happening in our communities.

Shortly after moving to Owen Sound, Bruce Power, OPG, applied for a license to ship nuclear steam

generators out of the harbour at Owen Sound, and that was actually right around my house. This would all occur in close proximity to our community's drinking water source.

I was disappointed that I was looking forward to yet another campaign to keep my drinking water safe, but I am responsible for things that I can change. I formed a citizens group, and we joined a coalition, and the steam generators did not leave the Western Waste Management Site near Kincardine. Now there may be several reasons for this, but I like to think that our group played a major role in it.

Next came the proposal for the deep geological repository, and that became an issue. Once again I became involved in a coalition to stop the development of this project. We believe it's not in the best interest of the environment and our communities and it will affect us on many levels if it proceeds.

I had the opportunity to tour the Western Waste Management Site at Kincardine. Now I've lived in Grey Bruce for over 20 years, and at the time of the tour I had no idea that waste facility existed. I'm educated, I'm a health care professional, and yet this nuclear waste dump- - I like to refer to it as that- - had been operational not far from my home all this time and I had no knowledge of it. Add to fact that waste from Darlington

and Pickering is being shipped by land and stored there, and that was all news to me.

I saw the incinerator, the storage for low and intermediate waste, and then I toured the facility where high-level waste is stored. It's an incredible sight and it's quite disturbing.

During the joint panel hearings for the DGR, we had an expert, Dr. Stephanie Rutherford, from Trent University, and she spoke about the "nuclear oasis" that exists in Grey Bruce. This concept is best described as when public support allegedly is derived from familiarity with the nuclear industry and the jobs and investment it brings.

So when people live and work in an area dependent on nuclear power, they're more than likely proponents of it. It's the residents that aren't reliant on Bruce Power that may not be so amicable. That might account for the peaceful co-existence of the Western Waste Management Site and the Town of Kincardine for so long.

Now I'll also give you an example of the peaceful co-existence of, you know, Bruce Power, OPG, the Western Waste Management Site and the other folks that don't really have a lot to do with Bruce Power, and their not understanding how other people don't really feel so positive about it.

I had entered a team in the Relay for Life, and we called them the "Skellywags," and we were setting up our tent, and right across from us- - it's a cancer fundraiser- - Bruce Power was funding and supporting the medical tent. So Bruce Power was taking care of the medical tent for a cancer fundraiser and the girls on my team said, "Hey, Sharen, take a look at that," and there was irony. We laughed at it, but nobody else thought it was ironic. These things happen all the time.

Bruce Power donates money to everything in the community, so if you don't work or have family that works there, and now we even see children that have been born into Bruce Power culture because it's been there so long, they don't understand that there are some people that- -

**THE PRESIDENT:** We're not dealing with Bruce Power, could you please- -

**MS SKELLY:** Well, OPG.

**THE PRESIDENT:** - - get into the- -

**MS SKELLY:** Well, I'm giving you my story and- -

**THE PRESIDENT:** I know you are- -

**MS SKELLY:** - - and I'm finishing it. I'm giving my story, and it will get to that.

On the other hand- -

**THE PRESIDENT:** And may not see. If we want to, we'll get into a discussion.

**MS SKELLY:** On the other hand, the communities- - this is all going to get to this.

On the other hand, the communities on the outskirts of the site of those that have waste from Darlington and Pickering shipped through them may not be proponents. In my purely informal survey of residents, I have determined that many are not aware of the existence of the Western Waste Management Site and the fact that nuclear waste is shipped there my road. But how can that be?

I mentioned earlier that I believe we must be vigilant consumers of drinking water. I also believe that we're stewards of the environment. But if residents are not aware of this extensive nuclear waste dump within their region, they're at a disadvantage. And they have not become aware of it because the Western Waste Management Site has been called a waste management site, not a nuclear waste management site or a radioactive waste management site. So if it's not there, they won't know, it won't hurt you.

All is not lost. I grew up in northern Ontario. You will realize that in northern Ontario- - north of Sudbury- - you really rattled me there, I got a little- - I'll get back. My father was a locomotive

engineer, and he was also a conservationist. We owned a farm in the Ottawa Valley and we used to plant trees there. But he was also a councillor and he was instrumental in getting some of the first recycling programs. But we used to pile into the car on Saturday nights and go watch them dump slag, which was kind of a dichotomy.

But I loved my life in northern Ontario. The blackened rock was beautiful to me and comforting, but it was also acidic and it didn't support life of any kind. But then in the sixties and seventies government regulations and local efforts to reduce pollution began and Inco built the superstack to address the air quality and air pollution problems in Sudbury. That's when the aggressive greening programs began. They applied lime to the acidic soil to make it favourable for growth, so trees and grasses were planted and the landscape began to be reborn.

Officials of the mines didn't take action until the landscape was ruined, but residents were so dependent on mining the nickel that they were living in this nickel oasis. So you might be asking me, what does that have to do with a 13-year licence? It means that with a 13-year licence we're going to have 13 more years of nuclear waste being shipped to Western Waste Management Site, 13 more years of waste on the road, putting all the

residence at risk on the route.

Don't mistake the silence of the residents as acceptance. They just don't know about it. I have been talking to people since I have become aware of the steam generators and, as in anything, people don't get involved in things until it affects them. You know, if something happens in your community, then you get involved, then you start to learn. That's what happened to me.

I've been talking to people. They don't know about that waste management site. Well, they do now, and they're starting to ask questions. And that's what we're going to do: we're going to educate them.

It happened in Sudbury and it can happen here. Nuclear waste will not be socially acceptable. The waste management site's going to be like that blackened rock in Sudbury and the residents here will start to put pressure on you. We don't want the waste from Darlington and Pickering. I don't know how it ended up in Kincardine, but we are getting smothered in your nuclear waste. We're living in the midst of all your nuclear trash, and we don't want it anymore. Thirteen more years is just you saying it's acceptable, we're going to keep on doing it.

There's got to be alternatives, but somebody has to take the lead. They did it in Sudbury. It can happen. There's alternative forms of energy. I'm not

saying it could happen overnight, but I'm telling you right now living amidst all that waste is not easy. We don't want it anymore, and I'm just letting you know that the citizens are going to start looking for other alternatives. Just because they didn't speak didn't mean that it was acceptance.

And I was quite offended.

**THE PRESIDENT:** Thank you.

Questions? Ms Velshi.

**MEMBER VELSHI:** Thank you for your intervention.

You mentioned this concept of nuclear oasis, and you've done your informal surveys. I know that I've read recently about more province-wide, more scientifically based surveys, and maybe Staff can comment on those. I don't know whether they were conducted with sponsorship by Bruce Power, but there was something fairly recent on support for nuclear power within the province.

Do Staff have results for that?

**MR. HOWDEN:** Barclay Howden speaking.

We don't have that at the tip of our fingers, but we can follow up. OPG may have a comment because they may have been involved in some surveys.

**MR. DUNCAN:** For the record, Brian Duncan.

You know, we've surveyed certainly

recently. We've surveyed in our geographic area. I don't think I could give accurate data much beyond our region. Certainly in our area the support for nuclear is high, as we've talked about before on day one. It varies across the region, but it remains consistently high.

**MEMBER VELSHI:** This particular survey- - and I'm sure Staff will be able to find it- - actually gives numbers across the province, aware that the nuclear oasis concept doesn't exist, and I think you'll be quite surprised to find that support is high across the province.

**MS SKELLY:** One thing I didn't say was the Canadian Nuclear Association and others, they're consistently saying that nuclear energy is clean energy, and I don't think that- - and they never address the waste issue. People are really unaware of the waste issue. They're not aware of these piles of waste that are- - if they had the waste in their backyards, they wouldn't say that nuclear power was the way to go. Because if they saw it, they would not want to- - they wouldn't want it in their backyard, I know that for sure.

**THE PRESIDENT:** Anybody else?

Okay, thank you. Thank you.

The next presentation is outlined in CMD 15-H8.89, and I understand that Mr. Archer will make the presentation.

Over to you.

**CMD 15-H8.89**

**Oral presentation by David Archer**

**MR. ARCHER:** So a couple of presentations ago we heard that you guys were minimizing increasing radionuclides above background. What we never hear is the industry or the regulator promising that there will be no releases, that we'll have 100 percent containment and we'll have nothing to worry about. We see you constantly adding to the background, never promising not to.

So like many kids in Ontario, I was somewhat involuntarily dragged on class field trips to a nuclear power plant, similar to my parents' experience being taken on a tour of a cigarette-rolling factory. At that time I asked why can't nuclear power plants run indefinitely, and it was explained: material degradation. I asked, what about the nuclear waste, and back then I was told we're five years away from a nuclear geological solution to nuclear waste, which is what has been said every decade, that the program must continue.

In 1979, I attended a march protesting this very plant. The protesters retreated with Ontario Hydro's presentation claiming the usual promises: "too

cheap to meter," would make Ontario and all Ontarians energy rich, these reactors would pay for themselves, they would generate refurbishment funds, and they wouldn't produce pollution, which is debatable.

Asking for a licence for not 5, but 13 years is a ploy to limit irritating public input and, as OPG admits, it's really to assure regulatory complicity with their plant. One example of this backfiring in the United States is San Onofre, California where their steam generators reached end of life. They hired Mitsubishi to replace the pressure tube berets, they re-designed them. The NRC, rather than hold public hearings to approve the design alterations and fast track the upgrades, they later failed, resulting in the permanent closure of the reactors. Now the utility is expensing the decommissioning costs and damages to ratepayers there.

And this just guarantees risky and costly decisions and the lesson is, tricks can backfire.

The Porter Commission here in Canada reasoned by 1978 that no new reactors should be built if a nuclear waste solution was not evident by 1984 and Ontario just came up with a work-around which is just to perpetuate refurbished reactors rather than

build new ones. It's just a work-around.

Fukushima, a multi-reactor site with four reactors blowing up next to one another was ample motivation to study the compounded problems faced when multiple reactors depend on shared systems and workers.

Canada still hasn't studied this habit of co-locating reactors beside one another despite multi-reactor- - its multi-reactor fetish it seems to have.

We depend on a regulator to protect the public interest, but the regulator is housed in the federal ministry anxious to export uranium. Evidence of this, for example, the CNSC publicly criticized the Québec provincial government's moratorium on uranium mining, a province that's smartly and permanently closed its two nuclear reactors.

We have a regulator in an industry that continues to treat fundamental flaws as simply public relations issues. The provincial government has tried to suggest that there are cost overruns. The government wants to have funding off-ramps, so the project could be halted, a 13-year licence rather than a five obfuscates the opportunity and eliminates hold

points.

During a recent set of hearings on the dumping of waste beside Lake Huron, the Ontario Police sent a message to those that opposed the Ontario government nuclear industry planned atomic dump. The message sent was that they are being watched and it seemed like police activism is for nuclear power.

Favourable laws and regulations continue to line the nest for nuclear. It locked itself into Ontario's future.

One item, a recent change finally to the *Nuclear Liability Act*, increasing the maximum total payout in nuclear accidents which was for years 75 million, which seems unbelievable, to one billion eventually here in Canada.

The U.S.'s cap on nuclear liability is \$13 billion. The Americans seem to value land, life and livelihood at a higher price.

No matter what delay or costs, nuclear corporations are permanently granted overruns. This guarantees their bad decisions, they continue to use inadequate cost estimates.

Underpricing nuclear is an industry-wide technique to fraudulently get the go-aheads that it needs.

So Canadian examples: Bruce A1 and 2. Costed at 2.8, became 4.8 billion. Promised 25 months, took 84 months.

Wolseong, Korea, the cost is secret. Promised 22 months, took 28 months.

Point Lapreau's refurbishment was promised at 1.4 billion, it became 2.8. Promised that it would take 18 months, it took 55 months.

Pickering A1 and 4, promised at 1.3 billion, became 2.6 billion. It took six to eight years respectively for those reactors.

Foreign examples of underestimating to manufacture consent. Watts Bar recently being licensed. Since the original reactor there was licensed, eight U.S. plants have closed. Watts Bar reactor 1 cost 6.8 billion, Watts Bar reactor 2 cost 6.1 billion and took about 40 years to complete.

V.C. Summer and Vogel, the flagships of new build and unlimited spending. Vogel originally was planned to be four reactors for 660 million, turned out to be two reactors costing 8.8 billion.

Currently Flamanville in France, , Olkiluoto, I'm pronouncing that wrong, in Finland and the Hinkley Point project in the U.K., they're all epic examples of funding holds and constant delays.

Government's missing the boat on the fact that 60 per cent of new power generating capacity is from renewable sector. I'd also like to point out, these hearings are held in a region removed from a massive population concentration, and that concentration of people both takes the risk for these reactors and funds them, and yet you hold them up here, basically compared to Toronto in the middle of nowhere.

This limits the number of people who are willing and likely to attend these fair hearings. I wonder what the CNSC or the industry is afraid of. Why not hold these hearings in Kensington Market and see how many hundreds of thousands of people participate.

The Darlington refurb can't proceed unless the CNSC arbitrarily extends the life span of Pickering beyond the manufacturer's end of life for Pickering's pressure tubes. The manufacturer gives- - the manufacturer states it's 210,000 effective full pressure hours.

In 2008 OPG informed the Ontario Energy Board that it required the refurbishment of Pickering. It spent 300 million towards that plan based on a 210,000 EFPH limit.

When the plan to refurbish Darlington was made, OPG no longer needed to refurb Pickering pressure tubes. Embrittlement and tube failure caused by hydrogen

pick-up was measured and estimated to be averaged, 53 parts per million across all the tubes.

Investigation shows that there may be a factored deviation of three across all tubes.

Delayed hydride cracking, DHC, is found to be higher in rolled joints and some of these joints show 120 parts per million and this is after only 149,000 hours of EFPH.

What would this figure be for tubes that are 210,000 hours old? I understand the preferred limit is 110 parts per million before we start worrying about bursting tubes.

Pickering 5 to 8 will be run to 245,000. Pickering groundwater contamination by tritium in 2007, the wet deposition was measured at 37,000 bequerels per litre. This pours into settling basin which drains into Lake Ontario and by keeping Pickering open you just continue dumping tritium into Lake Ontario.

Regulatory limits are set so high for tritium and C-14 inventories that groups of four plants such as Bruce A, Bruce B, Pickering B, Darlington, they don't contain enough total tritium and C-14 to even trigger the maximum. They have half of the regulatory limit. So four reactors usually the calculated inventory would be 24 million curies, but the regulatory action point is 54. So

rules that don't make sense. No attempt to desire to limit.

When asked why Canadians' maximum allowable limit on tritium in drinking water was set at 7,000 bequerels per litre and why the U.S. is set at 700, Dr. Patsy Thompson replied the Americans made a math error. And it seems to me that Harper muzzled only some scientists, not all of them.

This Halloween what was really scary was today's electricity cost increase, the January 1 cost increase and that 10-year-old at your door trick-or-treating gets old people's provincial data and old people's nuclear waste. The nuclear industry costumed in green and claiming it is clean and cheap.

It seems that entities are divided up by what I would assume to split blame up, but Bruce OPG nuclear waste management of Ontario, they burn low-level nuclear waste sending its smoke up a smoke stack, Pickering leaks and the Bruce facility can't seem to still find the source of a migrating tritium plume contaminating water test wells with levels as high as 50,000 bequerels per litre.

So the answer is not to extend the licence durations and a little bit of public input. It seems to me that's exactly what's needed, is more public input.

**THE PRESIDENT:** Thank you.

Question...?

Thank you. Thank you for your intervention.

**MR. ARCHER:** I don't know why you never ask an anti-nuclear opponent questions and you only seem to ask proponents questions. You have lots of questions for pro-nuclear presenters.

**THE PRESIDENT:** I'd like to move to the next submission which is an oral presentation by Dr. Bereznai, I'm sure I'm mispronouncing it, Bereznai, from the University of Ontario Institute of Technology as outlined in CMD 15-H8.83.

The floor is yours, sir.

**CMD 15-H8.83**

**Oral presentation by**

**George Bereznai, University of Ontario**

**Institute of Technology**

**DR. BEREZNAI:** Thank you, Dr. Binder and Commissioners.

My name is George Bereznai, I'm a professor in the Faculty of Energy Systems and Nuclear Science at the University of Ontario Institute of

Technology that is located in nearby Oshawa.

This evening I would like to say a few words to explain why I think that it is critically important for the CNSC to approve OPG's application for the renewal of the Darlington power reactor operating licence.

I will briefly summarize the role of nuclear power plants such as Darlington nuclear generating station to meeting Ontario's energy needs and doing so in a manner that minimizes further contributions to climate change.

For the rest of this century I see four factors as having the most significant impact on the well-being of humanity in general and for the residents of Ontario in particular.

These include demographics and especially the rapid growth and aging of the world's population, urbanization that shows how the majority of people increasingly prefer to live in cities, the growth in energy consumption and especially that of electricity which results from the last two factors as well as from the general desire for human beings to have a standard of living similar to what we enjoy in Ontario and how to achieve and maintain such improved standards of living while at the same time not causing

catastrophic changes to the earth's climate.

It took until the year 1804 for the human population to reach the 1 billion mark. In the next two centuries 6 billion more people were added and currently the growth is at the rate of 1 billion additional people every 12 years, which would double the earth's current population by the end of this century. Another way of looking at this rapid growth is that there are over 75 million people added to the human race each year, which is more than twice the current population of Canada. I think it is evident that such rates of population growth cannot continue much longer.

The principal causes that changed the conditions of human existence in the last two centuries and resulted in this rapid growth of the population have been the industrial, scientific and most recently the information revolutions that resulted in great improvements in the health care of humans leading to much longer life expectancy and, in particular, to much lower infant mortality rates.

Ultimately, the single most critical factor that led to the population explosion has been humankind's access to energy and in particular to reliable and affordable electrical energy. But what

can be done to ensure that the human population does not grow to unsustainable levels?

Population studies have projected that over the next 100 years the rate of growth of the earth's population can be slowed so that it reaches a plateau somewhere around 11 to 12 billion people. Such predictions are based on observations that as regions and countries reach what is typically referred to as being developed, the rate of population growth becomes zero and often turns negative. Therefore, the way for humanity to solve the problems inherent to the continued and rapid population growth is to raise the quality of life in the developing regions of the world to the point at which reproduction rates are the same as in the developed regions.

Studies have shown that there is a close relationship between the levels of per capita electricity consumption and the standard of living enjoyed by people of a given country. Such developed countries as Australia, the U.S., Canada, Japan and several in Europe have high rates of electricity consumption, a high standard of living and, other than for immigration, stable or declining populations, while countries with low standards of living accompanied by low electricity consumption but very

rapid growth in their population are found in some regions of Asia and several on the African continent.

Let me now turn my attention to the sources of electrical generation in three geographical areas: one for the world, one for Canada and one for Ontario.

The source of electrical generation is critically important in determining not only how much electricity is available and at what cost but also the impact that power plants have on the earth's climate. It has been widely recognized that the main factor in climate change is the release of greenhouse gases to the atmosphere, principally carbon dioxide, which is emitted when fossil fuels are burned. Worldwide, some 68 percent of electrical generation relies on fossil fuels. This number is much lower in Canada's case, at 20 percent, and lower still in Ontario, at 13 percent.

When one looks at the data on the contribution of various fuel types to generating electricity in Ontario, it is clear that while wind is an important contributor to generating electricity, but when the wind doesn't blow, it is typically replaced by burning natural gas. As much as wind is promoted as being environmentally benign, the fact is that to a large extent it has to be supplemented by

burning natural gas.

From an environmental as well as a consumer price point of view, I believe that Ontario would be much better off with less wind generation and therefore less of a need to burn natural gas and more nuclear generation.

Looking at the same data, namely the daily and weekly postings of the Independent Electricity System Operator, or IESO, that shows how the demand for electricity is met in Ontario. One is not only that wind is an unpredictable sort of energy but other such so-called renewable energy sources as biomass and solar contribute very little to meeting the demand for electricity in Ontario.

It is particularly important to understand that the bulk of the demand for electricity, made up by a combination of industrial, commercial and residential loads, is present at all times in the form of what is called baseload. Nuclear electric generating stations such as Darlington are critical to supplying this baseload. In Ontario, on most days nuclear power plants generate more than 50 percent of the electricity consumed in our province and are critical to ensuring that electricity is available whenever and wherever needed in the province

and at an affordable price.

Having mentioned residential consumers, I would like to highlight that more than half of the population worldwide and over 85 percent of the people in Ontario have chosen urban over rural living. Apart from cultural aspects, the delivery of healthcare and therefore longer life expectancy enjoyed in such developed countries as Canada are much more readily delivered in urban centres. However, other basics of life, in particular food, require complex and energy-intensive systems to provide for the needs of urban populations. The benefits of urbanization expected by a large majority of Ontario citizens are not possible to realize without a reliable and affordable electricity system.

Many of us remember the blackout in August 2003 that affected all of Ontario and much of the American Northeast. For a few summer days most of us happily coped, although there were some deaths, wasted food and significant productivity slumps caused by the blackout. In Ontario, the vast majority of the people and businesses are utterly reliant on the electricity system to which the Darlington Nuclear Generating Station is a major and very successful contributor.

In summary, it is predicted that global demand for electricity will grow 50 percent by 2050. To continue the use of fossil fuels will lead to a 3.5 to 4°C temperature increase, with catastrophic results. Since the early 1970s, nuclear energy has been key to Ontario's energy security, and industry, commerce and residents all rely on its continued availability. It should be self-evident that cities cannot exist without reliable and affordable baseload supply of electricity. It is clear to me that the increased use of nuclear generation worldwide will be an important contributor to improving humanity's well-being.

For the people of Ontario, the electricity generated by the Darlington Power plant is critical to continue having a high standard of living, and from an economic and high-quality employment point of view, the continued successful operation of Darlington is key to exporting CANDU technology.

For all the reasons presented, I unequivocally support OPG's application for the renewal of the Darlington Power reactor operating licence.

I would like to thank the Commission for the opportunity to present my views on this very

important topic.

**THE PRESIDENT:** Thank you.

Questions? Any questions?

Do you believe- - there is a big conference on climate change coming up in December in Paris. Do you believe that they will reach the same conclusion you have reached?

**DR. BEREZNAI:** I can only hope that our responsible politicians will take the kind of view that I was presenting here, namely that the only way we can slow down the rate of population overgrowth and exhaustion of the resources of this earth and prevent the extinction of certainly most of the biota and perhaps even human life is by finding a way to raise the standard of living of people across the world and through that reduce the population explosion.

**THE PRESIDENT:** Thank you. Thank you for your intervention.

**MR. HOWDEN:** Dr. Binder, before you start the next intervention, we have a bit of information about the survey as well as about the pressure tube research. If we could just provide that on the record to you?

**THE PRESIDENT:** Go ahead.

**MR. JAMMAL:** It's Ramzi Jammal for the

record.

You are correct, Mr. President, last year on March 27, 2014, staff presented to the Commission a dedicated Commission Member Document describing the research and the pressure tube and it is not a cliff-edge effect and this was presented to the Commission in public.

Ms Velshi asked the question about the public opinion poll with respect to the Bruce County. I am quoting from Bruce Power's website, according to their communication plan that they conduct on an annual basis a survey of their community, in specific Bruce County, Grey and Huron County. They conduct a survey by Ipsos Reid on a yearly basis and to date approximately 79 percent are in support of refurbishment of Bruce, which is about four in five respondents, 18 percent are opposing and 3 percent have no opinion.

**MEMBER VELSHI:** Mr. Jammal, I think there is another survey that looks at the province as well.

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

I don't have that information but we will look into that.

**THE PRESIDENT:** It was a recent survey and it was comparing also the United States and Canada. I saw it very recently.

**MEMBER VELSHI:** Yes, last month.

**THE PRESIDENT:** Yes, the last month, either in our press clippings or even in somebody's submissions.

**MR. JAMMAL:** Since we lost the Internet connection- - it's Ramzi Jammal for the record- - we will ask the Ottawa folks to assist us with this one.

**THE PRESIDENT:** Thank you.

**MR. LEBLANC:** Mr. President, if I may, I would just like to correct for the record. You indicated that the presentation by Mr. Archer was under CMD H8.89. It was, rather, under H8.155. Just so we correct this for the record. Thank you.

**CMD 15-H8.88**

**Oral presentation by**

**National Farmers Union, Waterloo-Wellington Local**

**THE PRESIDENT:** Thank you.

So we will move now to the next submission, which is an oral presentation by the

National Farmers Union, Waterloo-Wellington Local, as outlined in CMD 15-H8.88.

I understand that Ms Laepple will make the presentation. The floor is yours.

**MS LAEPPLE:** Thank you for this opportunity to share our experience as food producers after a fallout and concerns regarding the Ontario Power Generation's application for a 13-year licence to refurbish and produce more radioactive waste here at the Darlington Nuclear Station for decades to come.

The National Farmers Union policy on nuclear energy states:

"The NFU is opposed to new nuclear facilities due to the environmental problems associated with storage of radioactive waste and calls on all federal and provincial governments to suspend all development permits. The NFU demands full disclosure and accounting of operating costs, including those costs associated with nuclear waste disposal and decommissioning of existing nuclear plants. The NFU urges

federal, provincial and municipal governments to promote conservation and alternative renewable electrical power generation options such as solar, wind, bio-mass, tidal, co-generation, geothermal... The NFU rejects privatization of energy development and reaffirms support for public ownership of renewable, sustainable energy options."

That's the Policy Statement of November 2008.

As farmers, we work with nature and nature has given us senses for our own protection, vision, smell, taste. We can feel if it's too hot or too cold, but when it comes to radiation from man-made sources, all our God-given senses fail us. We cannot sense if it is in the air, water, our food, cutlery, furniture or the exit sign. Therefore, we rely on you, the Nuclear Safety Commission, to keep us safe from any harm coming from a nuclear power plant like Darlington today and for thousands of years to come. Posting test results a year later just won't do it.

You, on the other hand, expect from us farmers to produce safe and healthy food. No matter your age or position, all your lives depend on what we farmers produce for you. But since fallout from unplanned or accidental radiation is a real threat to the local and global food system, it is time that nuclear regulators such as the CNSC look at the whole picture and bring an end to the waste production with the safe shutdown of each reactor at the end of the lifecycle without refurbishing.

Less than 10 kilometres from my birthplace in Germany, American troops had nuclear warhead stations, from 1983 till 1990, aimed at Russia. These were Pershing II missiles at the Mutlanger Heide and two more stations within 100 kilometres.

Part of the high-security fence at that time consisted of a flock of geese. The power of people demonstrating for years but more so common sense of some politicians removed that threat. Last year, the Mutlanger Heide became one of the largest solar parks in Germany owned by the local utility.

While Pershing rockets were stationed there, another danger came without warning: a toxic cloud spun out by a burning nuclear power plant 2,000

kilometres away, Chernobyl.

Unnoticed radioactive particles fell as a heavy rain on our spring pastures and emerging crops. At first there was silence on how to protect people and livestock. Authorities were simply not prepared. Two days later we were asked to keep all livestock in and use feed from storage, which was at that time of the year in short supply.

In Southern Germany, Austria, Switzerland, farmers at that time had their cows in pasture or were cutting fresh grass to feed. Milk from many producers got contaminated but still was shipped to dairies. No one was informed in time to withhold shipment. Responding authorities soon realized there was not an adequate amount of equipment or training in the townships to locally measure the contamination. Would there be here?

Later, this milk then was transported back and forth through the country in railroad tankers as no one knew how and where to dispose of it. What would we do here today?

We have never seen or heard about any advice to the farming community how to respond to any kind of fallout to protect you, the consumer. Yet, fallout from nuclear accidents have had deadly and

long-lasting consequences on farms and the entire food systems in the past thousands of kilometres away from the accident sites.

We have not seen any mention of any risks to the local or wider food systems in the Darlington licensing application or emergency response plans. The risks that radioactive particles from Darlington could one day land on yours, mine or your children's dinner plate is just too high.

Another risk for the farming community is sharing the road. Our vehicles are much larger than they were 10 or 20 years ago. The tractors are faster, much bigger, and everybody over 16 without even a licence can drive them and we share the roads where you transport the nuclear waste through the countryside to Kincardine.

Another thing, the long-term financial liability of safely decommissioning and storing nuclear waste is another concern. A crash of our financial system is a serious, hard-to-calculate risk as there is no guarantee future generations are willing or have the means to pay for what previous generations have left behind.

Our days and age is like a short but dirty party night, with everyone expecting that the

great-grandchildren will clean up and pay the bill. So why keep producing more nuclear waste when our baseload demand of electricity is already high and the fuel for renewable energy is free to harvest?

We ask that the CNSC reject OPG's licence application for Darlington.

Thank you.

**THE PRESIDENT:** Thank you.

Questions? Dr. Barriault?

**MEMBER BARRIAULT:** Thank you, Mr. Chairman.

Do we have anybody from EMO available today?

**THE PRESIDENT:** No. We will do that- -

**MEMBER BARRIAULT:** I think the questions you are asking are for the Emergency Measures Organization to comment really in the case of fallout on the crops and whatnot, or CFIA, Canadian Food Inspection Agency. Have you spoken to them at all?

**THE PRESIDENT:** But staff, who is responsible for informing the farming community about milk, et cetera, in case of an emergency? We will get into detail when the Office of the Fire Marshal and

Emergency Management will appear in front of us.

**MR. HOWDEN:** Yes. Barclay Howden speaking.

So the province has those responsibilities but our staff is quite familiar with the plans and Mr. Luc Sigouin can provide you some information.

**THE PRESIDENT:** Go ahead.

**MR. SIGOUIN:** Luc Sigouin for the record.

Unfortunately, the representative from the Ontario Fire Marshal's office has left for the day but they will be back tomorrow and they could add additional information for the record for the Commission members and for the intervenor if she is present or can be listening.

But the Provincial Nuclear Emergency Response Plan has specific aspects relating to agriculture and food for protecting ingestion control of the population. There are specific responsibilities laid out for the provincial and federal food and agriculture agencies related to guidance to farmers and the agriculture industry on how to prepare, but also they would be giving advice and recommendations and guidance on how to respond to

the emergency to protect feed, how to manage feed, how to manage the animals and ultimately how to manage ingestion control of foodstuffs and milk and so on.

**MEMBER BARRIAULT:** Thank you.

Is there anybody from OPG who can comment really? Have you made any, I guess, effort really to speak to the farmers? I know you are doing some food testing at present but what would you do in the event of a- -

**MR. DUNCAN:** Brian Duncan for the record.

So, you know, if you look at our EP, our emergency preparedness planning and the work we do with whether it is the provincial nuclear emergency response plan, the emergency management organizations, the Durham organizations, because Durham Region is largely- - there is a large agricultural component in this region and so close to half of the people on my Community Advisory Councils are farmers, for example.

So we are not only in the planning phase. We consult farmers and people from the agricultural sector. I regularly meet with them. They have an opportunity to provide that kind of feedback.

And when we do something like we did

with the Exercise Unified Response, when we do those large drills involving many agencies, aspects of those drills look at what will we do for the agricultural community, what will we do around shelter and what will we do around foodstuffs and livestock.

**THE PRESIDENT:** Thank you.

Dr. McDill?

**MR. DUNCAN:** Thank you.

**MEMBER McDILL:** I just wanted to follow up. We have had occasions in the past where people in the community haven't known what they are supposed to do or what they are expected to do, and we have another situation with exactly the same thing and I think if the intervenor, as a Director of the National Farmers Union, does not feel that there is enough information, then it is probably a legitimate concern.

**MR. DUNCAN:** Brian Duncan for the record.

It certainly is something we have to take and have a look at. I mean it is- -ultimately, the responses and the education are outside of my boundaries of course, are with the provincial agencies, but it's that kind of feedback that is very helpful to us as we do these sorts of drills and as we

do this planning.

We try very hard through a variety of communication mechanisms. We work with these parties, the City of Toronto, the Ontario Fire Marshal and Emergency Management Office to educate and promote, you know, responses, but clearly there is more work to do.

**MEMBER MCDILL:** But a pamphlet was made up for the public. Would there be a role- - if I ask the intervenor, would there be a role for a pamphlet to be sent to the farming communities, the rural growers, the agricultural community?

**MS LAEPPLE:** Yes, that would help.

**MEMBER MCDILL:** Thank you, Mr. Chairman.

**MEMBER BARRIAULT:** Have you had the opportunity to talk to the Canadian Food Inspection Agency? I know they have some specialists who specialize in this area.

**MS LAEPPLE:** Yes. We looked at the Canadian Food Inspection Agency website and they did additional testing after Fukushima for a month or a year, and the results are still from 2012, so there is no information out there that is currently up to date.

**MEMBER BARRIAULT:** Nothing new. Thank

you.

**THE PRESIDENT:** Just one more time. The intervenor mentioned the fact that, if I understand- - if I misunderstood, please explain- - that you are worried about who is going to pay for the cleanup and I just want to reiterate again that my understanding is that the money is already there, it is not going to be given to the next generation. OPG, please confirm, did I get it right?

**MR. DUNCAN:** Brian Duncan for the record.

I want to make sure I understand the question correctly. The money for the decommissioning?

**THE PRESIDENT:** Decommissioning and dealing with the waste.

**MR. DUNCAN:** An ultimate site cleanup and management of the waste. That is correct. You know, as part of the ongoing operation, we of course are setting money aside for that ultimate eventuality.

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

Anybody else?

Last word to you.

**MS LAEPPLER:** I just want to thank you for the opportunity to share our concerns and hope

nothing will happen.

**THE PRESIDENT:** Thank you.

**MR. LEBLANC:** So this ends the oral presentations for this evening. There was going to be an oral presentation from the Greater Oshawa Chamber Of Commerce in CMD 15-H8.144 as well as a representation by Mr. James Ranscombe at 15-H8.89. They both have informed us that they are not available to present and that we should consider their submissions as written only and we will do so when we do some written.

It is 9:26. The Commission would like to take a little stretch break for 5-8 minutes and then do some written submissions until about 10 o'clock and then we will reassess. So we are not done yet but just a little break for five minutes and we will reconvene. Thank you.

**THE PRESIDENT:** Okay.

--- Upon recessing at 9:26 p.m. /

Suspension à 21 h 26

--- Upon resuming at 9:36 p.m. /

Reprise à 21 h 36

**MR. LEBLANC:** So we are going to now

proceed with some of the written submissions following the order as they are in the agenda, starting with the one from Madam Renee Cotton in CMD 15-H8.57.

But prior to starting, I just want to state that many of these written submissions raise the same key concerns or key themes, elements such as the licence length, emergency planning or emergency preparedness, the severe accident scenarios, and those are items that we are going to go into in detail.

So even though the Members may wish to ask some questions on those areas without some of the intervenors who will raise those issues and present them, we will recognize their submission this evening but we may not go into some of those questions unless it is an item that is really unique to that particular intervention, given we are going to deal with them in the next three days.

**CMD 15-H8.57**

**Written submission from Renee Cotton**

**MR. LEBLANC:** So I'm going to start with the submission, as I mentioned, from Ms Renee Cotton and it's CMD 15-H8.57. Do the Members have any questions pertaining to this submission?

Dr. Barriault...?

**MEMBER BARRIAULT:** Thank you, Mr. Chairman.

One of the points that the intervenor raises in her last paragraph on the first page is the question probably of a little more teaching and education in and around KI medication, when and how, and that's a bit different than what we found in the other interventions. So I'm wondering if that is being done. Maybe OPG would care to comment on that.

**MS SWAMI:** Laurie Swami for the record.

We work with our partners in Emergency Preparedness and support the efforts on education around the emergency plan around our facilities on a regular basis and that is true as we have moved into the KI pre-distribution program. There has been even more communication on what KI pills are for and how to use them. So that's all part of the program, as you will, of distributing the materials. There have been brochures provided and a lot of that information is included with them.

**MEMBER BARRIAULT:** Thank you. Thank you, Mr. Chairman.

**THE PRESIDENT:** Thank you.

Monsieur Harvey...?

**MEMBER HARVEY:** (Off microphone)

"After modelling an INSC level 7 accident, Switzerland has arranged for distribution out to 50 km. This is an international best practice..."

Is that the case in...?

**MR. HOWDEN:** Barclay Howden speaking. I'm going to ask Luc Sigouin to respond to that because they have been looking at these practices.

**MR. SIGOUIN:** Luc Sigouin for the record.

So just to confirm that I have understood the question appropriately, it was related to the second last paragraph- -

**MEMBER HARVEY:** Yes.

**MR. SIGOUIN:** - - about the Switzerland modelling an INES 7 accident?

**MEMBER HARVEY:** I wanted to know if this is an international best practice?

**THE PRESIDENT:** The 50 K. The 50 K.

**MEMBER HARVEY:** Well, it's not necessarily the 50 K or the 50 kilometres.

**THE PRESIDENT:** Right.

**MEMBER VELSHI:** Fifty kilometres.

**THE PRESIDENT:** Right.

**MR. SIGOUIN:** So that is correct.

Switzerland has extended their pre-distribution KI to 50 kilometres. Is that an international best practice? It is a very good practice. I would say it is very similar to the practice that has just been implemented in Ontario, where KI has been procured and is available for residents of the 50-kilometre secondary zone. The pre-distribution to that distance is not common around the world and in fact I would say that is probably one of the highest distances for pre-distribution. It is a good practice but I would say that the practice in Ontario is also an international very good practice.

**MEMBER HARVEY:** Thank you.

**THE PRESIDENT:** Go ahead.

**CMD 15-H8.58**

**Written submission from**

**Peter Tabuns, MPP for Toronto-Danforth**

**MR. LEBLANC:** The next submission is from Mr. Peter Tabuns, MPP for Toronto-Danforth, in CMD 15-H8.58.

Any questions?

**CMD 15-H8.59**

**Written submission from**

**GE Hitachi Nuclear Energy Canada**

**MR. LEBLANC:** As there are no questions, the next submission is from GE Hitachi Nuclear Energy Canada in CMD 15-H8.59.

Questions?

**CMD 15-H8.60**

**Written submission from Lorraine Roulston**

**MR. LEBLANC:** The next submission is from Ms Lorraine Roulston in CMD 15-H8.60.

No questions? All right. Madam Velshi, any questions? No? Okay.

**CMD 15-H8.61**

**Written submission from Ioana Antohe**

**MR. LEBLANC:** The next submission is from Ioana Antohe in CMD 15-H8.61.

**CMD 15-H8.62**

**Written submission from  
Granville Anderson, MPP for Durham**

**MR. LEBLANC:** The next submission is  
from Granville Anderson, MPP for Durham, CMD 15-H8.62.

**CMD 15-H8.63**

**Written submission from Thomas Lawson**

**MR. LEBLANC:** The next submission is  
from Mr. Thomas Lawson, CMD 15-H8.63.

**CMD 15-H8.64**

**Written submission from  
Environmental Earth Angels**

**MR. LEBLANC:** The next submission is  
from Environmental Earth Angels, CMD 15-H8.64.

**CMD 15-H8.65**

**Written submission from Don Ross**

**MR. LEBLANC:** The next submission is  
from Mr. Don Ross, 15-H8.65.

**CMD 15-H8.66**

**Written submission from the  
Orono Crown Lands Trust Board**

**MR. LEBLANC:** The next submission is from the Orono Crown Lands Trust Board, CMD 15-H8.66.

**CMD 15-H8.67**

**Written submission from the  
Port Hope & District Chamber of Commerce**

**MR. LEBLANC:** The next submission is from the Port Hope & District Chamber of Commerce, CMD 15-H8.67.

**CMD 15-H8.68**

**Written submission from  
Voices for Earth Justice**

**MR. LEBLANC:** The next submission is from Voices for Earth Justice, CMD 15-H8.68.

**CMD 15-H8.69**

**Written submission from BettyAnne and Al Bod**

**MR. LEBLANC:** The next submission is from BettyAnne and Al Bod, CMD 15-H8.69.

**CMD 15-H8.70**

**Written submission from Sarah Hutchinson**

**MR. LEBLANC:** The next submission is from Sarah Hutchinson, CMD 15-H8.70.

I should just mention that the submission from Voices for Earth Justice was 15-H8.68 and from BettyAnne and Al Bod was 15-H8.69.

So there are no questions for H8.70 and Ms Sarah Hutchinson.

**CMD 15-H8.71**

**Written submission from H. Douglas Lightfoot**

**MR. LEBLANC:** I will go to the next one, which is a submission from Mr. Douglas Lightfoot, CMD 15-H8.71.

Madam Velshi...?

**MEMBER VELSHI:** So this again is

around public opinion with respect to nuclear power and on page 3 there is a reference that amongst half the general public in Canada there is disfavour for nuclear energy.

Maybe staff can comment on- - I think it's a CNN recent poll, I don't know how recent that is, and I understand Mr. Jammal has been able to track down the poll I was talking about, so maybe you can update us on that as well.

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

Two things. I have to verify the accuracy before I give you the answer with respect to this intervention. However, we were able to find the information associated with the polling, that actually it speaks about a shutdown of a reactor in the U.S., in Massachusetts, due to economic reasons.

However, the article itself speaks about the support and decided pollsters in Ontario, who were 81 percent of the decided Ontarians, support refurbishment and that covered the whole province, GTA and outside the GTA, and 9 percent are strongly opposed, but I will verify with respect to the specificity of this intervention.

But definitely you were correct,

Ontario in general represents 81 percent of the decided persons who were polled with respect to the refurbishment.

**THE PRESIDENT:** Anybody else?

I have a question. On page 2, the paragraph, one before last:

"Fast reactors are much more fuel efficient ... and will eventually replace thermal reactors."

I would like to hear, you guys are planning this for the next 30 years. Is it likely to happen during your refurbishment time horizon? Is that coming over the horizon? OPG?

**MR. DUNCAN:** Brian Duncan for the record.

There are several nations that are looking at other reactor technologies, including fast reactors. We don't really see that in sort of the short term, in the next couple of decades certainly in Ontario.

**THE PRESIDENT:** Is it true that if they are more efficient they also- - I mean the idea is they produce less waste. Is that normally correct? Is that the idea behind them?

**MR. DUNCAN:** Brian Duncan for the

record. I am going to have my Chief Nuclear Engineer answer that one. Mr. Woods.

**MR. WOODS:** For the record, Steve Woods.

The type of reactor designs that are being contemplated here allow for a closed fuel cycle as opposed to the open fuel cycle which we employ currently. So from that perspective, yes, they are more efficient in terms of you can consume all of the nuclear material if you have sufficient time to do so.

**THE PRESIDENT:** Wouldn't that be wonderful if they can actually do this?

**MR. WOODS:** That would be wonderful and that is going to be the Generation 4 reactor which we haven't seen yet. It hasn't been proven commercially at this point.

**THE PRESIDENT:** Okay.

**CMD 15-H8.72**

**Written submission from Larry Wiwchar**

**MR. LEBLANC:** The next submission is from Larry Wiwchar at CMD 15-H8.72.

**CMD 15-H8.73**

**Written submission from Lois Banks**

**MR. LEBLANC:** The next submission is from Lois Banks, CMD 15-H8.73.

**CMD 15-H8.74**

**Written submission from Margaret Forsythe**

**MR. LEBLANC:** The next submission is from Margaret Forsythe, CMD 15-H8.74.

Madam Velshi?

**MEMBER VELSHI:** At the end of page 1, in the last paragraph, the second sentence, the intervenor says:

"As well we do not have a comprehensive risk assessment for the Darlington Power Stations."

I'm not quite sure what she may be referring to. Are these the probabilistic risk assessments, the deterministic? Any idea? Staff?

**MR. HOWDEN:** Barclay Howden speaking.

I'm not sure exactly but I think the intervenor refers to five years and I think it might be the fact that we require the safety analysis to be

updated on a five-year basis.

As you know, we have introduced two new regulatory- - not new, updated regulatory documents, one on deterministic safety analysis and the other on probabilistic safety analysis. Both of those are on a five-year cycle. So as the next set of analyses are done, they are done according to that schedule and then pulled together.

So I would say there is a comprehensive one today and they just continue to be updated over time. So I think that's what they may be asking.

**THE PRESIDENT:** I also have a question for the paragraph before that. I found it very interesting, this comment:

"As well CNSC ... Commissioners are only appointed for a 5 year terms. They should be doing a review of each plant at least 2 times in their term, so they can be well informed..."

That's a pretty good argument for a five-year cycle. Staff?

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

Sir, the Commission Members review the performance of reactor plants and sites on a yearly basis through the Regulatory Oversight Report that we present to you. So it is more frequent than twice in five years.

**THE PRESIDENT:** Thank you.

**CMD 15-H8.75**

**Written submission from Lorraine Mazzocato**

**MR. LEBLANC:** The next submission is from Lorraine Mazzocato at CMD 15-H8.75.

**CMD 15-H8.76**

**Written submission from  
Clarrington Museums and Archives**

**MR. LEBLANC:** The next submission is from the Clarrington Museums and Archives, CMD 15-H8.76.

**CMD 15-H8.77**

**Written submission from  
Big Brothers Big Sisters of Clarington**

**MR. LEBLANC:** The next submission is from Big Brothers Big Sisters of Clarington, CMD 15-H8.77.

**CMD 15-H8.78**

**Written submission from Cameco Corporation**

**MR. LEBLANC:** The next submission is from Cameco Corporation, CMD 15-H8.78.

**CMD 15-H8.79**

**Written submission from Brian Blomme**

**MR. LEBLANC:** The next submission is from Brian Blomme, CMD 15-H8.79.

And Cameco Corporation was 15-H8.78 and Big Brothers was 15-H8.77.

So there is no question with respect to Mr. Blomme.

**CMD 15-H8.80**

**Written submission from Bruce Balsdon**

**MR. LEBLANC:** I will go to the next submission from Mr. Bruce Balsdon, CMD 15-H8.80.

**CMD 15-H8.81**

**Written submission from Mary Everett**

**MR. LEBLANC:** The next submission is from Mary Everett, CMD 15-H8.81.

**CMD 15-H8.95**

**Written submission from Aecon Group Inc.**

**MR. LEBLANC:** The next submission is from the Aecon Group Inc., CMD 15-H8.95.

Did I miss one?

**THE PRESIDENT:** I have 15-H8.89 next.

**MR. LEBLANC:** That is one that has been rescheduled right at the end.

**CMD 15-H8.96**

**Written submission from Durham College**

**MR. LEBLANC:** So the next one will be the submission from Durham College, CMD 15-H8.96.

**THE PRESIDENT:** Wait, wait, wait, we haven't done Aecon yet.

**MR. LEBLANC:** Oh, you had a question on Aecon?

**THE PRESIDENT:** Yes. Do you have a question? Okay.

**MR. LEBLANC:** So Durham College, CMD 15-H8.96.

**CMD 15-H8.97**

**Written submission from Michelle Simeunovich**

**MR. LEBLANC:** The next submission is from Michelle Simeunovich, CMD 15-H8.97.

**MEMBER McDILL:** I have one. Some of these questions I think can be deferred until tomorrow, Wednesday.

**THE PRESIDENT:** Yes. There are some great numbers here about evacuation time, et cetera, that I really would like the Durham Regional Nuclear

Emergency Response Plan and the Durham people and the Office of the Fire Marshal to be able to answer. So we will have to remember to raise them in terms of how fast they can evacuate the 20-kilometre zone. Okay.

**MR. LEBLANC:** And just so we remember, they also may be accompanied or at least could access the Ministry of Transportation in terms of evacuation route.

**THE PRESIDENT:** Right. And also the sheltering, yes.

**MR. LEBLANC:** Yes. And they are all supposed to be available tomorrow and Wednesday, but particularly Wednesday in terms of the Emergency Management.

**THE PRESIDENT:** Okay.

**CMD 15-H8.98**

**Written submission from Brad Blaney**

**MR. LEBLANC:** The next submission is from Brad Blaney, CMD 15-H8.98.

--- Pause

**MR. LEBLANC:** The next submission is- -

**THE PRESIDENT:** Too fast.

**MR. LEBLANC:** Too fast.

**THE PRESIDENT:** Go ahead.

**MEMBER VELSHI:** Well, I don't even know where to start on this but, you know, there are a lot of allegations made and I'm sure staff want to set the record straight on this, so I don't know what's the best way of handling it. Do we go through these 12 points, one by one?

**THE PRESIDENT:** I would suggest that staff make a general remark and you can pick what comment you want to make on which points.

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

To set the record straight with respect to the intervention, there are a lot of allegations being made from competency of CNSC staff to our interaction with other federal regulators and provincial regulators.

For the record, what is being presented here is completely inaccurate and from a transparency perspective the CNSC is one of the most transparent regulators in the world as we speak with respect to the proactive disclosure, access to information, as the Commission is aware and the intervenor will hopefully become aware of the fact

that every reference we have in this CMD is available for the public to review.

**THE PRESIDENT:** Thank you.

Go ahead.

**CMD 15-H8.99**

**Written submission from Pat Rogerson**

**MR. LEBLANC:** The next CMD is from Pat Rogerson, CMD 15-H8.99.

**CMD 15-H8.100**

**Written submission from Deborah A. Beatty**

**MR. LEBLANC:** The next submission is from Deborah Beatty, CMD 15-H8.100.

**CMD 15-H8.101**

**Written submission from Greg Allen**

**MR. LEBLANC:** The next submission is from Greg Allen, CMD 15-H8.101.

**CMD 15-H8.102**

**Written submission from Wendy Hunter**

**MR. LEBLANC:** The next submission is from Wendy Hunter, CMD 15-H8.102.

**CMD 15-H8.103**

**Written submission from  
Joe Dickson, MPP for Ajax-Pickering**

**MR. LEBLANC:** The next submission is from Joe Dickson, MPP for Ajax-Pickering, CMD 15-H8.103.

**CMD 15-H8.104**

**Written submission from George Milne**

**MR. LEBLANC:** The next submission is from George Milne, CMD 15-H8.104.

**CMD 15-H8.105**

**Written submission from Barbara J. Moore**

**MR. LEBLANC:** The next submission is from Barbara Moore, CMD 15-H8.105.

**CMD 15-H8.106**

**Written submission from Janey Edwards**

**MR. LEBLANC:** The next submission is from Janey Edwards, CMD 15-H8.106.

**CMD 15-H8.107**

**Written submission from  
John LaForge from Nukewatch**

**MR. LEBLANC:** The next submission is from John LaForge from Nukewatch, CMD 15-H8.107.

**CMD 15-H8.108**

**Written submission from Susan Hoch**

**MR. LEBLANC:** The next CMD is from Susan Hoch, CMD 15-H8.108.

**THE PRESIDENT:** I think we have dealt with this but I'm looking at the paragraph that starts:

"There is NO SAFE LEVEL OF  
RADIATION..."

And the last sentence:

"Before 1950, 1/6 people got cancer (less than 17%...). Now, with all the radiation in the world, 3/6 people get cancer-60%..."

Staff, do you want to comment on this?

**DR. THOMPSON:** Patsy Thompson for the record. I would ask Dr. Demeter to speak to this issue.

**DR. DEMETER:** Dr. Sandor Demeter for the record.

By tomorrow I will gather some historical data on cancer incidence for you.

The current lifetime incidence of cancer is in the 46-47 percent and I believe that the incidence has remained relatively constant if it is age-corrected, but we have an aging population, so we have an absolute number of increased cancer cases because we have more people surviving into their elderly.

The other interesting thing is that the cancer fatality rate has declined over time because of interventions and therapy. So my understanding, and I will confirm this for tomorrow is that cancer incidents- - some very specific cancer

incidents increase through time because of detection, better detection. But on average cancer rates remain relatively stable except for increased rates in the elderly which we have a larger number of elderly, not because of increased incidents.

**THE PRESIDENT:** So it's because we live longer? Is there a relation?

**DR. DEMETER:** Yeah, the risk of getting cancer increases as you get older and we all have to pass away from something as we get older, so it's either going to be heart disease, cancer or injury which are the big three. And so cancer and heart disease sort of take equal footing as causes of mortality.

**THE PRESIDENT:** So you don't believe it's because of radiation?

**DR. DEMETER:** No, I don't believe it's radiation. I don't.

**THE PRESIDENT:** Thank you.

**CMD 15-H8.109**

**Written submission from Bruce Campbell**

**MR. LEBLANC:** The next submission is from Bruce Campbell, CMD H8-109.

**CMD 15-H8.110**

**Written submission from Graham Lodge**

**MR. LEBLANC:** The next submission is from Graham Lodge, CMD H8-110.

**CMD 15-H8.111**

**Written submission from Melanie Duhamel**

**MR. LEBLANC:** The next submission is from Dr. Melanie Duhamel, CMD H8-111.

**CMD 15-H8.112**

**Written submission from Carolina Rodriguez**

**MR. LEBLANC:** The next submission is from Carolina Rodriguez, CMD H8-112.

**CMD 15-H8.113**

**Written submission from Sandra Halls**

**MR. LEBLANC:** The next submission is from Sandra Halls, CMD H8-113.

**CMD 15-H8.114**

**Written submission from Stacey Snow**

**MR. LEBLANC:** The next submission is from Stacey Snow, CMD H8-114.

Madam Velshi...?

**MEMBER VELSHI:** I'll ask OPG first and then staff can follow up. The second-last paragraph the intervenor says isn't there a greater risk of an accident during the years the units are undergoing refurbishment?

So when it comes to serious accidents is there a greater risk when the plant is shut down?

**MR. DUNCAN:** Brian Duncan, for the record.

When we enter into refurbishment the very first phase is to remove- - offload the core of all fuel. That will be followed by a period where we drain and dry the reactors. So for the majority of the refurbishment period there will essentially be steel shelves. So the risk of an accident during that timeframe is significantly reduced.

**MEMBER VELSHI:** Staff, anything else to add?

**MR. RINFRET:** François Rinfret.

Staff would agree with that position.

**CMD 15-H8.115**

**Written submission from Natasha MacKenzie**

**MR. LEBLANC:** The next submission is from Natasha MacKenzie, H8.115.

**THE PRESIDENT:** So this intervenor talks in the last paragraph in the first page about Fukushima that had some hot spots as far away as 200 kilometres from Fukushima.

So the question is if you follow the wind and you have those hot spots, how will the emergency plan deal with this? Maybe I will start with OPG and maybe get to staff. Is that a concern?

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

In the emergency plan the protective action levels and work that the province would do would be to consider wind speeds and wind direction and so would make account of that as they develop their protective actions for the province to implement. And so that is part of the overall planning that we would have in place should there be an event, a serious event like that.

I can't speak specifically to hot spots 200 kilometres from Fukushima.

**THE PRESIDENT:** My interest here is, is the emergency plan allowed to follow the wind and provide KI pills or whatever in areas beyond the original plan? Staff?

**MR. SIGOUIN:** Luc Sigouin, for the record.

So under both the provincial and the federal plan there are arrangements that are in place.

They were recently tested in the Exercise Unified Response in 2014 for federal assets from NRCan to do airborne and ground radiation surveys after the plume has been through, after the release to identify areas where there may be hot spots. So that is accounted for in the plan, identifying those hot spots and there are intervention levels, operational intervention levels for action, protective actions to be taken if required in those hot spots.

So the answer to your question, sir, is yes, it is accounted for in the emergency plans, both the provincial and federal level.

**THE PRESIDENT:** Okay. So a related question here on the next page it states here, "but KI pills are not stocked at pharmacies outside the zone,

the zone being the 10 kilometres, i.e. GTA". It says that there is no KI pill in the GTA. Is that correct?

**MR. SIGOUIN:** Luc Sigouin, for the record. So I'll answer on behalf of OFMEM.

No, that is incorrect. There are -KI pills have been purchased and pre-stocked up to 50 kilometres from each of the three nuclear facilities in Ontario and they are available for the public to pick up at any time if they request.

**THE PRESIDENT:** Thank you.

Marc...?

**CMD 15-H8.116**

**Written submission from Marilyn McKim**

**MR. LEBLANC:** The next submission is from Marilyn McKim, H8.116.

**CMD 15-H8.117**

**Written submission from**

**Women's Healthy Environments Network (WHEN)**

**MR. LEBLANC:** The next submission is from Women's Healthy Environments Network or WHEN, CMD H8.117.

**CMD 15-H8.118**

**Written submission from Jacqueline Wakefield**

**MR. LEBLANC:** The next submission is from Jacqueline Wakefield, H8.118.

**CMD 15-H8.119**

**Written submission from Lorraine D'Antonio**

**MR. LEBLANC:** The next submission is from Lorraine D'Antonio, H8.119.

**CMD 15-H8.120**

**Written submission from Julia Levin**

**MR. LEBLANC:** The next submission is from Julia Levin, H8.120.

**CMD 15-H8.121**

**Written submission from Michelle Boigon**

**MR. LEBLANC:** The next submission is from Michelle Boigon or Boigon, H8.121.

The next submission, Mr. President, I

think you want to introduce tomorrow in the context of- - that was from the CANDU Owners Group so we are going to move it.

**THE PRESIDENT:** Okay.

**MR. LEBLANC:** We are going to deal with it tomorrow.

**CMD 15-H8.123**

**Written submission from Travis Turner**

**MR. LEBLANC:** The written submission- - the next one is from Travis Turner, CMD H8.123.

**CMD 15-H8.124**

**Written submission from  
Uniform Durham Regional Environment Council**

**MR. LEBLANC:** The next submission is from Uniform Durham Regional Environment Council, H8.124.

**CMD 15-H8.125**

**Written submission from Matthew Rushton**

**MR. LEBLANC:** The next submission is from Matthew Rushton, H8.125.

**CMD 15-H8.126**

**Written submission from  
Whitby Chamber of Commerce**

**MR. LEBLANC:** The next submission is from Whitby Chamber of Commerce.

**CMD 15-H8.127**

**Written submission from  
Ajax-Pickering Board of Trade**

**MR. LEBLANC:** The next submission is from the Ajax-Pickering Board of Trade, H8.127.

And the Whitby Chamber of Commerce was H8.126.

**CMD 15-H8.128**

**Written submission from Susan Larsh**

**MR. LEBLANC:** The next submission is from Susan Larsh, CMD H8.128.

**CMD 15-H8.129**

**Written submission from Judith Cockman**

**MR. LEBLANC:** The next submission is from Judith Cockman, CMD H8.129.

Dr. McDill...?

**MEMBER McDILL:** There is a comment in this one. We are doing 129, right? I am trying to keep up.

"I have since learned that Darlington sits on a fault line and with earthquakes caused by fracking, profliterating..."

Et cetera. Perhaps we can address this again with the seismic issue? I don't imagine he is online.

**THE PRESIDENT:** Well, maybe staff can but is there any fracking anywhere near Darlington that's going on now? Anybody is aware of that?

OPG..?

**MR. DUNCAN:** Brian Duncan, for the record.

There is none that we're aware of. No, we don't believe there is.

**THE PRESIDENT:** Staff...?

**MR. HOWDEN:** Barclay Howden speaking. We looked at this in terms of whether their fracking is used within the oil and gas industry and at present, to the best of our knowledge, there isn't any in the Darlington area. It's expected, because there is probably no deposits in the area, that there wouldn't be fracking there in the future.

**CMD 15-H8.131**

**Written Submission from  
Bruce Peninsula Environment Group**

**MR. LEBLANC:** The next submission is from Bruce Peninsula Environment Group, H8.131.

**CMD 15-H8.132**

**Written Submission from John Herda**

**MR. LEBLANC:** The next submission is

from John Herda, H8.132.

**CMD 15-H8.133**

**Written Submission from Belinda Cole**

**MR. LEBLANC:** The next submission is from Ms Belinda Cole, H8.133.

**CMD 15-H8.134**

**Written Submission from William Shore**

**MR. LEBLANC:** The next submission is from William Shore, H8.134.

**CMD 15-H8.135**

**Written Submission from Dwayne E. King**

**MR. LEBLANC:** The next submission is from Dwayne E. King, H8.135.

**CMD 15-H8.136**

**Written Submission from Jutta Splettstoesser**

**MR. LEBLANC:** The next submission is from Ms Jutta Splettstoesser, CMD H8.136.

**CMD 15-H8.137**

**Written Submission from Eleanor Ward**

**MR. LEBLANC:** The next submission is from Eleanor Ward, H8.137.

**CMD 15-H8.138**

**Written Submission from  
Douglas Saunders, Clear Path Solutions**

**MR. LEBLANC:** The next submission is from Douglas Saunders from Clear Path Solutions, H8.138.

**CMD 15-H8.139**

**Written Submission from Dennis Wharton**

**MR. LEBLANC:** The next submission is from Mr. Dennis Wharton, H8.139.

**CMD 15-H8.140**

**Written Submission from Swith Bell**

**MR. LEBLANC:** The next submission is

from Swith Bell, H8.140.

**CMD 15-H8.141**

**Written Submission from Alec Adams**

**MR. LEBLANC:** The next submission is from Alec Adams, H8.141.

**CMD 15-H8.142**

**Written Submission from Monica Vida**

**MR. LEBLANC:** The next submission is from Ms Monica Vida, H8.142.

**CMD 15-H8.143**

**Written Submission from Kelly Clune**

**MR. LEBLANC:** The next submission is from Ms Kelly Clune, H8.143.

**CMD 15-H8.153**

**Written Submission from Trixie Deveau**

**MR. LEBLANC:** The next submission is a written submission from Trixie Deveau, H8.153.

**THE PRESIDENT:** No, not in ours. Next one is- -

**MR. LEBLANC:** Which one did you have?

**THE PRESIDENT:** Yeah, okay.

**CMD 15-H8.154**

**Written submission from  
several individuals (letter writing campaigns)**

**MR. LEBLANC:** Then at H8.154, this is where we've aggregated- - consolidated the written submissions from two- - from several individuals, but coming from two letter-writing campaigns. Those letters address a lot of the issues that we will be discussing in the next three days, and in that context, we have aggregated them.

So Mr. President, do I need to read out the names, or is it sufficient that they are already there for the record?

**THE PRESIDENT:** They will appear in our- - in the proceeding. They- -

**MR. LEBLANC:** Not really.

**THE PRESIDENT:** They're not on the record?

**MR. LEBLANC:** They're on the record,

yes.

**THE PRESIDENT:** Yeah. So where will this record be put?

**MR. LEBLANC:** Well, on the record, if somebody asks for a copy, we'll provide it to them.

**THE PRESIDENT:** With those names.

**MR. LEBLANC:** So we'll list them in an appendix to make sure that they're available.

**THE PRESIDENT:** Yeah, that's what I meant. Right.

**CMD 15-H8.159**

**Written Submission from Christine Koenig**

**MR. LEBLANC:** So the next submission is from Christine Koenig, CMD H8.159.

--- Pause

**CMD 15-H8.161**

**Written Submission from Curtis Bennett**

**MR. LEBLANC:** The next submission is from Mr. Curtis Bennett, CMD H8.161.

**THE PRESIDENT:** Hold on.

**MEMBER VELSHI:** I don't even know if I

have a question. I was kind of puzzled by this submission, so maybe staff can help me.

Is the concern inadequacy of the building code or Darlington's compliance with RFEMF risk, or is there a risk?

--- Pause

**MEMBER VELSHI:** So if we look at the email, which is the last page of the submission, the third paragraph says:

"The Darlington power plant and others are not designed to accommodate high penetrating RF electromagnetic fields."

Is that a risk that one should be concerned about?

**MR. HOWDEN:** So Barclay Howden speaking.

I don't have the detailed Q and As with me right here, but the- - we did review this submission, and we didn't see an issue with it.

The buildings are built to the Building Code.

The intervenor started off by saying that this wasn't someone trying to sell their services, but it appears to be a demonstration of

they're trying to raise a concern and reviewing with it- - I know the Secretary had spoke with the person to try to get more clarity on what they were trying to do and, to us, it's not 100 percent clear exactly what their intervention is about.

But with regard to the Building Codes, we're satisfied the Building Codes are solid with respect to RF electromagnetic fields.

**MEMBER VELSHI:** Thank you.

OPG, did you have anything to add?

**THE PRESIDENT:** I think we should take a couple days.

The theory- - it's a militaristic kind of a theory that if somebody explodes one of those electromagnetic weapons, you can disable any electrical device. I think this is what this individual is claiming, that you are susceptible to such an attack.

I remember reading about it somewhere. I don't know where. But I just wondered whether you have looked at this as a remote possibility.

**MR. HOWDEN:** So Dr. Binder, I'd like to just say that Gerry Frappier has additional information. I'd like him to provide the information. Maybe OPG can comment on it.

**THE PRESIDENT:** Go ahead.

**MR. FRAPPIER:** Gerry Frappier.

So yeah, sorry. For whatever reason, I didn't have it on my computer here.

There has been a look at sort of electromagnetic interference and various aspects of that as part of the- - both the screening process on hazards, also on- - you'll remember a similar sort of thing being sort of solar corona effects and that that might have evidence.

I think the key thing on this one here is that if there's things that are disrupting the EM environment of the plant, the main safety systems that are all failsafe on loss of any kind of connectivity that way so that you're going to basically put the power plant into a safe state.

But we found no evidence of anything that- - short of, perhaps, the one you just brought up- - that could have that kind of effect into the- - throughout the nuclear power plant.

**THE PRESIDENT:** OPG, want to add anything?

**MR. DUNCAN:** Brian Duncan, for the record.

Well, we'll certainly take it away,

President Binder, and have another look at it in light of the additional comments.

I have to tell you that my first impression would be very similar to what Mr. Frappier said, that an issue like that would likely shut me down, but I have a lot of capability to manage once I'm shut down. And even as far as the mechanical systems that I have, that would not be affected by something like this.

If I require them, I'd put them in service.

But let us take it away and have a look.

**THE PRESIDENT:** Thank you.

Marc?

**MR. LEBLANC:** So this was the last of the written submissions we're going to consider tonight. That doesn't mean it's the last written submissions. There's two of them that we have set aside today, the one from COG and the one from Dr. Greening.

As well, there were seven scheduled oral presentations that were turned into written submissions from Mr. Ranscombe, McTeague, Azzopardi, the Ontario Clean Air Alliance, the Greater Oshawa

Board of Commerce, Nancy Doucet, and the Parkcrest Tenants' Association. And we will accumulate those and deal with them at the end of the proceedings because they will be all over your books and it will be very difficult to follow.

So we'll organize them so that we can follow them in a more structured fashion.

So I think, Mr. President, that's it for tonight, and we are resuming tomorrow at 8:30 a.m.

**THE PRESIDENT:** Right. So tomorrow, 8:30, we should all be ready to go.

Thank you. Thank you for your patience.

--- Whereupon the hearing adjourned at 10:23 p.m.,  
to resume on Tuesday, November 3, 2015  
at 8:30 a.m. / L'audience est ajournée  
à 22 h 23, pour reprendre le mardi  
3 novembre 2015 à 8 h 30